

CITY THEATRICAL

NEW YORK • LONDON

D4 HP Dimmer User's Manual

Rev 1.01



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System Compliance Information



The D4 Dimmer is CE Certified
Standards applied:

EN 55203-1: 2009
EN 55203-2: 2009
EN 301 489-1 V1.8.1
EN 301 489-3 V1.4.1
EN 60950-1:2006 / A1:2010
FCC Rules, Part 15, Subpart B, Sections 15.107 and 15.109

Products Conform to CE Marking Directive 93/68/EEC

All models are RoHS compliant

Safety Notices, Ratings and Power Requirements

Please read this entire manual before using your new equipment. Please keep the manual in a safe place so you can refer to it in the future as required.

The D4 HP Dimmer is intended for use only by qualified professionals. Connection, installation and hanging of this equipment must be performed in accordance with all pertinent local, regional and national safety codes and regulations.

The D4 HP Dimmer is intended for indoor use.

The unit enclosure is rated NEMA 1 / IP20.

Rated operating voltage; 100~240 VAC, 10A max

Maximum operating temperature: 0°C - 40°C.

Introduction

Thank you for using City Theatrical's D4 HP Dimmer. The D4 HP Dimmer represents new benchmarks for control features and affordability in a dimmer for use with LEDs, incandescent fixtures, relays, or other devices.

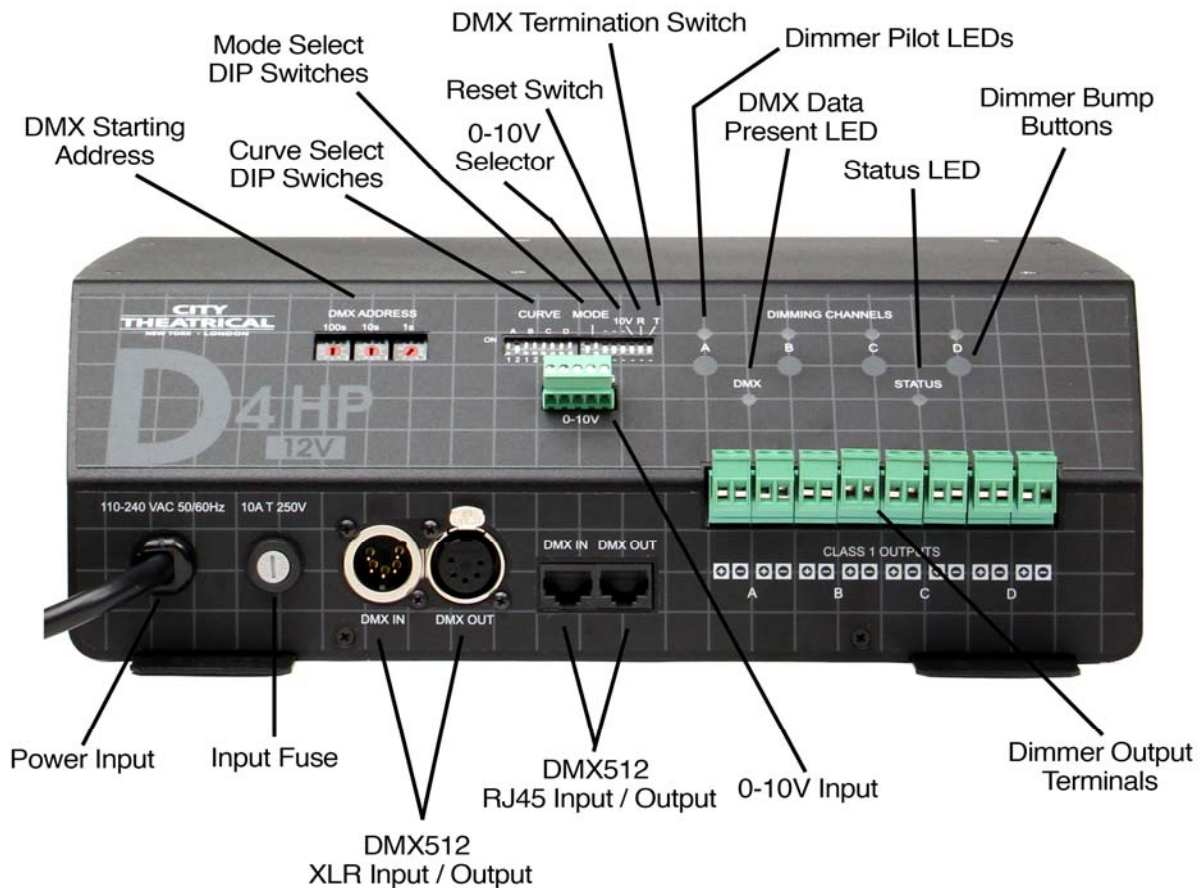
The D4 HP Dimmer features include:

- Built-in 600W power supply
- Rotary DMX selector switches
- Bump buttons
- Channel output indicator lights
- DMX termination switch
- DMX present light
- Status light
- Replaceable input fuse
- Fuseless outputs
- XLR DMX512-A and RJ-45 DMX512-A Input/Pass-Thru (Only one input, and one output may be used at the same time)
- RDM responder functions
- 0-10V Control input on PN5750

- Detachable terminal block outputs PN5750
- Anderson connectors on PN5752
- Five TV/Film modes
- Six smoothing rates
- NEMA 1 / IP 20 rated enclosure (indoor use)
- Four channel DC Dimmer with 2 outputs per channel (10 Amps per channel).
- FCC and CE Certified
- Fan Cooled
- Attached power cord (PN5750) or detachable PowerCon power cord (PN5752)
- Mounting feet

Every effort has been made to anticipate your questions in this manual, but if you have any questions that are not answered here, or you want to discuss a special application, please feel free to contact us directly at City Theatrical.

D4 HP Front View



Setting up the D4 HP Dimmer

Installation

Install the D4 HP Dimmer in a suitable location, following the instructions below.

Power Connections

Connect 100 - 240VAC power to the Dimmer using the front facing power input. The Input power is fed to an internal power supply that is protected by the 10A T 250V fuse located next to the power input

Dimmer Output Connections

The four dimmer channels are labeled "A", "B", "C", and "D". Each channel supports up to two load outputs. If the D4 HP Dimmer has terminal blocks, connect +VDC to the + (plus) Terminal and – (minus) VDC to the – Terminal. These terminals will accommodate up to 14 AWG / 1.5mm² wire. If the D4 HP Dimmer has Anderson Powerpole connectors, you must first install an Anderson Powerpole. See <http://www.citytheatrical.com/pdfs/Techbulletins/AndersonConnectorsTechBulletin1008.pdf> for instructions on installing Anderson connectors. Then simply plug the +VDC into the + (plus) Terminal and – (minus) VDC into the – Terminal. Anderson connectors will accommodate between 10 AWG and 20 AWG wire (5.26mm² and 0.518mm² wire). Up to 10A can be loaded onto each channel. Keep in mind that while 10A can be the output per channel, it is shared between the two outputs on a given channel.

Overcurrent Protection

The D4 HP Dimmer is provided with an external 10A 250V fuse for AC input protection. This fuse is user serviceable. Each dimmer output is provided with fuseless hardware-based overcurrent protection that functions automatically when an overcurrent condition exists. When overload condition is removed, normal operation resumes.

DMX512 Input / Output / Termination

This is a PLASA/ANSI compliant DMX512-A Input / Output. The D4 HP Dimmer supports 5-pin XLR DMX512-A input as well as RJ-45 input which is a lower cost alternative to DMX cable. Once connected, the DMX start address can be changed using the three rotary switches on the front panel of the unit. A single position DIP switch is provided as a DMX termination switch if the unit is at the end of the DMX line. The Termination switch is located at the far right of the DMX Address DIP Switch array and is marked "T". Whichever input has the highest value will take precedence controlling the output of the D4 HP Dimmer. Only one DMX input and one DMX output per D4 HP is permitted.

0-10V Input

The D4 HP Dimmer supports 0-10V input control. If your 0-10V control supplies voltage, leave the 10V DIP switch in the OFF position. Otherwise put the DIP switch in the ON position so the D4 HP Dimmer supplies the current to your device. This device is set so the highest input level takes precedence to control the output on the load. Make sure to leave the 10V DIP switch in the off position if you are not using this function. Otherwise your load will be set to maximum because there will be nothing pulling down the current being supplied on the 0-10V screw terminals.

User interface

The D4 HP Dimmer is provided with a set of switches and LED indicators for configuration and status monitoring:

1. DMX Present LED: Indicates DMX512 Data is being received, blinks if no data is present.
2. Dimmer Pilot Light LEDs: Fade up and down with the dimmer to permit easy monitoring and testing
3. Status LED: Indicates the following error/fault conditions:

Condition	Blink Pattern	Blinks followed by 1sec pause
UNDER VOLTAGE	. . .	1
INVALID DMX ADDRESS	2
OUTPUT OVER CURRENT	4
INPUT OVER CURRENT	5
OVER TEMP	6
OVER VOLTAGE	7
OUTPUT SHORT CIRCUIT	8

4. Bump Buttons: A bump button is provided for each channel output
5. Curve Selection DIP Switch (8 position): Select the dimming curve for each of the individual dimmer outputs in the unit (See page 8)
6. MOD (Mode) Selection DIP Switch (2 position): Select the PWM modulation frequency for dimmer channels set to the LED Curve. (See page 8)
7. 10V Dip Switch (1 position): Set this to OFF if this function is not in use or if your device provides the voltage for 0-10V control. Otherwise set this to ON.
8. R DIP Switch (1 position): Setting this Reset switch to ON resets the Dimmer and holds in reset until set to OFF.
9. T Dip Switch (1 position): Setting this termination switch to ON connects end-of-line DMX termination.

