



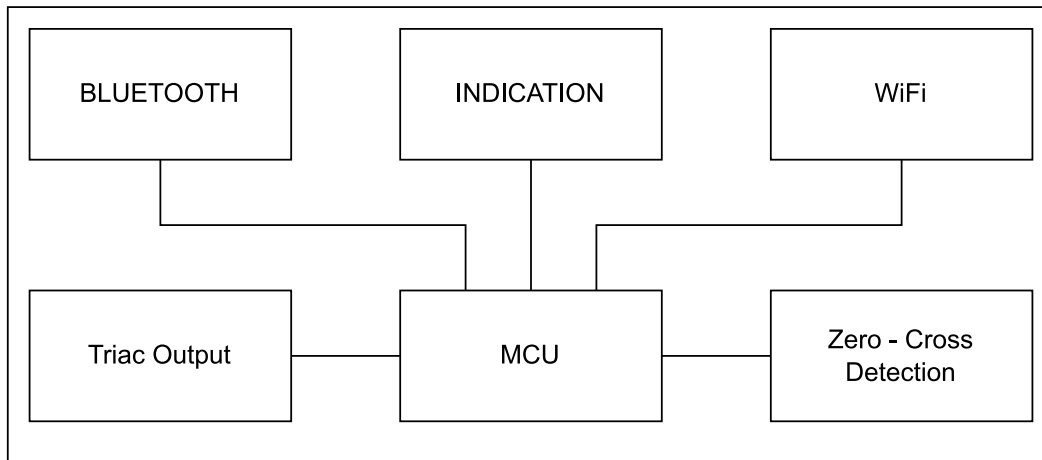
ULDC-T
TECHNICAL DATASHEET

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ULDC-T Universal LED Driver Controller Technical Datasheet

Overview

The ULDC-T is an advanced lighting control device designed for controlling triac-dimmable LED drivers. With features including zero-crossing detection, wireless connectivity, and comprehensive protection features, it provides sophisticated control for modern lighting applications.



Features

- Advanced triac dimming control
- Zero-crossing detection for precise phase control
- Wireless connectivity with encrypted communication
- Over-the-air firmware updates
- Status monitoring capability
- Comprehensive protection features
- Industrial-grade reliability
- MQTT support for IoT integration

Regulatory Approvals (pending)

- CE
- UL Component Recognition
- FCC Part 15 Class B
- RoHS Compliant
- EN 61547 EMC Immunity
- EN 55015 EMC Emissions
- IEC 61000-3-2 Harmonics
- IEC 61000-3-3 Flicker

Power Specifications

- Operating Voltage: 100 - 120 V AC
- Power Consumption
 - Operating: < 2W typical
 - Standby: < 0.5W
- Protection
 - Surge protected
 - Overcurrent protected

Dimming Control

- Control Method
 - Leading/Trailing edge dimming
 - Zero-crossing detection
 - Phase angle control
 - Resolution: 256 steps
 - Update Rate: 100Hz/120Hz (50/60Hz mains)
- Performance
 - Dimming Range: 1-100%
 - Minimum Dim Level: Configurable
 - Maximum Dim Level: Configurable
 - Response Time: < 20ms
 - Zero-crossing Accuracy: $\pm 100\mu\text{s}$

Communication

- Wireless Interface
 - Protocols: BLE, Wi-Fi
 - Wi-Fi: 802.11 b/g/n
 - Range: Up to 100m line of sight
 - Security: WPA2-PSK, WPA3
 - Encryption: AES-128
- MQTT Support
 - QoS Levels: 0, 1
 - Last Will Testament
 - Retain Messages
 - Topic Filtering
 - SSL/TLS Support
- OTA Updates
 - Secure Boot
 - Encrypted Transfer
 - Rollback Protection
 - Progress Monitoring
 - Verification

Environmental Specifications

- Temperature
 - Operating: -20°C to +60°C
 - Storage: -40°C to +85°C
- Humidity
 - Operating: 10% to 90% RH (non-condensing)
 - Storage: 5% to 95% RH (non-condensing)
- Altitude
 - Operating: Up to 2000m
 - Storage: Up to 15000m
- Protection Rating: IP20

Mechanical Specifications

- Dimensions
 - Width: 90 mm
 - Height: 70 mm
 - Depth: 25 mm
 - Weight: 120g
- Mounting
 - DIN Rail: 35mm
 - Surface Mount: 4 points
 - Mounting Holes: 4.5mm diameter
- Connections
 - Terminal Type: Spring cage
 - Wire Size: 24-14 AWG
 - Stripping Length: 8mm
 - Screw Torque: 0.5 N·m

Performance Specifications

Dimming Performance

- Dimming Range
 - Full Range: 10-100%
 - Adjustable High End: 100-70%
 - Adjustable Low End: 10-30%
 - Fine Control: 1% steps
- Response Characteristics
 - Turn-On Time: < 100ms
 - Turn-Off Time: < 100ms
 - Dimming Speed: Adjustable 0.1-100% per second
- Dimming Curve
 - Linear

Configuration Parameters

Dimming Configuration

- Minimum Level: 10-30% (1% steps)
- Maximum Level: 70-100% (1% steps)
- Power-On Level: 10-100% (1% steps)
- Fade Time: 0-60 seconds
- Response Curve Selection
- Phase Control Type (Leading/Trailing)

Network Configuration

- Wi-Fi Settings
 - Network SSID: 32 characters max
 - Security: WPA2-PSK, WPA3
 - Channel Selection: Auto/Manual
 - Signal Strength Threshold
- MQTT Settings
 - Broker URL/IP
 - Port Number
 - Client ID
 - Username/Password
 - Topic Structure
 - QoS Level
 - Keep-alive Interval

LED Indicators

- Power (Green)
 - On: Normal operation
 - Off: No power
- Status (Blue)
 - On: Connected to network
 - Blinking: Configuration
 - Off: Not connected

Reliability

- MTBF: >50,000 hours at 25°C
- Service Life: >10 years
- Warranty: 2 years
- Operating Cycles: >1,000,000
- Flash Memory Cycles: >100,000

Application Notes

- Recommended Wire Types
 - Power: 18-14 AWG