

# Lionel Milk Car Mini Commander Installation Guide

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# **OVERVIEW**:

The Milk car is normally operated by the UCS track. When over the UCS track, application of power on the  $4^{th}$  and  $5^{th}$  rails applies power to the solenoid to cycle the milk can eject action.

The Mini Commander HC v2 is required for the Milk car. The Mini Commander HC has one high current driver output for the large coil in the milk car. This driver is on HC-1 only. Be certain to connect the coil to this output.

*Important note:* The Mini Commander HC v2 is a new version of the Mini Commander HC. The Mini Commander HC had the high current driver on the HC-2 output. This has been moved to HC-1 for DCS compatibility. A coil coupler may be optionally controlled by the HC-2 output.

# **INSTALLATION PROCESS SUMMARY:**

To free yourself from the UCS, you will need to modify one of the trucks on the car to "collect" power from the 3<sup>rd</sup> (center) rail for the Mini Commander to activate the eject solenoid. A new power pickup roller / coupler is included in the kit. This is attached by bending over small tabs around the axel. The second slider shoe, nearest the coil motor, is not used, and the wire may be insulated and left free inside the milk car, or the wire may be cut close to the shoe. Insulating the wire will allow easier reversal of the upgrade, should it be desired.

The truck that will have the power collector installed will need a "common" wire attached. It is suggested to solder this to the truck frame after baring some metal. Usually there is a small tab on the frame on the opposite side of the coupler to attach a wire.

After mounting the Mini Commander, simple configuration is done to set the ID and select the operating characteristics. A configure / run switch may be installed in the car, or Soft Set Technology<sup>™</sup> may be used to set the ID. A small hole can be made and momentary pushbutton may be installed to act as a configure / run switch. The switch that seems to look nice, and works well is a Radio Shack #275-1571. Programming is covered later in the document.

# **INSTALLATION SEQUENCE:**

Start by removing the car shell noting the position of the milk can load door. This door is held in place by the shell body when the car shell is on. Remove the slider wires from the eject solenoid, and prepare the ends of the coil wires as shown below. The wire that is closest to the coil from the slide shoe can be insulated with a piece of heat shrink tubing and secured in the car as not to interfere with the operating mechanism.



Coil wires

Remove the truck on the side of the car that is **not** under the eject mechanism.

Remove the slider shoe / coupler mounting plate by bending up the 4 tabs at each axel end. Scrape a bit of paint away from the frame as shown below.

Cut the super flex wire included in the kit in 2 equal lengths. Solder one end of the wire to the truck as shown below. Use a fairly high wattage iron to heat the truck for a secure connection. This wire will be connected to the Mini Commander "GND" terminal.



Scrape paint and attach wire here for "common"

Next, test fit the new roller/coupler assembly on the truck. If the tabs circled below impact the wheels, you will need to cut them off or bend them over. The "fast angled" wheel sets typically require this modification. Do not cut off the mounting tabs!



Attach the remaining length of super flex wire to the new plate that has the 3<sup>rd</sup> rail collector and coupler. It is best to sand the tab with lightweight sandpaper to clean the tab prior to soldering. Heat-shrink the wire where it attaches to the roller.

Attach this new plate to the truck by bending the tabs over the axle (not too tightly), and re-attach the truck to the chassis. Make sure the wheels turn freely after mounting the new roller/coupler assembly.

Next route the wires back up through the chassis hole grommet to the topside of the chassis.

Next, we will locate the double stick tape that will mount the Mini Commander to the chassis. Prepare two (2) pieces of double stick the same size as the Mini Commander. Two layers are best to raise the Mini Commander up off the chassis to prevent the spring from touching the bottom side of the Mini Commander HC. Attach the double stick as shown below, making a notch for the mechanism to operate:



Possible location of the Configure / Run switch

Verify that the mechanism does not impact the tape *before* final attachment of the double stick. Be certain the surface of the chassis is clean to secure a good bond. Place the tape (and, subsequently the Mini) about 1/8" away from the chassis edge to clear the car body interior.

If you wish to attach a Configure/Run switch, now is a good time to drill the hole. A suggested location is shown above at the "Star".

Peel the double stick and mount the Mini HC to the double stick tape, orient as shown.

Cut a wire harness to the appropriate length to reach from the Mini Commander, and attach to the coil wires along with a  $4.7\mu f/50v$  non-polarized capacitor (supplied) across the eject solenoid. Heat-shrink the solenoid coil connections.

