Network LED Dimmer

Features

⬊ Provides complete control of LED intensity (0–100%) through serial communication or manual pushbutton

⬊ Uses DMX512-A, Modbus/ASCII, or Optomux protocols

⬊ Uses PWM (pulse width modulation) to control LED performance without flicker or color shift

⬊ Compact, lightweight, sturdy package

Network LED Dimmer

Description

The Opto 22 Network LED Dimmer is a constant voltage PWM (pulse width modulation) dimmer that controls light-emitting diodes (LEDs). Used alone or teamed together, this compact dimmer is suited for applications involving LED color mixing, stage or accent lighting, step or path marking, facade or wall lighting, or any other use that requires variable light from LEDs.

The Network LED Dimmer is suitable for 12–24 VDC constant voltage LED assemblies: lamps, bulbs, strips, bars, and rope. It can also be used for other resistive-type loads.

Pulse width modulation provides linear dimming with minimal color shift and flicker-free performance. The Network LED Dimmer acts by controlling the amount of power sent to the LEDs, rapidly changing the state from on to off. This high switching frequency makes dimming both efficient and effective for LEDs.

The Network LED Dimmer includes a serial communications port, a test pushbutton, and two external indicator lights:

• TX/RX for serial communications—green indicates TX and red indicates RX.

• PWM for ramp activity—Intensifies as LEDs are ramped up.

Manual Control

The built-in test pushbutton on the Network LED Dimmer provides manual control for testing connections and settings:

To turn on or off	Push briefly
To ramp up or down	Push and hold; let go at the level of brightness you want

Once you have ramped to the level you want, you can push briefly to turn LEDs off. When you push again to turn them back on, the setting is retained and they will be at the same level of brightness you set before.

For manual control beyond testing, you can wire your own momentary pushbutton (typically a doorbell or other simple normally open pushbutton) to the dimmer.

System Control

With serial communications included in the Network LED Dimmer, you can now control LEDs through standard serial protocols—including DMX512-A, Modbus/ASCII, and Optomux—and incorporate lighting control into existing building, automation, and lighting control systems.

The Network LED Dimmer uses an RS-485 serial network. Serial link connections require no tools: they are made by bare-wire spring connectors. Duplicated positions on the serial connector simplify daisy chaining. Up to 124 dimmers can be on the same serial link (total for all protocols).

Two blocks of DIP switches inside the dimmer's case let you set the following parameters:

• Protocol

• Address

• Serial line termination

• Baud rate (Modbus and Optomux only)

• Parity (Modbus only)

Addresses and baud rates depend on the protocol you use:

	DMX	Modbus	Optomux
Address range	1–512	1–127	1–255
Baud rate	250,000	9600 19,200 115,200 230,400	9600 19,200 115,200 230,400

To set the switches, use your smart phone to scan the QR code (above right; also located inside the dimmer's cover) and

Part Number

Part	Description
LED-SPCV-LV100W	Networkable Constant Voltage LED Dimmer, Serial Modbus/DMX, Push Button, Rated 100 W Low Voltage (12/24 VDC)

follow the link for configuration settings, wiring diagrams, and more. Or see the *Opto 22 Network LED Dimmer User's Guide* (form 2038) for details.

