



DCC Explained Simply, Part 1 - FAQs

FREQUENTLY ASKED QUESTIONS ABOUT DCC

Q. What does DCC Ready, DCC Friendly and all those terms mean?

There are a lot of confusing terms like these out there and unfortunately their meaning is not clear or standardised. Each manufacturer seems to have a different idea of what the terms mean. Generally speaking however they fall into the following categories.

DCC Fitted

This should mean that a DCC decoder has been fitted to the model at the factory and it is ready to control under DCC. However the type of chip may not be one that suits your operation and may in fact be a proprietary type that only works under the model manufacturers own DCC control system. If a model is described as DCC Fitted, check to see if it is also described as conforming to NMRA standards. If so, it is more likely to be compatible with many makes of DCC system.

Sound Equipped

This usually means that the model is also fitted with a DCC decoder.

DCC Ready

Should mean that there is a socket fitted to the locomotive to allow you to plug a decoder into without having to fiddle with the locomotive's wiring. However, dismantling the locomotive may not be that easy and then there is a question of what format the socket takes. There are various types, a 6 pin socket, 8 pin and now a 21 pin socket is beginning to become available in Europe. The most common socket is an 8 pin type, and should conform to NMRA wiring standards.

DCC Friendly

Generally this means that the model can be easily connected to the DCC decoder, but no socket or decoder has been provided in the model. It may not be that 'Friendly' either, and it may require the services of a DCC expert to equip the model with a decoder.

Q. Will my model run better under DCC control?

In most cases the answer to this is yes, provided the model was running well before you equipped it with a decoder. However if the model was running poorly before you equipped it with a decoder, it will definitely not improve its performance.

Q. Can I run my normal DC locomotive on a DCC system?

Technically speaking, yes, if the DCC control system complies with the NMRA standards. Non-standard systems may not provide this capability. The NMRA standard provides a capability for running a single non-decoder equipped model on a system, but only one. My view is don't try it. It can cause too many problems, and most layout operators hate doing it as there is very poor control over the locomotive.

In order to do this, the DCC controller still feeds the track with a normal DCC signal, but the overall on-off ratio is modified so the DC motor will run anyway. The problem with this approach is that the motor in the DC locomotive may not cope well with this signal and the motor can overheat.

Coreless motors, such as the Portescap, should NEVER be used directly on DCC track, and in fact do not work well when fitted via a DCC decoder. The reason is that the coreless motor design has no iron armature,

so the rotor is like a basket of wire. With pulse or digital power, the wire basket heats up very quickly and can destroy the motor.

General Rule: Run DCC equipped locos. on DCC systems. Run DC locos. on DC systems. Do not try to mix the two.

Q. Can I run a DCC equipped locomotive on a plain DC system?

Again yes. But in this case the decoder equipped model will require a higher starting voltage before it begins to move compared to other models on the track. This is because a good model motor may begin to creep along at around 2 volts, but the decoder in the DCC model requires a higher voltage to operate the electronic decoder chip and will not start to move until there is enough voltage on the track to start the chip running.

If you want to run a DCC equipped locomotive on a plain DC system permanently, my recommendation is to remove the decoder if possible. If it is a plug-in decoder, this should be relatively easy to do, providing you insert a blanking plug into the vacant decoder socket.

Another problem is with pulse-width control DC controllers. The DCC locomotive will see the pulses as potential control pulses and may behave erratically. So no DCC locomotives on pulse-power controllers.

And another potential problem is with feedback DC controllers, again the DCC equipped locomotive may behave erratically.

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Q. If I convert to DCC, can I still use my high-frequency track cleaner circuit?

No, absolutely not. These devices produce a signal that is similar to the DCC control system and will only confuse the decoder. From an electrical point of view, I have very strict reservations about these devices anyway as I believe they cause pitting in the surface of the rail and locomotive wheels that eventually leads to poor performance.