Attach the power pickup wires from the truck, making sure the 3<sup>rd</sup> rail collector wire is connected to "HOT" on the Mini Commander.

Wire the Configure/ Run switch if utilized. See the below picture to clarify the necessary wiring. Wiring harnesses are available for this feature, please contact <a href="mailto:support@electricr.com">support@electricr.com</a> for assistance.

An extension antenna is included, however it is rarely needed for this type of installation. If operation is erratic, you can enhance the signal reception by using the supplied antenna extension. The extension is a single wire with a connector that plugs over the "ANT" pin. Place the antenna wire in a place that will not be in the way of the operation of the car, it is fine to shorten the wire. However, if you shorten it too much, it will not help the reception.



Attach the Configure/Run switch to pins 1 & 2 here if installed.

# **INSTALLATION COMPLETED**

# **CHECKOUT and CONFIGURATION:**

Assuming you have the wiring reviewed, power up the car on the track. The Mini Commander HC is set to ACC one (1) when shipped.

#### CHECKOUT:

Although the configuration is not done yet, you can get the car to partially operate by selecting ACC + 1 + AUX1. Distinct solenoid activation should occur, most likely a bit too strong. If the solenoid does not activate or gets stuck closed, immediately remove power from the car. If this is OK, proceed to configuration, otherwise check the wiring, and as needed contact The Electric Railroad Company for technical support.

#### CONFIGURATION:

Three methods may be used to configure the Mini Commander HC in this install.

- 1) Configuration may be done by using Soft Set Technology. Using this method eliminates the need for the presence of a configure/run switch.
- 2) A jumper (included) may be placed on P1, pins 1 & 2 to enter configuration mode if problems are experienced with Soft Set mode. The shell will need to be removed to access the Mini Commander board in this case.
- 3) A configure / run switch may be used. This switch can be momentary (preferred) or an on/off type switch.

**IMPORTANT NOTE**: The configure/run mode of operation is determined at power on of the Mini Commander HC. Once sampled, the state is maintained. Thus a momentary switch is quite useable. Simply power up the car holding the push button active, then you may release. Configuration mode will be active until the power is cycled. The power must be removed 10 seconds to observe a jumper or switch state change. (on or off)

Your installation may use an ENG ID or ACC ID from the CAB-1. DCS will require the ENG ID selection. Pick a number for the ID, and do one of the following:

### **USING SOFT SET**

With the car on the track and power applied, configure the Mini Commander HC as follows- waiting 1 second between each SET press. Actually a few extra SETs are a good idea. I usually press it 6 to 7 times!

As ACC: ACC + 1 + SET + SET + SET + SET + SET (Soft Set entry sequence) ACC + ## + SET (where ## is the ACC number you want) AUX1 + 5 + BRAKE + 1 WAIT 10 seconds; do not press any CAB-1 key while waiting.

As ENG: ACC + 1 + SET + SET + SET + SET + SET (Soft Set entry sequence) ENG + ## + SET (where ## is the ENG number you want) AUX1 + 5 + BRAKE + 1 WAIT 10 seconds; do not press any CAB-1 key while waiting.

Now select the car by ACC (or ENG) + ## (the number you entered above) and then press AUX1 to operate the eject action.

If the car is not operating, you will need to redo the configuration sequence. Notice the AUX2 keys are not configured, as AUX2 defaults to coil coupler settings

# **USING a SWITCH or JUMPER**

As ACC.

Power off the track for at least 10 seconds Add the jumper, or activate the switch (close the contacts) Power on the track

ACC + ## + SET AUX1 + 5 + BRAKE + 1	(where ## is the ACC number you want)
As ENG: ENG + ## + SET	(where ## is the ENG number you want)
AUX1 + 5 + BRAKE + 1	

Power off the track for at least 10 seconds Remove the jumper, or open the switch appropriately.

NOTE: the voltage selection ("5" after AUXn) may need to be adjusted for your car. If the operation is sluggish, try 6 or 7 to improve the delivery quality.

#### **OPERATION**:

#### CAB-1

Operation with the CAB-1 is as simple as selecting the ACC or ENG and the ID that you assigned. Pressing AUX1 will activate the milk can delivery.

#### DCS

Operation under DCS can be initiated by adding the milk car as a TMCC engine. When selected, using any of the soft keys (except AX8/9) under the LCD will operate the car.

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