Specifications

Nominal Input Voltage	12 or 24 VDC (Full range: 9–30 VDC)
Operating Current	20 mA @ 12 V, 0% duty cycle 30 mA with pushbutton pressed
Max. Output Power*	100 W @ 12 V: 8 A @ 50 °C ambient 100 W @ 24 V: 4 A @ 50 °C ambient Derate to 0 A @ 70 °C ambient
On-board Fuse	10 A automotive mini fuse (red)
Torque Specs	Recommended for 6-position screw connector: 6 in.-lb. (0.678 N-m)
External Pushbutton Excitation	Open Circuit Voltage: 8 VDC Typical (P.B. open) Short Circuit Current: 4 mA Typical (P.B. closed)
Protocols	DMX512-A, Modbus ASCII, Optomux
Serial Communication Link	1 RS-485 (shielded twisted-pair, 2 pair: one pair for data, one for common) port with duplicate terminal positions for easy daisy chaining
Max. Turnaround Delay	12 microseconds (Modbus and Optomux only)
Max. Dimmers on Link	124 Opto 22 Network LED Dimmers
Max. Distance	1000 feet (304.8 m.) at 115,200; 500 feet (152.4 m.) at 250,000
Selectable Data Rates (Baud)	DMX: 250,000 Modbus: 9600; 19,200; 115,200; 230,400 Optomux: 9600; 19,200; 115,200; 230,400
Address Range	DMX: 1–512 Modbus: 1–127** Optomux: 1–255**
Termination and Biasing***	Set DIP switch (inside case) if Dimmer is at the physical end of the link. Biasing must be supplied by master for the RS-485 link.
LEDs	TX/RX: Green = TX; Red = RX PWM: Intensifies as LEDs are ramped up; fully lit at duty cycle of 100%
PWM Frequency	244 Hz
PWM Period	4.2 milliseconds
PWM Resolution	Brightness commands are 8-bit logarithmic curve; duty cycle commands are 15-bit resolution
Max. Number of Ramp Steps	256 using logarithmic brightness curve; 32,768 if writing linear duty cycle
Ramp Time Parameter	(Optomux and Modbus protocols only) User selectable with range from 0–255
Operating Temperature	-20 to +70 °C
Storage Temperature	-20 to +85 °C
Humidity	0–95% humidity, non-condensing
Agency Approvals	UL, CE, CSA (all pending); RoHS
Warranty	30 months

*For rated power, mount to a flat, thermally conductive surface (steel, aluminum).
**Do not use address 0; it is the broadcast address.
***Both ends of the physical link must be terminated. Master must supply bias.
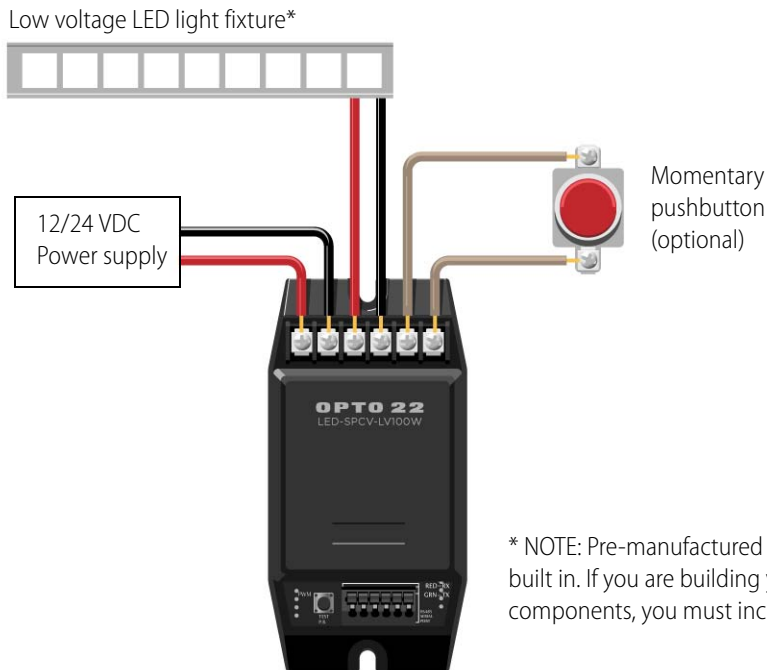
Network LED Dimmer

Connectors and LEDs

12/24 VDC power connection   LED outputs   External pushbutton input

For details on wiring and serial network connections, see the *Opto 22 Network LED Dimmer User's Guide* (form 2038).

PWM LED ➔   ← TX/RX LED

Test pushbutton   Serial port

Wiring

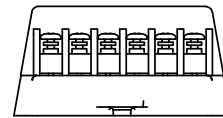Low voltage LED light fixture*
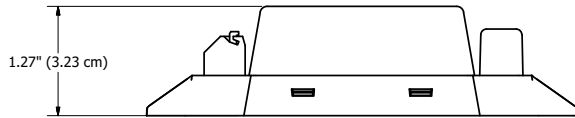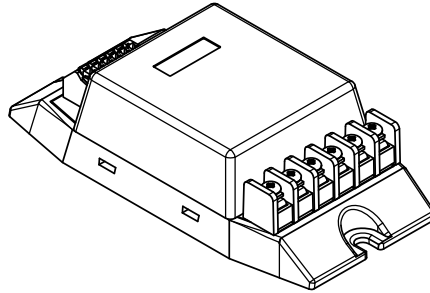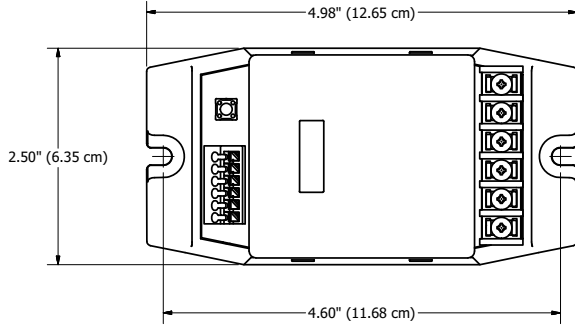
12/24 VDC Power supply

