CV19 =0, the locomotive will respond to commands sent to the decoder address. Else the CV19 value contains a consist address, and the decoder responds to that address. If several decoders have a value in CV19 that is the same, they will all respond to the packet sent for that address.

If you run units back to back, you will need to change CV19 discussed above to reverse the normal direction of one or more of the units such that as the lead unit moves forward and the other unit moves backwards. Add 128 to the value in CV19 to reverse the normal direction of travel. If you run units "elephant" style (both facing the same direction), you will not need to make this adjustment.

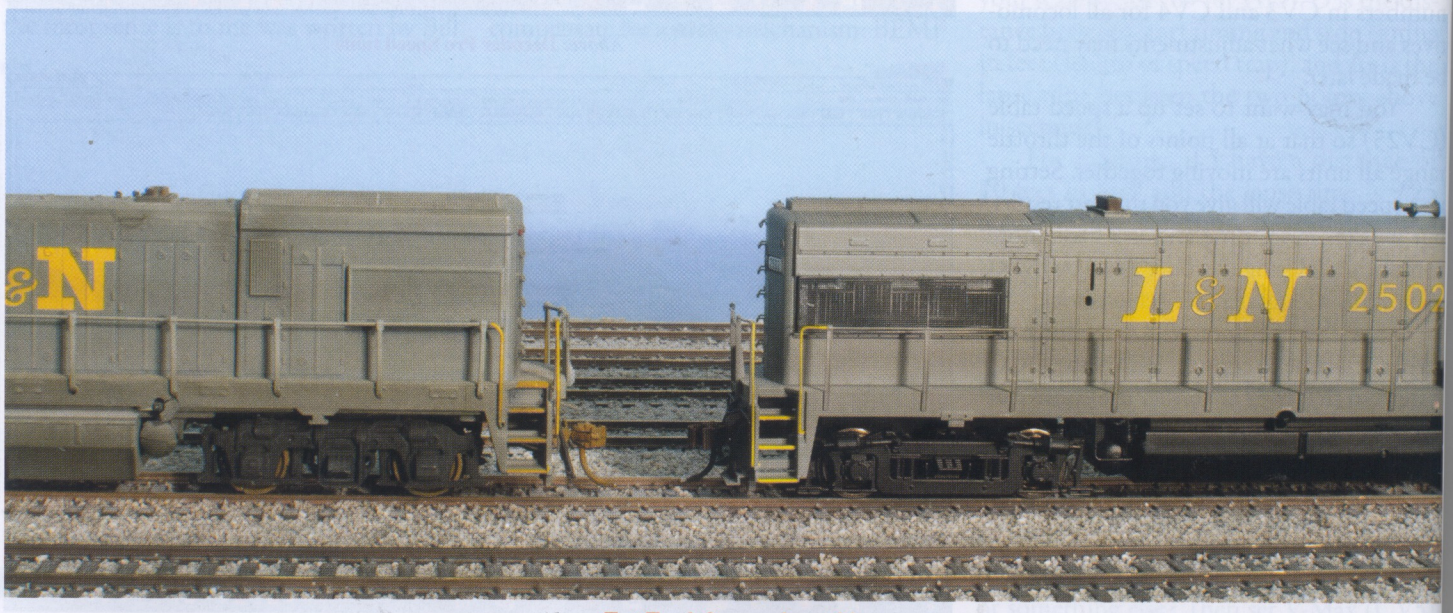
The command station sends one packet to the consist address (not a packet to each locomotive within the consist), and all locomotives respond accordingly. This reduces the amount of communications (packets) sent on the bus and, therefore, the bus responds more quickly as do the locomotives. You do need a decoder with DAC capability to use this method. Some older decoders do not have this ability because they were manufactured before DAC (advanced consisting) protocol was defined or implemented.

With DAC, one can control lights and other output functions independently. For example, you set the front headlight on the lead unit to turn on when moving forward and set the rear headlight to not come on when moving in reverse. Likewise, you set the last unit to turn on the headlight facing out when in reverse and not to turn on the headlight facing the other units under any condition. Depending on how the units are arranged, back to back or head to tail (elephant-style), one chooses the appropriate lights to come on when moving in reverse. You can also have the front headlight come on in forward or reverse, depending on your desires. Additional units in the midst of the consist can be configured to keep the headlights dark regardless of direction by calling up that locomotive address and setting CV21-CV22. You have the flexibility to set several functional outputs to work in a variety of ways. In theory, you could control all number boards to work together or only those on the lead unit. You could have horns on multiple units sound together or only the lead unit. Within CV22, Bit 0 controls F0 forward light, Bit 1 for reverse light, and Bit 2 to Bit 5 for F9 through F12. In CV21, Bit 0 controls F1, Bit 1 F2, and so forth up to Bit 7 controlling F8.

I prefer DAC or Advanced Consisting for the flexibility. You have the options to enable or disable any functional output of any unit within the consist to achieve any result that you desire. Another consideration is the number of slots the command station has for locomotives. With CSAC, each unit within a consist takes one slot in the command station. Under basic consisting, because all locomotives have the same address, the command station sees this as only one locomotive and therefore, only one slot is used. You may have to manage the available slots or upgrade your command station. For a matched set of A-B-A units, Basic Consisting works fairly well.

Some systems make the initial process of consisting pretty easy for CSAC (Universal) consisting. On Digitrax, you have the lead unit on the right throttle and put the unit you wish to add on the left, and then press MODE + on a DT300, or press MU + on a DT400 or DT 402 throttle. However, for DAC consisting, you will have to program each decoder individually. This is a little more effort, but the results are better. With JMRI DecoderPro, this process is relatively easy. The one thing I would prefer that is not available in DAC is to use the lead unit number as the consist address. We are limited to using only the short address 1–128. This is a fair compromise given the other advantages.

At this point, I like to go to the test track and see how things are working. One of the best ways to make this check is to have a large circle of track or a long stretch of track where you can run these units together. My north staging yard was designed to be able to run equipment in a continuous circle to break in and test. It is conveniently located within the walls of my shop. I put units on the track some small distance apart, usually one inch (therefore not coupled), and run them at various speeds forward and backward, observing any changes in the distance between them. Make adjustments and repeat the test until you are satisfied that they are moving together closely enough. I would suggest doing this with two units at a time. Trying to test and adjust more units at one time just gets to be too confusing. Once the first two units are speed matched, couple them together and set the third unit on the track with this pair and repeat as we did above. If you have done things well in the first phase of speed matching, you should have minimal or no adjustments in this phase.



Above: Test Track for speed matching