LIGHTING CONTROL continued:

To operate other lighting types when you turn them on in either direction:

Flashing Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 35 in that CV.

Single Pulse Strobe Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 36 in that CV.

Double Pulse Strobe Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 37 in that CV.

Rotary Beacon Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 38 in that CV

Gyra Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 39 in that CV.

Constant Dim Light;
Select the CV for the wire color you want in Worksheet Table 11. Enter 44 in that CV.

To control which lights will operate when the engine is receiving standard DC power:

- The lights connected to: the white and yellow wires equal 1; the green wire equals 2; the purple wire equals 4; and the brown wire equals 8.
- Select CV 13 (Worksheet Table 16) and enter the sum of the lights you want to be active.

To control which lights will operate when the engine is is part of a multiple engine consist:

- Select CV 22 (Worksheet Table 17) and enter the sum of the headlights you want to be active when in consist. The white wire equals 1; and yellow wire equals 2.
- Select CV 21 (Worksheet Table 17) and enter the sum of the other lights you want to be active when in consist. The green wire equals 1; the purple wire equals 2; and the brown wire equals 4.

To return to the preset settings:

- Select CV 30 (Worksheet Table 18) or CV 8 and enter 2. Then turn your power supply off and then turn it on. Your decoder is now as it was when you bought it.

Additional information is available on the web at **www.tcsdcc.com** , or email **tcs@ot.com.**

Compatible with NMRA DCC standards. Made by **TCS** in the USA.

Contact TCS at: P.O. Box 341, 845 Blooming Glen Rd., Blooming Glen, PA 18911
Phone **215-453-9145** Fax **215-257-0735** Email **tcs@ot.com** Web **www .tcsdcc.com**

TCS DCC decoders provide the ultimate in control.

Plain English Programming Guide

Dither creates the ultimate in slow speed control.
Quiet Drive creates smooth quiet engine performance.
Factory Reset is the fast way back to original settings.
Goof Proof no questions asked warranty.

Programming is basically simple. The first thing to do is follow the programming steps required to enter a code into a decoder with your system. They are usually very simple steps and take less than a page to explain. Then just follow the steps in this guide that apply to what you wish to change. The only unusual term is **CV.** A **CV** is just a location to store information, just like a mailbox. To identify each individual CV, they are assigned an address just like the mailbox in front of your residence. In each mailbox you put a code, a number between 0 and 255, which is **decoded** to determine what you want the engine to do.

As you use this guide, record your choices on the worksheet supplied with your decoder. The Worksheet Table where each CV is listed is shown in parentheses () by the CV number. If you do this, you will have a permanent record of your choices and it will help familiarize you with the logic of the worksheet. This is helpful because this guide only deals with the 80% most commonly used choices where the Worksheet for your decoder is a complete listing.

ENGINE ADDRESSING:

To change the address to a number from 1 to 127:

- Select CV 1. (Worksheet Table 2)
- Enter your desired address.

To change the address to a number from 128 to 9,999:

- Select CV 29. (Worksheet Table 1)
- Enter 38.

THEN

- Follow your systems process for four digit addressing.

OR

Example:

Enter the desired engine number on your calculator. → 3155

Divide the desired engine number by 256 →

- Enter the whole number (12) in CV 17. (Worksheet Table 3) → 12.3xx

Multiply the whole number (12) by 256 → 3072

Subtract the result (3072) from the desired engine number → 83

- Enter the result (83) in CV 18. (Worksheet Table 3)

ENGINE ADDRESSING continued:

To run multiple engines at one time from the consist address:

- Follow your systems process for consist addressing.
- If your system has you choose the consist address, enter your desired address between 1 and 127 in CV 19. (Worksheet Table 4)
- If you want an engine to operate in reverse when in consist, add 128 to your address in CV 19. (Worksheet Table 4)

To only program one decoder when you have more than one decoder with the same address:

- See Worksheet Table G (Decoder Lock) in the worksheet provided.

MOTOR CONTROL:

To stop the engine motor when DC current (Analog power) is on the track:

- Select CV 29. (Worksheet Table 1)
- If CV 29 = 6, subtract 4 and enter 2.
- If CV 29 = 38, subtract 4 and enter 34.