Momentary pushbutton (optional)

* NOTE: Pre-manufactured LED light fixtures have a resistor built in. If you are building your own assembly from LED components, you must include an appropriate resistor.

Dimensional Drawing

4.98" (12.65 cm)

2.50" (6.35 cm)

4.60" (11.68 cm)

1.27" (3.23 cm)

Opto 22 • 43044 Business Park Drive • Temecula, CA 92590-3614 • **www.opto22.com**
SALES 800-321-6786 • 951-695-3000 • FAX 951-695-3095 • sales@opto22.com • **SUPPORT** 800-835-6786 • 951-695-3080 • FAX 951-695-3017 • support@opto22.com

More About Opto 22

Products

Opto 22 develops and manufactures reliable, flexible, easy-to-use hardware and software products for industrial automation, energy management, remote monitoring, and data acquisition applications.

OptoEMU Energy Management System

The easy-to-use OptoEMU Sensor monitors electrical energy use in your facility and delivers detailed, real-time data you can see, analyze, and use in building and control systems. The Sensor can monitor energy data from pulsing meters, electrical panels or subpanels, and equipment. View energy data online using a software service or incorporate the data into your control system for complete energy management.

SNAP PAC System

Designed to simplify the typically complex process of selecting and applying an automation system, the SNAP PAC System consists of four integrated components:

- SNAP PAC controllers
- PAC Project™ Software Suite
- SNAP PAC brains
- SNAP I/O™

SNAP PAC Controllers

Programmable automation controllers (PACs) are multifunctional, modular controllers based on open standards.

Opto 22 has been manufacturing PACs for over two decades. The standalone SNAP PAC S-series, the rack-mounted SNAP PAC R-series, and the software-based SoftPAC™ all handle a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

SNAP PACs are based on open Ethernet and Internet Protocol (IP) standards, so you can build or extend a system easily, without the expense and limitations of proprietary networks and protocols. Wired+Wireless™ models are also available.

PAC Project Software Suite

Opto 22's PAC Project Software Suite provides full-featured, cost-effective control programming, HMI (human machine interface) development and runtime, OPC server, and database connectivity software for your SNAP PAC System.

Control programming includes both easy-to-learn flowcharts and optional scripting. Commands are in plain English; variables and I/O point names are fully descriptive.

PAC Project Basic offers control and HMI tools and is free for download on our website, www.opto22.com. PAC Project Professional, available for separate purchase, adds one

SoftPAC, OptoOPCServer, OptoDataLink, options for controller redundancy or segmented networking, and support for legacy Opto 22 serial *mistic*™ I/O units.

SNAP PAC Brains

While SNAP PAC controllers provide central control and data distribution, SNAP PAC brains provide distributed intelligence for I/O processing and communications. Brains offer analog, digital, and serial functions, including thermocouple linearization; PID loop control; and optional high-speed digital counting (up to 20 kHz), quadrature counting, TPO, and pulse generation and measurement.

SNAP I/O

I/O provides the local connection to sensors and equipment. Opto 22 SNAP I/O offers 1 to 32 points of reliable I/O per module, depending on the type of module and your needs. Analog, digital, and serial modules are all mixed on the same mounting rack and controlled by the same processor (SNAP PAC brain or rack-mounted controller).

Quality

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California. Because we test each product twice before it leaves our factory, rather than only testing a sample of each batch, we can guarantee most solid-state relays and optically isolated I/O modules for life.

Free Product Support

Opto 22's California-based Product Support Group offers free, comprehensive technical support for Opto 22 products. Our staff of support engineers represents decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Additional support is always available on our website: how-to videos, OptoKnowledgeBase, self-training guide, troubleshooting and user's guides, and OptoForums.

In addition, hands-on training is available for free at our Temecula, California headquarters, and you can register online.

Purchasing Opto 22 Products

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-6786 or 951-695-3000, or visit our website at www.opto22.com.

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