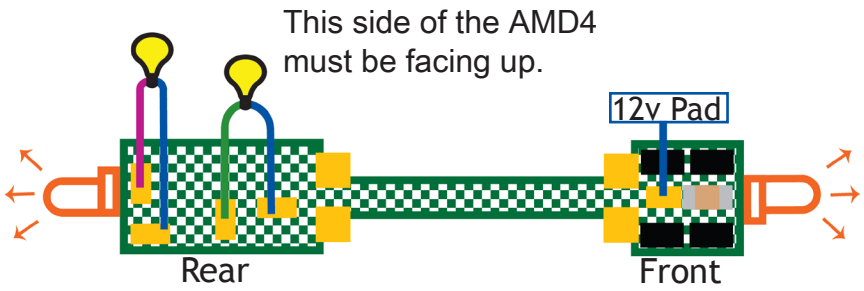
WIRING DIAGRAM



For the extra lighting functions one must use either a 15 mA 1.5v bulb or a LED without a resistor. It is critical that only one bulb or LED is attached to each function, and that any 1.5v bulbs used are rated for 15 mA.

PROGRAMMING OTHER FEATURES: Decoder Lock, Variable Momentum, Button Control of the motor, Loadable Speed Tables, Modifiable Momentary Pulse, Mars, Gyra and Rotary Beacon Light and Function Remapping. If you wish to use them, see **Additional Programming Guide** at www.tcsdcc.com or get a copy at your Dealer.

WARRANTY PROCEDURE: All decoders are covered by a one year goof proof, no questions asked warranty. When returning this decoder it must be in a small box.

1. Register the decoder(s) on our website at www.tcsdcc.com.
2. Print out a copy of the Warranty Registration and include it in a small box with the decoder(s).
3. Return decoder(s) directly to TCS. Train Control Systems
   PO Box 341
   Blooming Glen, PA 18911

Compatible with NMRA DCC standards. Made 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**

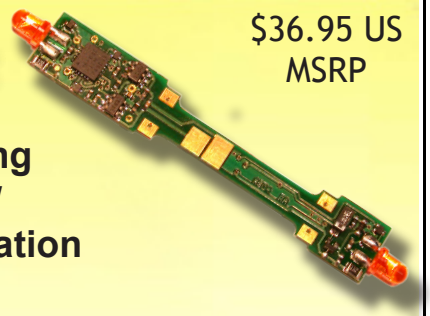
1029

NEW

$36.95 US MSRP

TRAIN CONTROL SYSTEMS

Now Featuring Back EMF / Load Compensation



Provides 1.0 amp continuous and 2 amp peak draw.
A powerful two function drop-in decoder for Atlas N Scale engines: B23-7, B30-7, B36-7, C628, C630, Dash8-32BW, Dash8-40B, Dash8-40BW, RS-11 and GP-38. It also fits the DCC Ready versions of the following: GP-40, GP-40-2, SD-7, SD-9, SD-35, TrainMaster and U25B.

AMD4

Dimensions 2.83"x.351"x.13" or 71.88mm x 8.92mm x 3.3mm

- **Back EMF Load Compensation** for superior slow speed control even with heavy loads.
- **Quiet Drive** creates **SUPER QUIET** engine performance.
- **Autodetect** for realistic throttle response when using **DC power**.
- **Dimmed Brightness** of bulbs or LEDs is **adjustable**.
- **Dither** is the ultimate in **DCC control** thru the entire speed range.
- **Variable Momentum** lets you make **custom** acceleration **curves**.
- **Factory Reset** is faster and easier to reset to the default settings.
- **Brake on DC** stops the train with deceleration when in a **DC block**, maintains lighting, then accelerates when DCC returns.
- **Mars, Gyra, Rotary Beacon, Blinking Ditch Lights** and **Momentary Pulse** are adjustable.
- **Decoder Lock** for programming **same address decoders** independently.
- **Button Control of the Motor Circuit:** for a smoke unit, high speed switching, or a variable brightness light up to 1.2 amps
- **Function Remapping:** 13 buttons for most lights, 7 buttons for operations.
- **OPS Mode Programming allows on the main track programming.**
- **All Program Modes are supported allowing use with any controller.**
- **Basic and Advanced Consisting for use with any controller.**
- **Standard 2 Digit or Extended 4 Digit Addressing.**
- **User Loadable Speed Tables for custom speed curves.**
- **14 or 28 / 128 Speed Step Control operating at 256 speed steps.**
- **Additional lighting features not listed above include Random Flicker, Single & Double Strobe, and Constant Dim light.**

8 7 9 5 0 8 0 0 0 3 0

Our Famous GOOF PROOF NO Questions Asked Warranty

WORKSHEET INSTRUCTIONS

- A blank outlined box is provided by each CV number. This is so you can preplan your decoder and have a record of your choices.
- In many cases you are recording a single value such as an address, a rate, or a limit.
- In some cases you are choosing more than one value such as actions, functions, or buttons. Each of these will have a value. Add the values of those you want active and enter that sum in the blank box.
- The other box by the CV number is the factory set value. If it is shaded, it can be reset with **Factory Reset**.

