



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.

**+12V Lighting:** This decoder uses an unregulated 12V supply for lighting. For use with LED's, you must include current-limit resistors (1KΩ recommended).

**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](http://tcsdcc.com) to download the "Comprehensive Programing 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](http://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**  
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| Scale | Functions | Function Rating | Continuous/Peak |
|-------|-----------|-----------------|-----------------|
| HO    | 2         | 100 mA          | 1.3 /2.0 Amp    |

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

The T4X 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 T4X may be used in locomotives which have ditch lights in addition to forward and reverse headlights.

**!!!WARNING!!!** This package does not include a wiring harness. This SKU number assumes you already have a wiring harness in your loco.

## 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:<br><a href="http://www.tcsdcc.com">www.tcsdcc.com</a> and check out the <b>Complete Programming Guide</b> . |     |   |   |

## 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,<br>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 <a href="http://www.tcsdcc.com">www.tcsdcc.com</a>  |    |  |                           |     |      |