D4 HP Dimmer RDM Parameter IDs

The D4 HP Dimmer supports all the mandatory RDM Parameter IDs (PIDs) plus the following PIDs:

PROXIED_DEVICE_COUNT
 PROXIED_DEVICES_ENHANCED
 SUPPORTED_PARAMETERS
 PARAMETER_DESCRIPTION
 DEVICE_MODEL_DESCRIPTION
 MANUFACTURER_LABEL
 DEVICE_LABEL
 FACTORY_DEFAULTS
 SOFTWARE_VERSION_LABEL
 DMX_BLOCK_ADDRESS
 SENSOR_DEFINITION
 SENSOR_VALUE
 RECORD_SENSORS
 OUTPUT_RESPONSE_TIME
 OUTPUT_RESPONSE_TIME_DESCRIPTION

MODULATION_FREQUENCY
MODULATION_FREQUENCY_DESCRIPTION
DMX_START_ADDRESS
SLOT_INFO
SLOT_DESCRIPTION
SENSOR_DEFINITION
SENSOR_VALUE
RECORD_SENSORS
CURVE
CURVE_DESCRIPTION
IDENTIFY_DEVICE

To learn more about RDM, a good place to start is the Wikipedia article on RDM (lighting) at: [http://en.wikipedia.org/wiki/RDM_\(lighting\)](http://en.wikipedia.org/wiki/RDM_(lighting))

DMX addressing

Set the starting address for the D4 HP Dimmer using the DMX Address rotary switch. The switches are labeled as 100's, 10's, and 1's. To set the starting address, simply twist the rotary switches to match the desired starting address and the remaining three slots are addressed contiguously. The highest starting address that can be set by the rotary switches is limited to 509 in the D4 HP Dimmer.

DMX addressing may also be set using RDM. When RDM is used, the individual dimmer channels may be set independently, to any DMX address.

Whichever method is used, last takes precedence. The unit maintains the last used setting over power cycles, and checks on power up to see if switches have been changed while the unit was off.

Selecting Dimmer Curves

The dimming curve can be set individually for each 10A channel output. The D4 HP Dimmer has an eight position DIP Switch with two positions for each channel output.

Dimmer	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Switch 7	Switch 8	Function
A	OFF	OFF	#						Normal Dimming, ISL Curve
	OFF	ON	#						NON - DIM
	ON	OFF	#						Linear Dimming Curve
	ON	ON	#						LED Curve
B			OFF	OFF	#				Normal Dimming, ISL Curve
			OFF	ON	#				NON - DIM
			ON	OFF	#				Linear Dimming Curve
			ON	ON	#				LED Curve
C					OFF	OFF	#		Normal Dimming, ISL Curve
					OFF	ON	#		NON - DIM
					ON	OFF	#		Linear Dimming Curve
					ON	ON	#		LED Curve
D						#	OFF	OFF	Normal Dimming, ISL Curve
						#	OFF	ON	NON - DIM
						#	ON	OFF	Linear Dimming Curve
						#	ON	ON	LED Curve

The LED Curve is the default mode, and is intended for controlling LEDs but may be used for other specialized loads.

The LED Curve Modes have been optimized for flicker free performance in TV and Film applications. All settings have been camera tested with motion picture film and digital cinema cameras. The settings are different to allow compensation for variations in shutter speed and shutter angle. A camera test is recommended to confirm the correct setting has been selected.

The ISL (Inverse Square Law) Curve is intended for incandescent lamp dimming and is similar to a conventional mains-powered lighting dimmer curve. The PWM period for ISL is 60Hz. The NON-DIM function is intended for relays and other devices requiring switched power without PWM dimming.

The Linear Curve is a simple linear scale that can be used to drive DC integrators or other devices where linear response needed. The Linear PWM period is 60Hz.

Mode Settings

The Mode Settings include TV/Film Mode 1 - 4 which are DIP selectable, and TV/Film Mode 5 which is selectable via RDM only using the MODULATION_FREQUENCY RDM parameter.