BASIC CONFIGURATION

Circle the values by all of the changes you want to make.

1	A	0	1	Reverse the direction the engine runs.
	B	2	-2	Use 14 Speed Steps instead of 28/128.
	C	4	-4	Disable 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		**Adjust the Default Value by the values you have circled.**

ADDRESSING

2 Digit Address

Use if the address is 127 or less.

2	CV 1	3		Record your choice here.

4 Digit Address

Make sure Table 1 "E" = 32.

3 **Your command station will assign the values of CV 17 and CV18**

CV 17	0		← Record your four digit address here
CV 18	0		

For more information about CV 17 and 18 visit our web entry on this topic at: http://www.tcsdcc.com/faq/four_digit_addressing.htm

Consist Address

If this is greater than 0, the regular address is unalterable.

4 **Add 128 to reverse the loco when in consist. Some systems only!**

CV 19	0		Use a 2 digit address when in a consist (Multiple units).

MOTOR CONTROL

Speed Graph

1 volt = 18 **0 produces straight line acceleration.**

6	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

The effect of engines starting and stopping heavy loads.

7	CV 3	0		**Acceleration**	Larger values add time to each speed step.
	CV 4	0		**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**

Dither

Dither provides the ultimate in speed control throughout the speed range. If there isn't movement at 2%, increase CV 57 by 5 until you have movement of the flywheel. To fine tune the speed, change CV 56 by 1 until it is running as desired.

10	CV 56	3		**Dither Frequency**	The highest frequency = **1**.
	CV 57	10		**Dither Voltage**	The lowest voltage = **1**.

NOTE: Both CV 56 and CV 57 must be greater than 0 for Dither to be active.

Back EMF, Rule 17 Dimming Options and Opposite Dim Control

If BEMF is enabled Dither is disabled. If BEMF is disabled Dither is automatically enabled based on the values of CV56 and CV57. To adjust dither set CV57 to a recommended value of 15, if there isn't movement at 2% throttle setting, increase CV57 by 5 until you have movement of the flywheel. To fine tune the speed, change CV 56 by 1 until it is running as desired.

Even number OR 0= BEMF OFF **Odd number = BEMF ON**

13	BEMF disabled =0		**BEMF enabled = 1**	BEMF button control= 3	Dims when stopped = **16**
	To turn on BEMF and function button control of it, put 3 into CV 61				Opposite light is dimmed = **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**	For more information go to www.tcsdcc.com/BEMF.pdf

Light Function Wires

11	CV 49	0	White Wire	
	CV 50	16	Yellow Wire	
	CV 51	32	Green Wire	
	CV 52	32	Purple Wire	

Place the value attained from the table by the function wire that will control it.

* Auto-Mars: Automatically turns Mars light on when decelerating below 36% speed. This setting also turns the Mars light on steady above 36% speed.

Light Effect	Choose a value. fwd	rev	both
Constant Bright Light	0	16	32
Random Flicker (fire box)	1	17	33
Mars Light	2	18	34
Flashing Light	3	19	35
Single Pulse Strobe	4	20	36
Double Pulse Strobe	5	21	37
Rotary Beacon	6	22	38
Gyra Light	7	23	39
Rule 17 (dimmable light)	8	24	40
Momentary Pulse	9	25	41
Ditch Light (Left or Right)	10	26	42
Ditch Light (Other side)	11	27	43
Constant Dim light (50%)	12	28	44
*Auto-Mars	13	29	45

Ditch Light Control

14	CV 63	64		**Ditch Light Blink Holdover Time** (**12** = 1 second, **60** = 5 seconds)
	CV 117	5		**Ditch Light Blink Rate** (**1** = slow, **12** = fast)

Analog (DC) Power Control

Turn off Black or Red wire powered functions.

				Green = **1**	Purple = **2**
17	CV 13	255		**Activate power to light functions on DC**	
	Brake on DC			**Activate by subtracting 4 from CV 29 in table 1.**	

Consist Lighting Control

Activate so the direction of travel lights are lit.

				Green Wire = **1**	Purple Wire = **2**	
18	CV 21	0		**Other Light Functions**		
	CV 22	0		**Headlight Functions**	White Wire = **1**	Yellow Wire = **2**

Factory Reset

Sets all CVs with a shaded value back to that value.

20	CV 30	0		**As soon as you enter a 2 in either CV 8 or CV 30, The reset is complete.**
	CV 8	153		