

Technical Reference

for the

MASTER SERIES
Digital Command Control
D102-EU Decoder

WITH AUTO-REVERSING HEADLIGHT

Dimensions:

1.66 x .65 x .123 inches

42 x 16.5 x 3 mm

Decoder version 2.1, 2.2, 2.3

\$29.95

This is an EPF (extended packet format) decoder supporting:

- , Four digit address (long)
- , Uploadable speed table with programmable motor drive frequency
- , 128 Speed mode operation
- , Decoder assisted consisting
- , All forms of operations mode programming (programming on the mainline)
- , Programmable Start Voltage works for all speed modes
- , Motor rating 1.3 Amp continuous, 2 Amp peak (stall)
- , 2 Function outputs rated for up to 40mA incandescent bulbs (150mA when used with LEDs or if a 22 to 33 ohm resistor is used in series with bulb)
- , Automatic reversing headlights

**Every attempt has been made to ensure this decoder complies with
all applicable NMRA Standards and Recommended Practices**

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Webster, NY 14580 716-671-0370

Configuration Variables used by D102 Decoders

- CV1** normal 7 bit loco (short) address; 1-127 valid
- CV2** vstart, value added to all speed steps of "standard speed table", 1 count = .89% of full voltage when using the normal speed table. If uploadable speed table is used the percentage varies with the frequency of PWM motor control in CV9.
- CV3** acceleration rate (each unit = 32mS between speed steps) 254 max. CV23 is added to this value on power up]
- CV4** deceleration rate (each unit = 32mS between speed steps) 254 max. CV23 is added to this value on power up
- CV7** Manufactuer ID. North Coast = 11
- CV8** Decoder version number. This decoder is 23 which means ver. 2.3
- CV9** PWM frequency. This CV determinesthe total PWM period for the uploadable speed table. Each unit = 128uS this allows a frequency of 30hz to 279hz. 279hz comes from using each speed = 1 count this yields: max speed = 28*128us for a 3.58mS period which equals 279hz.
- CV17** high byte of 14 bit address
bit 6,7 always= 1
bits 0-5 are upper 6 bits of 14 bit address
- CV18** low byte of 14 bit address (lower 8 bits)
- CV19** 8 bit address for consist, when active the consist responds to all commands addressed to it the same as it would to it's normal 8 or 14 bit address. Note: the normal 8/14 bit address is still active for all non-speed/direction commands (especially useful for headlight and other function controls of individual locomotives while in consist). If the consist address is set to 0 then the consist is inactive.
bits 0-6 7 bit consist address (1-127)
bit 7 0= direction is normal, 1= direction is reversed
- CV23** acceleration rate adjust (each unit = 32mS between speed steps) this value is added to the value in CV3 at power up or when reprogrammed
- CV24** deceleration rate adjust (each unit = 32mS between speed steps) this value is added to the value in CV4 at power up or when reprogrammed
- CV29**
- bit 0 1= direction of operation is reversed, 0= direction is normal
 - bit 1 1= use 28 speeds mode, 0= 14 speed mode
 - bit 2 1= DC conversion enabled. 0 = disable DC mode
 - bit 3 not used
 - bit 4 1= use alternate (uploadable) speed table, 0= use normal speed table
 - bit 5 1= use 14 bit address in CV17,18 (do not use CV1), 0= use CV1 not CV17,18
 - bit 6 not used
 - bit 7 not used

