Tweaking Decoder Performance

If the decoder and motor parameters are nicely matched and the loco control performs to your satisfaction, don't tweak. If the loco performed nicely before decoder installation and you are not satisfied with the way the decoder controls the loco, some tweaking will help. This requires use of S-CAB Throttle's CV mode to change some decoder configuration variables.

The NMRA has defined a long list of decoder configuration variables (CVs), but decoder manufacturers are not obligated to support all CVs.

If you changed the decoder's address during Quick-Start, you have already changed CV#1. There are really only 4 other variables worth experimentation.

Let's review the procedure:

- Switch S-CAB Throttle to CV mode.

- Review operation of the 'C#' key. Press it once, then again, and again while watching the display. Each press and release of 'C#' steps to the next CV in the sequence; 1, 2, 3, 4, 5, 6, 29, 65, and then repeats. These CVs, listed in the table below, are the only CVs that can be edited with the radio CAB.

CV#	Description	Entry Format
CV1	Primary address	1 or 2 digit number
CV2	Starting voltage	% full voltage
CV3	Acceleration rate	1 or 2 digit number
CV4	Deceleration rate	1 or 2 digit number
CV5	Maximum voltage	% full voltage
CV6	Mid voltage	0
CV29	Decoder configuration	0 or 1
CV65	Kick start	1 or 2 digit number

- Review operation of the 'C=' key. With a CV number already selected, press 'C=' and the display will show a default value for the CV. For example, S-CAB suggests 90 (meaning 90% of full motor voltage) as a default choice for CV#5, which means the decoder will use 90% of maximum motor voltage at speed step 28.

- *NOTE: Since S-CAB Throttle is communicating by radio, it has no way to "read" values of decoder CV's, which are available only through track feedback. Default values suggested by the Throtttle are just that; suggested values.*

- Either keep the default value or use the numeric keypad to choose a different value.

- Press the 'Enter/Send' key to transmit the new value to the decoder.

- Switch back to CAB mode and see how the loco performs. Continue this trial and error process until satisfied.

Local or Global Addressing?

Let's use global addressing because its more reliable and works with all decoders. However, be sure to turn off the radios for all decoders except the one to be programmed.

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Change motor starting voltage (CV2)

- Select the loco and make sure it's receiving control commands.

- Turn off radios on all other decoders.

- Switch Throttle to CV mode. The CAB light turns off, the CV light turns on and the display shows 'C' with blank second digit.

- Press 'ALL' key to select global addressing.

- Press the 'C#' key twice. S-CAB displays 'C2', meaning that CV#2 is selected. Since this CV defines starting voltage, it is the CV we want to adjust.

- Press the 'C=' key. Throttle displays '10', meaning 10% of full voltage for speed step 1, It's a good value as a first choice. If you are repeating this process to choose a better value, use the numeric keypad to set the value smaller or greater than 10.

- Press 'Enter' to send the command and watch for a slight jerk of the loco as the decoder acknowledges the command.

- Switch back to CAB mode. Try starting the loco on speed step 1 to see how it behaves. It should barely move. At step 2, it should crawl along nicely. Remember, the decoder provides 28 speed steps, so the first couple of steps don't need to produce large speed changes.

- If not satisfied, repeat the process, using a smaller value if the loco starts with an unrealistic jerk or increasing the value if the loco does not move on speed step 1 or 2.

Change Motor Maximum Voltage (CV5)

Follow the same procedure as for starting voltage, pressing the 'C#' key until display shows 'C5'. Default value is 90%. Since loco speeds at full voltage are usually unrealistically high, values between 70 and 90% are typical. CV5 cannot be set lower than 50%

Change Loco Acceleration or Braking (CV3, CV4)

For acceleration, change the value of CV#3 as follows.

- Switch to CV mode

- Press 'ALL' key to select global addressing.

- Press 'C#' 3 times to display 'C3'

- Press 'C='. Display shows 'U4'

- For more momentum (slower acceleration), enter a number greater than 4. For no momentum, enter 0.

- Press 'Enter/Send' to transmit the value of CV#3 to the decoder.

- Switch back to CAB mode and see how the loco accelerates in response to speed commands

For braking, change the value of CV#4.

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