OFF	OFF	TV/Film Mode 1
ON	OFF	TV/Film Mode 2
OFF	ON	TV/Film Mode 3 (Default)
ON	ON	TV/Film Mode 4

The settings are also provided to allow control of other specialized loads (see below).

Dimmer curves and Modes may be set manually using the Dimmer Curve and Mode DIP switches or using RDM. Whichever method is used last takes precedence. The unit maintains the last used setting over power cycles, and checks on power up to see if switches have been changed while the unit was off.

Smoothing (Dimmer Response Time)

When the LED Curve is selected, one of six different smoothing settings can be selected using RDM. The smoothing setting determines how quickly the dimmer responds to changes in DMX level. With the fastest smoothing setting (5ms) the dimmer and connected LED loads will respond immediately to any level change. As longer smoothing settings are selected, the dimmer and connected LED loads will “ramp” more smoothly between DMX levels, simulating the delayed response of an incandescent filament lamp. The six Smoothing settings are:

- 5ms
- 10ms
- 50ms
- 100ms (default)
- 200ms
- 400ms

The selected Smoothing setting affects all channels configured with the LED Curve. The default setting is 100ms. The Smoothing (Dimmer Response Time) setting is selected via RDM using the DIMMER_RESPONSE_TIME Parameter.

Using D4 HP Dimmer with CTI Flicker Candles

City Theatrical Flicker Candles may be used with the D4 HP Dimmer in TV/Film Mode 4 or 5 without need for a candle adapter. Up to 200 CTI Flicker candles can be powered and dimmed with a D4 HP Dimmer.

Note

The D4 HP Dimmer is a constant voltage PWM dimmer and so will work with any size LED load that is within the Dimmer’s 40A current and 12VDC voltage range. Note that constant voltage dimmers do not compensate for voltage drop in load wiring so care should be taken to optimize load wiring designs by minimizing run length, assuring termination quality, and assuring adequately sized wire is used.

Appendix A: Using D series Dimmers with LED Tape

The CTI 5700 D series Dimmers have been optimized for use with 12V LED tape. The D4 HP Dimmer can be used with single color, two color (variable white), three color (RGB), or four color (RGBW, RGBA) tape.

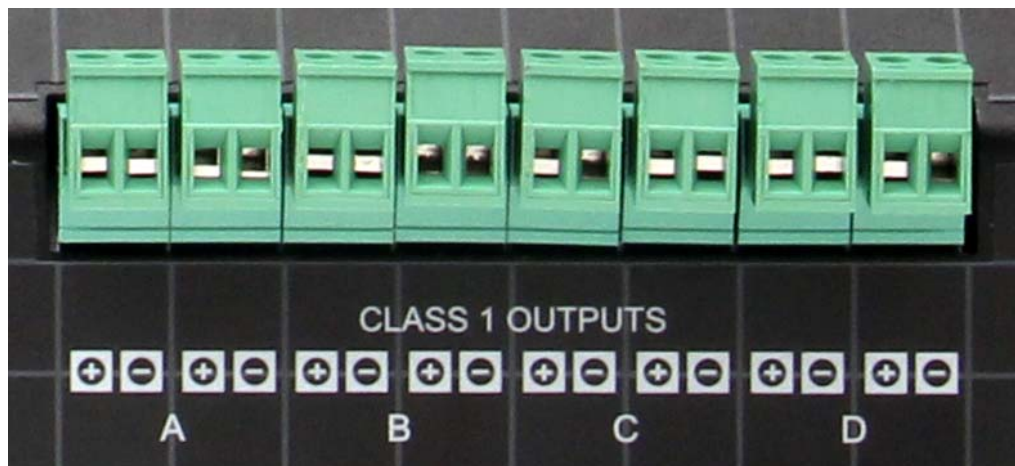
How much Tape can I use with one D4 HP Dimmer?

LED tape load current varies by brand and style. Use the manufacturer's mA/meter specification figure to determine your load, and distribute your load to assure no more than 10A per D4 HP Dimmer. Consult your tape manufacturer for more information.