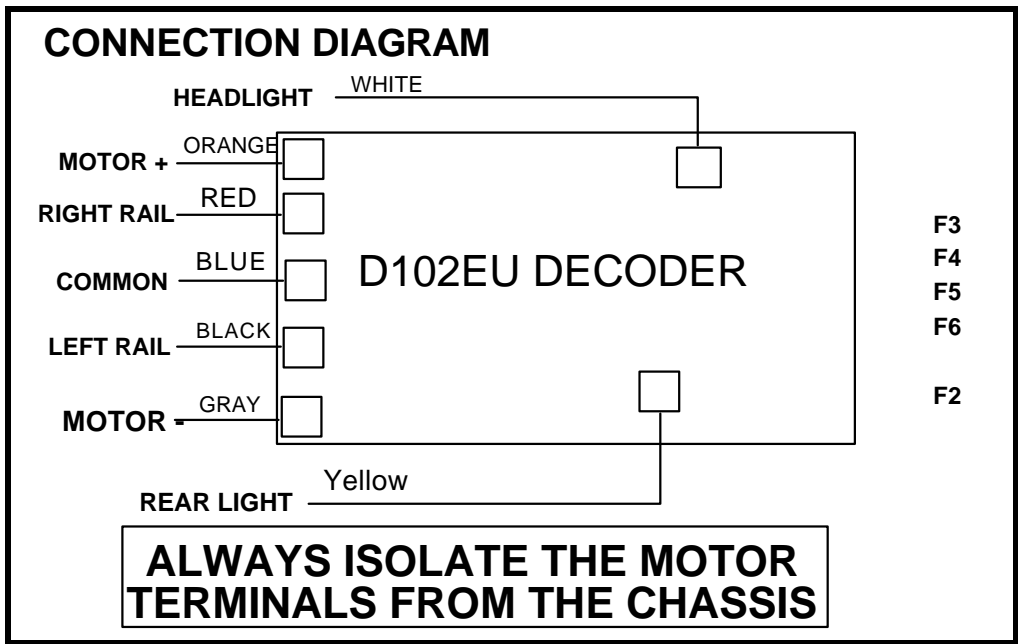
UPLOADABLE SPEED TABLE VARIABLES

- CV66** Speed step 0 of uploadable table (Must be 0 for proper operation)
- CV67-CV94** Speed step 1 to 28 of uploadable speed table

Factory default values for decoder Configuration Variables (CVs)

Digitrax users: use the hex numbers, all other systems use normal decimal numbers

CV	Default value in		Description	CV	Default value in		Description
	decimal	hex			decimal	hex	
1	3	3	short address	74	23	17	alt spd table step 8
2	4	4	start voltage	75	27	1B	alt spd table step 9
3	0	0	acceleration	76	31	1F	alt spd table step 10
4	0	0	deceleration	77	36	24	alt spd table step 11
9	195	C3	PWM frequency	78	39	27	alt spd table step 12
17	192	C0	long address high byte	79	44	2C	alt spd table step 13
18	0	0	long address low byte	80	50	32	alt spd table step 14
19	0	0	consist address	81	55	37	alt spd table step 15
23	0	0	acceleration adjust	82	60	3C	alt spd table step 16
24	0	0	deceleration adjust	83	64	40	alt spd table step 17
29	6	6	decoder configuration	84	71	47	alt spd table step 18
30	0	0	error register	85	77	4D	alt spd table step 19
66	0	0	alt spd table step 0	86	86	56	alt spd table step 20
67	2	2	alt spd table step 1	87	93	5D	alt spd table step 21
68	4	4	alt spd table step 2	88	103	67	alt spd table step 22
69	5	5	alt spd table step 3	89	112	70	alt spd table step 23
70	9	9	alt spd table step 4	90	123	7B	alt spd table step 24
71	12	0C	alt spd table step 5	91	135	87	alt spd table step 25
72	16	10	alt spd table step 6	92	150	96	alt spd table step 26
73	20	14	alt spd table step 7	93	168	A8	alt spd table step 27
				94	195	C3	alt spd table step 28



Due to the high in-rush current of an incandescent grain-of-wheat type bulb (about 10 times the normal operating current) function outputs are rated at 40mA each. We recommend Miniaturics part number 18-014-10 (2.4mm diameter 14 volt/30mA) bulbs or, if you like a whiter light, the 18-712-10 (1.7mm diameter 12 volt/30mA) bulb for best results. If LEDs are used the functions are rated at 150mA continuous.