Q. Is DCC more sensitive to dirt on the track?

Not really, clean track and wheels is important no matter what system you use. However in recent times many new locomotives are now being brought out that have 'all-wheel pickup', and this helps the performance of models in either system.

Remember that you need to clean the wheels of other non-locomotive rolling stock too, as it can spread dirt around the track too. There are a lot of theories about using light oil or powdered graphite to improve the power collection on layouts, but for everyone that swears in favour of these methods there is someone who found no improvement using them.

My view is that all plastic wheels on rolling stock should be replaced with metal wheels and the best wheel materials are stainless steel or nickel silver. Abrasive cleaning of track or wheels should be a last resort, simple cleaning with alcohol does the job very well.

Q. I Have too many locomotives to convert to DCC. It would cost me a fortune

OK, but do you use all those locomotives at present? How many are stored away and not really used? How many are not in good operating condition? This is an argument frequently brought up to argue against converting to DCC. I would not bother arguing this point with someone, because it indicates they really do not want to convert to DCC. If they are that negative about DCC, then it is probably best that they do not convert at all.

Decoders are cheap these days. You could not buy the individual parts to build one for the money they charge, and they are especially cheap when factory-fitted to a model. So a gradual re-equipping of a large fleet is quite possible. You can even negotiate bulk purchases from some suppliers to further reduce costs.

And once you have converted one model, many modellers find it was not as hard as they originally thought, and the rest of the fleet follows soon after.

Q. Why should I have to pay for a model that has DCC on-board when I don't use it?

The cost of the decoder in that model has been heavily subsidised by the rest of the model, so you are getting a bargain. But if you don't want the decoder in the model, remove it. This is quite often easy to do. Although manufacturers are currently offering some models with or without decoder, eventually those models will arrive fitted with a decoder anyway.

Whether you like it or not, the majority are embracing DCC, and future models will be fully equipped with DCC and sound as a standard feature.

Q. I've bought an engine fitted with a DCC chip, and it runs well on DCC. It will not move on DC. Can I change this?

Short answer, possibly. Under the NMRA standards, a decoder should be able to operate under DC conditions, but the question is whether the decoder fitted to the locomotive complies with those standards. And of course, remember a DCC locomotive takes a higher starting voltage to get moving than a DC locomotive.

If the decoder is NMRA compliant, then normally DC operation is enabled when you receive the model. To check if the model will respond to DC, you need to look at the value of one of the configuration variables in the decoder, number 29, usually called CV29. The most common value for this variable is 38, if it is say 34, then DC operation is not switched on. Try reading the value of CV29, add 4 to whatever value you read and program that number back into the decoder.

Q. I have fitted a decoder to my locomotive and now the lights won't work.

Probably one of the most misunderstood areas with fitting decoders. If the locomotive is not 'DCC Ready', then any existing lamps in the model will most likely be no good to you. The manufacturers of locomotives prior to about 2006 would often have used a crude, cheap system of providing a constant brightness headlight using some diodes and 1.5 volt lamps. These lamps cannot be connected as is to a DCC decoder.

There is a simple way to find out if they are 1.5 volt lamps, and that is to connect them to a single 1.5 volt cell, like an AA or AAA. If the lamp glows reasonably brightly, they are 1.5 volt lamps and must be replaced with 12 volt lamps. If on the other hand, the lamps glow very dimly, then they probably are already 12 volt lamps, in which case they will be OK.

You can also fit LED lamps to the model, but you must put a resistor of 680 ohms or more in series with the LED. By series, this means it is connected into one lead of the LED, it does not matter which lead. The other lead of the resistor and the other lead of the LED can then be connected to the decoder. As a general rule, the longer lead of the LED goes to the common or blue wire of the decoder.

There are numerous stories going about that you do not have to put the resistor in the circuit because 'the decoder can work it out'. This is absolutely untrue, decoders cannot work it out. Unless the instructions with the decoder tell you that it is not necessary to add a resistor, you must put one in the circuit yourself.