American Flyer
2-8-8-2 Steam Locomotive
Owner's Manual
DCC Addendum

Featuring

LEGACY
R·A·I·L·S·O·U·N·D·S

LIONEL
CONTROL SYSTEM
LEGACY

DCC operations

DC and DCC operation

Your locomotive will operate on pure DC and DCC. DC operation provides directional control and directional lighting based on track polarity. When operating on DC power, the smoke unit is disabled and the only sounds that are available are the automatic sounds, such as the prime mover (other sounds, including horn and bell, are not controllable). To fully experience the features on your locomotive, a DCC command station is required.

When operating on DC, as the voltage is increased, the sounds and lighting will activate before motion. The motion is delayed to allow direction changes without losing sound or lighting. Simply lower the track voltage unitl the locomotive stops, change the direction switch, wait for the lighting to reverse, and then increase the voltage to activate motion.

When operating under a DCC system, the features are controlled by the numerical Function keys. Both short and long addressing modes are supported, as well as advanced consisting, which is easily configured in the Lionel DCC implementation.

Note! When a locomotive is powered up on the DCC system, the Function keys may not be in "sync" with the locomotive state, and may require a couple of presses to sync the operation. This is an artifact of the DCC systems, and is a common situation with DCC decoders.

The NCE system will need a bit of configuration for optimal performance. Refer to the NCE system manual and the information below.

Under the "Setup Command Station" menu

1. Number of Stop Packets: set to 8 (default)

2. Number of Horn Stop Packets: set to 8 from default of 2

3. Number of Program Packets: set to 8 from default of 4

4. Momentum Multiplier: set to 1 from default of 8

OPTIONAL – set this if you wish to "Quill the Horn or Whistle"

5. Under the "Setup the Cab Parameters" menu: Analog Horn Channel: set any channel from 1 to 9 from default of 0

Note! Be sure to set CV 47 to match!

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DCC Mode Operating Features

The Function keys are similar to the LEGACY touch pad. There are many Function keys on the remotes, mapped to ten physical buttons – F0 to F9. Note that some DCC controllers have additional Function keys above F9.

F0 (0 key)   Toggles Headlight On/Off
F1 (1 key)   Toggles Bell On/Off
F2 (2 key)   Horn/Whistle sound
F3 (3 key)   RPM up (and Startup)
F6 (6 key)   RPM down
F4 (4 key)   Master volume up
F7 (7 key)   Master volume down
F5 (5 key)   Shutdown (and Emergency Stop when moving)
F8 (8 key)   Toggles smoke On/Off
F9 (9 key)   Reset, resets operating modes, re-fueling (only when stopped)
F10 (shift+0)   Sequence Control Trigger (only while stopped)
F11 (shift +1)   Toggles cab light On/Off
F12 (shift + 2)   Toggles strobe light or MARS light On/Off

Setting the locomotive address in DCC mode

The locomotive address may be set by modifying the CVs or by using the locomotive Program/Run switch. Using the Program/Run switch makes ID changes a snap! Simply slide the switch to PROGRAM, enter the loco ID (short or long) and press the Horn/Whistle button (F2). The locomotive will blow the Horn or Whistle, and then the ID is set! Slide the switch back to RUN, and use the selected ID for your loco.

Setting the consist position (CV50) in DCC mode

Another great Lionel feature is CV50, "Consist Position." When creating a consist on a DCC controller, one only gets to enter the default "direction" of travel.Once the consist is created, tedious lighting tweaks are the norm. On the Lionel DCC implementation, simply select each locomotive ID in the Consist (not the consist ID!) and enter CV50 per the following selections, and all lighting, sound masking, and general operations are configured. CV50 values: 1 for lead loco, 2 for mid loco(s), and 3 for end loco.

DCC operations

Lionel Specific CV Settings

Lionel's Manufacturer ID is 73 (The Electric Railroad Co.)
1.   CV 1, Short Address
2.   CV 3, Acceleration Rate
3.   CV 4, Deceleration Rate
4.   CV 7, Code Version
5.   CV 8, Manufacturer ID (73) [write to 08 => full decoder reset]
6.   CV 17 & 18, Long Address
7.   CV 19, Consist Address
8.   CV 29, Operating Modes, see DCC spec.
9.   CV 47, Analog Horn Channel (Quilling)
10. CV 50, Consist Position (1 = Lead, 2 = Mid, 3= End)
11. CV 54, Brake Squeal Sound (set zero (0) to disable or one (1) to enable)
12. CV 58, Control and Consist Filter Setting* (default = 3)
13. CV 59, Speed Step 128 Filter Setting* (default = 5)
14. CV 60, Speed Step 28 &14 Filter Setting* (default = 5)
15. CV 61, Function Groups Filter Setting* (default = 3)
16. CV 62, Config Variables Filter Setting* (default = 3)
17. CV 67 to 94, Speed Table 28 (active for 14 and 28 step mode only)

* Filter valid settings are 1 to 8. The filter settings are used to help prevent dirty track from affecting loco operation by rejecting commands that do not repeat for the selected count within a short period of time. For example, if the loco is on speed step 20 and the user sets speed step 30, the default filter setting of 5 requires five speed step 30 commands to change to speed step 30. Normally commands are repeated often enough in DCC controllers to pass the default filter settings selected.

If your locomotive stops occasionally, increase the filter setting for CV59 and CV60. If the loco does not respond to all speed commands, decrease the filter setting for CV59 and CV60.
   The locomotive supports the CV 19 high order bit for reversing the direction of the locomotive travel. Normally this bit is used in consisting of diesels, however may be used to reverse any locomotive's default direction behavior.

DCC operations

Lionel Specific CV Settings (continued)

CV29 supports the following (default is 18 decimal, 12 hex):

Bit 0 = Locomotive Direction: "0" = normal, "1" = reversed. This bit controls the locomotive's forward and backward direction in DCC mode only.

Bit 1 = FL location: set to "0" in bit 4 to allow Speed and Direction instructions control the FL, "1" = bit 4 in function group one instruction controls FL. The recommended setting is"1".

Bit 2 = Power Source Conversion: Set to"0" = DCC Capable Only. Set to "0", this bit is not supported. However the locomotive will operate on DC only environments.

Bit 3 = Bi-Directional Communications: Set to "0", single direction communication.

Bit 4 = Speed table: In this loco, the Speed Table set by configuration variables 66-95 is always active in 14 and 28 speed steps, and never active in 128 speed steps. Bit 4 is not used.

Bit 5 = "0" = one byte addressing, "1" = two byte addressing (also known as extended addressing) . Both modes are supported.

Bit 6 = Reserved for future use

Bit 7 = Accessory Decoder: "0" = Multifunction Decoder, "1" = Accessory Decoder, this bit is set to "0".

• Set CV29 to 18 (12 hex) for short locomotive address.

• Set CV29 to 50 (32 hex) for extended (long) locomotive address.