To reverse the engine direction when running in forward:

- Select CV 29. (Worksheet Table 1)
- If CV 29 = 2, add 1 and enter 3.
- If CV 29 = 6, add 1 and enter 7.
- If CV 29 = 34, add 1 and enter 35.
- If CV 29 = 38, add 1 and enter 39.

To fine tune slow speed control:

- Set the throttle control just above stop. (1 or 2 percent)
- If the engine is not running slowly, select CV 57 (Worksheet Table 10) and increase it by 5 until some motion is detected. The practical range is 5 to 50, 0 will nullify Dither. In rare circumstances, you may not have motion at 50. In that case, select CV 2 (Worksheet Table 5) and increase it by 5 until motion is detected.
- If the engine is running to fast, select CV 57 (Worksheet Table 10) and decrease it by 5 until it is running slowly. 0 will nullify Dither.
- To super tune slow speed, select CV 56 (Worksheet Table 10) and increase or decrease it by 1 until you find what you like best. Decreasing will make the engine run a little faster but smoother. Increasing will make the engine run a little slower but you will reach a point where it seems to move in steps. 0 will nullify Dither.

To reduce the top speed:

- Select CV 5 (Worksheet Table 6) and try 245 first, then reduce it by 10 at a time until you have slowed the engine sufficiently.

To adjust the rate of acceleration:

- If the engine seems to accelerate faster in the lower half throttle, select CV 6 (Worksheet Table 6) and try 120 first, then reduce it by 5 until you are happy.
- If the engine seems to accelerate faster in the upper half throttle, select CV 6 (Worksheet Table 6) and try 135 first, then increase it by 5 until you are happy.

MOTOR CONTROL continued:

To add momentum when accelerating and decelerating:

- If you want the engine to accelerate at a slower rate to a given speed even though you quickly set your throttle to the final desired speed, set CV 3 (Worksheet Table 7) to a higher value. The higher the value, the slower the rate of acceleration. The practical range is 0 to 30.
- If you want the engine to decelerate (brake) at a slower rate to a given speed or stop even though you quickly set your throttle to the final desired speed, set CV 4 (Worksheet Table 7) to a higher value. The higher the value, the slower the rate of deceleration. The practical range is 0 to 30.

LIGHTING CONTROL:

To add dimming (Rule 17) to the front and/or rear headlights:

- To have a dimmable front headlight when running forward only, select CV 49 (Worksheet Table 11) and enter 8. To have a dimmable front headlight when running in both directions, select CV 49 (Worksheet Table 11) and enter 40.
- To have a dimmable rear headlight when running in reverse only, select CV 50 (Worksheet Table 11) and enter 24. To have a dimmable rear headlight when running in both directions, select CV 50 (Worksheet Table 11) and enter 40.

The light will dim when you press button 4. AND

- To dim the headlight when the engine is stopped, select CV 61 (Worksheet Table 12) and enter 16.
- To have the opposite headlight on and dimmed, select CV 61 (Worksheet Table 12) and enter 32.
- To dim the headlight when the engine is stopped and to have the opposite headlight on and dimmed, select CV 61 (Worksheet Table 12) and enter 48.

To adjust the brightness of the dimmed headlights:

- Some TCS decoders allow you to change the brightness of the dimmed light. The preset value is 15. If you want the light dimmer, select CV 64 (Worksheet Table K) and enter a smaller number. LED's operate nicely on values from 2 to 6.

To operate ditch lights (Using the green and purple wires):

- To have ditch lights operate in forward direction only, select CV 51 (Worksheet Table 11) and enter 10 and select CV 52 (Worksheet Table 11) and enter 11.
- To get both the ditch lights to turn on with button 1, select CV 36 (Worksheet Table 15) and enter 4. CV 35 (Worksheet Table 15) should already be a value of 4. To get both the ditch lights to turn on with button 3, enter 16 in both CV 35 and CV 36 (Worksheet Table 15) . The ditch lights will flash when you push button 2 or 5.
- The ditch light blink holdover time is preset for about 5 seconds. Select CV 63 (Worksheet Table 13) and increase or decrease the time. A value of 12 equals about 1 second.

To operate other lighting types when you turn them on in either direction:

Random Flicker (fire box);

Select the CV for the wire color you want in Worksheet Table 11. Enter 33 in that CV.

Mars Light;

Select the CV for the wire color you want in Worksheet Table 11. Enter 34 in that CV.