BY FINCHUM TECHNOLOGIES INC.

Open Source
5 Volts to 24 Volts Digital & Analog LED Controller
20 Amps max output
Featuring WLED controls
Drive LED strips and 2D arrays

Multivoltage LED Controller (5V–24V, Analog + Digital)

Overview

A compact, high-capacity LED controller supporting both analog and digital addressable LEDs. Designed for advanced lighting applications with integrated protection, connectivity, and expansion features.

Electrical Specifications

Parameter	Specification
Voltage Range	5V – 24V DC
Total Output Current	Up to 20 Amps
Control Interface	WLED (Wi-Fi-based)
LED Types Supported	Analog, 4 channels (voltage-controlled) Digital, 4 data outputs (addressable)

Supported LED Types

Analog LED Output

- 4 independent channels

- 8-bit PWM resolution per channel

- PWM frequency: 97 kHz (minimizes visible flicker)

- Maximum per-channel current: 8 Amps

- Combined analog output current: 20 Amps max

- Uses an independent constant-voltage driver chip

Digital LED Output

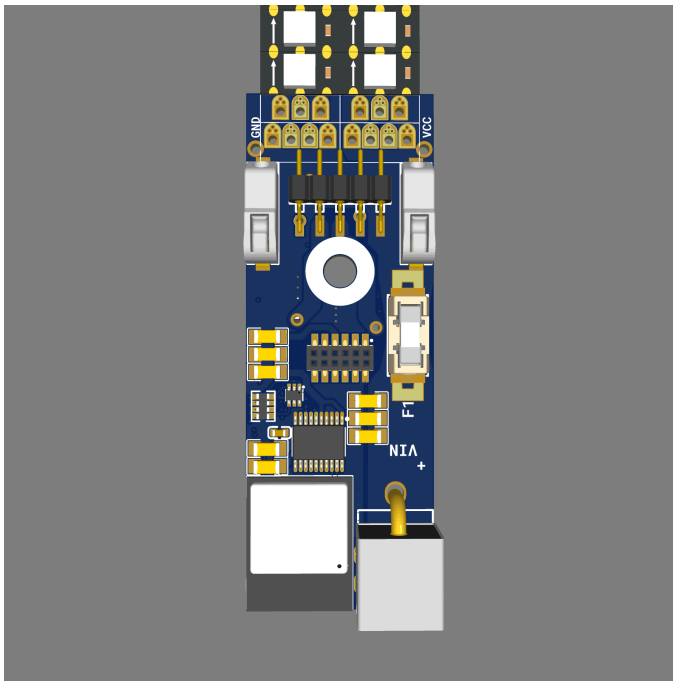| Addressable Strip Type	Max Quantity Supported
3-pin (1-wire, e.g., WS2812)	Up to 4 strips
4-pin (2-wire, e.g., SK9822)	Up to 2 strips

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  On-board screw terminals and solder pads for power injection

- Shared maximum current output: 20 Amps

Integrated Protections

Protection Feature	Description
Thermal Monitoring	Onboard temperature sensor for overheat monitoring
Power Fuses	User-replaceable LED power fuse with fault indicator
Logic Circuit Protection	Auto-resetting fuse for logic power
Power Supervisor	Ensures stable logic voltage
ESD Protection	All power and LED logic lines protected against ESD

Mechanical

- Designed to fit into standard 1" aluminum channel

- **Dimensions:** 65mm (L) × 24mm (W) × 9mm (H)*
  *Height varies with power adapter configuration

Expansion and Interfaces

Basic Interface Board: Touch-sense input, Qwiic connector, and IR remote input

Audio Reactive Board: Auto-switching onboard Microphone or 3.5mm line-in

Ethernet Board: Hardwired Ethernet adapter

Motion Sensing Board: 9-axis IMU for motion-reactive lighting

Timekeeping Board: Real-Time Clock (RTC) for time-based automation and instant-on color temperature settings on startup

Occupancy Detection Board: mmWave Radar Occupancy Sensor

Spectral Analysis Board: Light Spectrum Analyzer (includes CRI calculations)

Audio Output Board   Provides analog sound output

DMX Interface Board   DMX input

USB programming   Hardwire connection for programming (OTA supported out of the box)

Connectivity Options

Interface Type	Availability
WiFi 6 (2.4GHz)	Onboard
Zigbee/Thread (802.15.4)	Onboard
Bluetooth 5	*(Optional)*
USB	Add-on
Ethernet	Add-on
CAN Bus	Add-on
I2C (Qwiic)	Onboard (3.3V)
Audio Line In	Add-on

Supported Protocols

- Architectual: Art-Net, E1.31 (sACN)

- DMX (via add-on)

- Profile switching via JSON

- [Other protocols can be listed as needed]

Licenses

Something something license that wled has

Use Cases

Application Type	Example Use
DIY Projects	Custom light installations, cosplay props
Photography & Videography	Flicker-free lighting, CRI analysis via spectrum tool
Residential	Under-cabinet lighting, crown molding, closets
Ambient Displays	Ambilight-style TV backlights, synced room lighting
Automotive	Car interior/exterior lighting via CAN integration
Stage & Performance	Wireless LED props, matrix displays with sync control
Smart Home Integration	Occupancy-based automation, day/night scheduling

Case Studies and Reviews:

"Ehh, they're okay, I use them to light my whole home."
-Avery Finchum