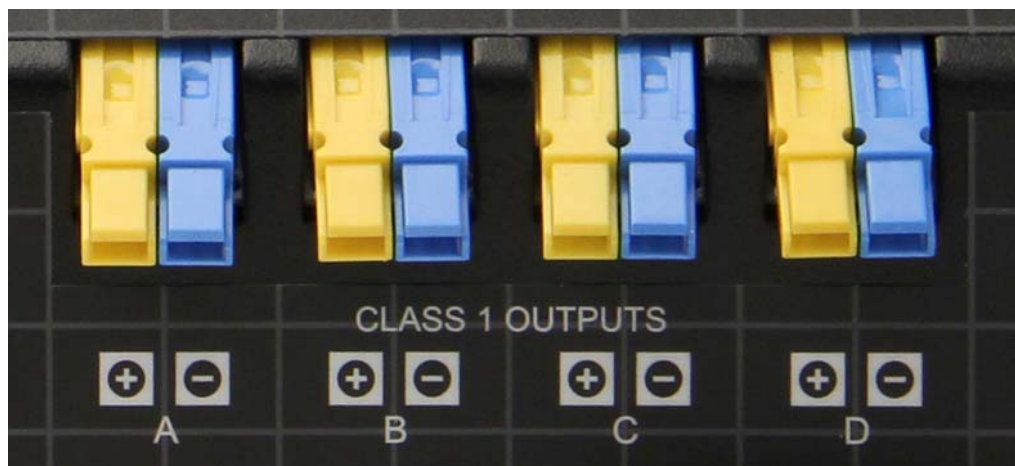
Connecting Single Color Tape

12 Volt single color tape is provided with a single +VDC circuit and a -VDC circuit.

1. Connect the +VDC circuit to one of the four + output terminals and connect the -VDC circuit to the accompanying -output terminal.
2. Select the LED Curve for each dimmer channel used.
3. If you wish to change the PWM frequency, use RDM or the MOD DIP switch to select the frequency desired.



5750 Output Terminals



5752 Output Terminals

Connecting Three Color (RGB) or Four Color (RGBW, RGBA) LED Tape

12 Volt three color LED tape is provided with a single +12VDC circuit and a –VDC circuit for each color.

1. Connect the +12VDC circuit to any one of the eight + output terminals. The + terminals are bussed, and provide constant voltage. Note that some tape comes pre-wired with Black wire for the +12VDC circuit while other tape comes pre-wire with White wire.
2. Connect the R, G and B circuits each to one the eight – output terminals (in the case of four color tape, connect the A or W circuit to the fourth – output terminal). The – terminals are the PWM dimmed outputs of the D4 Dimmer. Note that some tape comes with the R, G and B (and A or W) circuits in a different order than others.
3. – Output terminals located on the same channel will be controlled by the same DMX address.
4. Select the LED Curve for each dimmer channel used.
5. If you wish to change the PWM frequency, use RDM or the MOD DIP switch to select the frequency desired.

D4 HP Dimmer Specifications

DMX Control Features

The D4 HP Dimmer Includes:

- Rotary switches for DMX addressing
- 0-10V input control
- DMX 5-pin XLR terminals for input/Pass-Thru
- Ethernet Terminals for DMX In/Pass-Thru
 - Note: a total of one input, and one output may be used per D4 HP
- Termination switch for end-of line DMX termination
- RDM Responder functions

Mechanical

- Rugged NEMA 1 Aluminum enclosure surface mounting tabs for wall or deck mounting

Electronic/ Functional Features

All units include:

- Bump Buttons
- Rotary switch, DMX Addressing
- DIP Switch, Curve Selection (four choices)
- DIP Switch, LED TV and Film Modes (five choices)
- DIP Switch, 0-10V Input Control Enable (on-off)
- DIP Switch, DMX Termination (on-off)
- LED indicators:
 - Dimmer pilot lights (one for each channel)
 - DMX (data present)
 - Status
- Fan Cooled

Other Features

All units include:

- Four dimmer output channels with two outputs per channel
 - Max output per dimmer channel 10A (shared between two outputs)
 - Anderson Powerpole (PN5752) or screw terminals (PN5750)

- Max total output per device 40A
- Fully RDM enabled
- Individual DMX addresses
- 100 - 240 VAC input
- 10A T 250V fuse for protection
- Internal power supply (12V, 40A)
- Self healing over current protection
- Individually protected against over-temperature
- Individual bump buttons
- PWM resolution 16-bit
- Dimming Curves
 - Linear, 60Hz
 - ISL, 60Hz
 - Non-Dim
- LED Features:
 - Six variable LED smoothing rates
 - Five TV/Film Modes

Compliance:

- ETL Listed to UL508-A
- CE Certified
 - Emissions/Immunity
 - Electrical Safety
 - WEEE
 - Sustainability
 - RoHS Compliant

CTI Part #s: 5750, 5752 D4 HP Dimmer

Power: 100 - 240 VAC 10A Max Power Input

Weight: 6.7 lbs. (3 kg)

Dimensions: 12.25" (L) x 8.00" (W) x 4.062" (H) 311mm (L) x 203mm (W) x 103mm (H)