



Backed by our famous
"GOOF-PROOF" Warranty

Main Features of this Decoder:

BEMF Load Compensation: Provides superior slow speed control performance under load.

Quiet Drive: Super-quiet motor control for "buzz" free motor performance.

DC Mode: Decoder will automatically detect DC power. You can also configure how your lighting effects function on DC.

Variable Momentum: Allows you to make custom acceleration and deceleration curves.

LED-Ready Lighting: This decoder has on-board 1KΩ resistors for use with LED's. It is not necessary to add your own external current-limiting resistors.

Function Remapping: Buttons 0 through 12 may be used to control the lighting functions of this decoder.

Programmable Lighting Effects: Choose from 20 separate user-programmable lighting effects!

Decoder Lock: Feature which prevents accidental/unwanted programming

Speed Tables: Configure custom speed curves and set speed limits.

Other Features of This Decoder: This decoder has more features than could be listed in this pamphlet. For the complete list of available features, visit our website tcsdcc.com to download the "Comprehensive Programming Guide" found in the Documentation section of our website.

WARRANTY PROCEDURE: All decoders are covered by a one-year warranty. This decoder must be returned in a small box.

1. For registration, more details, and disclaimers, visit tcsdcc.com/warranty
2. Print out a copy of the Warranty Registration and include it in the box
3. Return decoder(s) directly to TCS using the address below.

Compatible with NMRA DCC standards

Designed & Built by TCS in the USA

Train Control Systems
P.O. Box 341
845 Blooming Glen Rd.
Blooming Glen, PA 18911



Phone **215-453-9145**
Fax **215-257-0735**
Email tcs@tcsdcc.com
Web www.tcsdcc.com



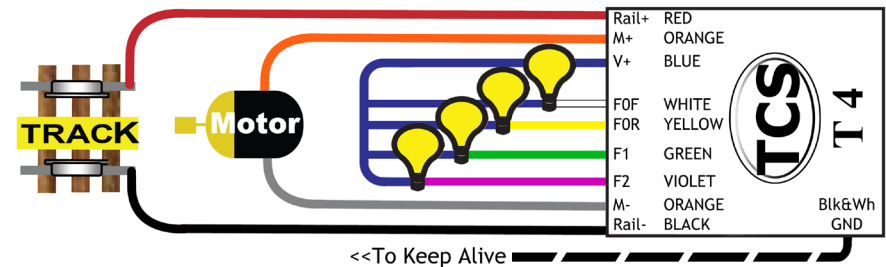
Scale	Functions	Function Rating	Continuous/Peak
HO	4	100 mA	1.3 /2.0 Amp

Dimensions: 0.661" x 0.969" x 0.193" or 16.79mm 24.61mm 4.9mm

The T4-LED is a multi-purpose HO-scale decoder. This decoder may be hard-wired or plugged directly into any locomotive with a 9-pin JST plug. The T4-LED may be used in locomotives which have ditch lights in addition to forward and reverse headlights.

WIRING DIAGRAM

Diagram drawn for clarity - wire decoder per the written wire colors. The wires on your decoder may not be lined up the same as the diagram.



INSTALLATION

For detailed installation examples visit our website where we maintain a constantly growing database of a wide range of locomotives and decoders.



BASIC CONFIGURATION

CV 29 Configuration			
A	0	1	Reverse the direction the engine runs.
B	2	2	Use 28/128 speed step mode.
C	4	4	Enable analog (DC) operation.
D	0	16	Make the Loadable Speed Tables active.
E	0	32	Make the decoder address 128 or higher.
CV 29	6		← Program the sum of the values you choose into CV 29
2 Digit Address			
		Use if the address is 127 or less.	
CV 1	3		← Record your choice here.
4 Digit Address			
		Make sure 4-digit Addressing is enabled in CV29	
CV 17	0		← Record your four digit address here
CV 18	0		Your command station will assign the values of CV 17 and CV18
Consist Address			
		Add 128 to reverse the loco when in consist.	
CV 19	0		Use a 2 digit address when in a consist (Multiple units).
Decoder Lock			
CV 15	0	All unlocked = 0	Decoder to unlock = 1 - 6 All locked = 7
CV 16	1	Mobile = 1 Sound = 2 Light Only = 3	4 5 6
To unlock a decoder, make CV 15 = 0 or CV 15 = CV 16. To lock a decoder, make CV 15 not equal to CV 16. To lock all same address decoders, make CV 15 = 7.			
Factory Reset			
CV 8	153	Program a value of 2 or 8 to perform a Factory Reset.	
Back EMF and Rule 17 Dimming Options			
Even number OR 0= BEMF OFF Odd number = BEMF ON			
BEMF disabled = 0		BEMF enabled = 1	
Turn on BEMF and button control of it make CV 61 = 3		BEMF button control = 3	
		Dims when stopped = 16	
		Opposite light dim = 32	
CV 61	1	BEMF and Dimming Control BEMF+Stopped + Opposite dim = 49	
CV 136	2	Function button control of BEMF Bits 0-7 designates buttons 5-12	
CV 64	15	Dimmed Brightness (2 - 6 for LEDs, 12 - 18 for Bulbs)	
CV 10	0	BEMF Cut Out	
RailCom® (If Supported)			
CV 178	0	CV address pointer	
CV 180	0	RailCom® Transmit Options	
CV 181	0	RailCom® Transmit Options	
CV 28	0	Broadcast enable	
For more information on decoder features or programming visit: www.tcsdcc.com and check out the Complete Programming Guide .			

MOTOR CONTROL

Speed Graph			
CV 2	0		Start Volts -- Set the voltage when the throttle is first applied.
CV 6	0		Mid Volts -- Set the voltage when the throttle is at midpoint.
CV 5	0		Top Volts -- Set the voltage when the throttle is at full speed.
Momentum			
CV 3	1		Acceleration -- Larger values add time to each speed step.
CV 4	1		Deceleration -- Larger values add time to each speed step.
CV 23	0		*Acceleration Adjustment when in Consist
CV 24	0		*Deceleration Adjustment when in Consist
*Values above 128 increase the adjustment * Values below 128 decrease the adjustment			
Motor Trim			
CV 66	0	Forward Trim	Values above 128 increase speed, values below 128 decrease speed.
CV 95	0	Reverse Trim	

LIGHTING CONTROL

Lighting Features					
Light Function Wires		Light Effect	fwd	rev	both
CV 49	0	White Wire	F0F		
CV 50	16	Yellow Wire	F0R		
CV 51	32	Green Wire	F1		
CV 52	32	Violet Wire	F2		
Rule 17 Dimming Control					
Rule 17 Dimming is turned on and off by button 4 as the default, but this value can be remapped via CV 123. See the Function Remapping guide in the lighting section of docs.tcsdcc.com for more info.					
Consist Lighting Control					
CV 21	0	Extra Functions	Green and Purple wire = 3		
CV 22	0	Headlight Functions	White and Yellow Wire = 3		
Lighting Quick Presets					
CV 8	10	Program a value of 10 to make violet and green ditch lights. Button 1 turns them on and Button two makes them blink.			
	11	Program a value of 11 for default trolley settings.			
	12	Program a value of 12 for standard trolley settings and tail lights.			
Note: For more information on Quick Presets visit the Comprehensive Programming Guide at www.tcsdcc.com					