LED CONTROLLERS

PRODUCT OVERVIEW

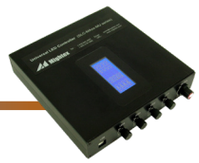
Mightex LED controllers provide constant-current supply to drive LED light sources. Our ample selection of LED controllers come in a variety of designs to provide customers a multitude of features including multi-channel control, up to 4 operational modes (manual, analog input, software, and external trigger), forward-voltage monitoring, current display, arbitrary waveform, and more.

Manual & Analog LED Controllers

SLA, SLB, and BLS Series
Manual and analog input control modes
Tiered maximum current settings

● *page* **50**

Manual & Software LED Controllers



SLC-CA04-MU and SLC-MA04-MU
4 channels
Current resolution options

● *page* **56**

USB/RS232 Software LED Controllers

Up to 3 control modes
Forward voltage monitoring available
Arbitrary waveform available

Software Control

SLC-MA01 | SLC-MA02 |
SLC-MA/CA12 | SLC-MA/CA16
Normal and Strobe modes

● *page* **52**

Software Control & External Trigger

SLC-AA/AV | SLC-SA/SV |
SLC-FA/FV |SLC-XA/XV |
SLC-HA/HV
Normal, Strobe and Trigger modes

● *page* **54**

LED Controllers Accessories

Power adaptors
Electrical power plug adapters
BLS series control module

● *page* **58**

MANUAL & ANALOG LED CONTROLLERS

Mightex's manual and analog-input LED controllers are designed to drive a broad range of LED light sources. These LED drivers have two operational modes:

1. **Manual Knob Control Mode:** the current output of each channel can be adjusted manually;

2. **Analog Input Control Mode:** the current output of each channel can be controlled via 0 ~ 5V analog input

The control mode is set via a DIP switch, and the factory default setting is "Manual Knob Control Mode". The drivers also have a Maximum Current Setting DIP Switch, which allows user to set the maximum current to specific intervals depending on the model. When the Maximum Current Setting DIP Switch is set at a smaller value (e.g. 350mA), the LED driver has a finer resolution for the output current.

FEATURES

- Dual control modes: manual or analog input
- Universal - suitable for any LED
- Tiered maximum output current settings to prevent overdrive
- Capable of driving variable loads

APPLICATIONS

- Microscopy
- Lighting
- Machine vision
- Display
- Semiconductor equipment
- Testing instruments
- Medical instruments

When the driver is set to "Analog Input Control Mode", the output current is proportional to the voltage of the analog input signal. For the 2-channel models, the operational mode and the current limit of each channel can be set independently from each other.

MODELS

Manual & Analog-input Universal LED driver | *Current Display*

SLB-1200-1

Manual & Analog-Input Universal LED driver |

SLA-0100-2 | 100mA I_{max}
SLA-1000-2 | 1000mA I_{max}
SLA-1200-2 | 1200mA I_{max}

BLS Series Manual & Analog-Input LED driver |

BLS-13000-1E | 13000mA I_{max}
BLS-18000-1 | 18000mA I_{max}
BLS-27000-1 | 27000mA I_{max}

PERFORMANCE SPECIFICATIONS | SLA & SLB SERIES

Models	SLA-0100-2	SLA-1000-2	SLA-1200-2	SLB-1200-1
Current Display	No			Yes
Number of Channels	2			1
Power Supply Input Voltage (V_{dc}) | V	9 ~ 24			
Maximum Output Voltage (V_{max})[1] | V	V_{dc} - 3.0V			
Maximum Per Channel Output Current (I_{max})[2] | mA	100	1,000	1,200	1,200
Maximum Per Channel Output Power (P_{max}) | W	2	10		
Max Modulation Frequency | KHz	50	1		
Tiered Max. Current Settings | mA	30 50 100	350 500 1,000	350 750 1,200	

[1] Maximum output voltage is 3V less than the Power Supply Input Voltage (V_{dc}). For instance, with a Power Supply Input Voltage of V_{dc} = 24V, the Maximum Output Voltage V_{max} would be 21V.
[2] If the channel output voltage is V_d and the output current is I_d, they must simultaneously satisfy: (a) $V_d \le V_{max}$; (b) $I_d \le I_{max}$; and (c) $V_d * I_d \le P_{max}$.

PERFORMANCE SPECIFICATIONS | BLS SERIES

Models	BLS-13000-1E[d]	BLS-18000-1	BLS-27000-1
Current Accuracy | mA	±3%		
Number of Channels	1		
Power Supply Input Voltage (V_{dc}) | V	48	12	12
Power Supply Input Current (I_{dc}) | A	2.5	13.75	16A
Maximum Output Voltage (V_{max}) | V	5.5	7.5	5.0V
Maximum Per Channel Output Current (I_{max}) | mA	13000	18000	27000
Maximum Per Channel Output Power (P_{max}) | W	72	135	135
Max Modulation Frequency | KHz	3		
External Analog Input[c] | V	**0 ~ 5**		

[a] When forward voltage of LED load is greater than 8V, 24V DC input might be used.
[b] External analog voltage source should have 8+ mA of current driving capability.
[c] The input current should be greater than the combined output current of the two channels.
[d] Spec for legacy support. BLS-13000-1 has been discontinued and replaced by BLS-13000-1E.

DIMENSIONS

Models	Weight | **g**	Size (lxwxh) | **mm**
SLA series	60	80x64.3x23.7
SLB series	250	150x106x55
BLS-1000-2 | BLS-3000-2	600	160x157x68
BLS-13000-1E | BLS-18000-1 | BLS-27000-1	1300	221x156x96

USB/RS232 SOFTWARE LED CONTROLLERS

Mightex's USB/RS232 software-controlled universal LED drivers are designed to drive a broad range of LED light sources. Each unit comes with a powerful PC-based software with a user-friendly GUI, which enables users to drive LEDs without the need to write any code. In addition, a full-featured SDK is provided, in order for users to write their own software and to integrate Mightex's LED drivers into their own systems. A Linux driver is also available upon request. Furthermore, the drivers have a built-in protection feature, allowing users to limit LED driving current and voltage.

Channels can be individually configured to work under one of the following 3 modes:

1. **Normal Mode (or DC Mode):** The output current is a constant, which can be adjusted (using software) from 0 mA to 1,000 mA, through the USB interface.

FEATURES

- Computer controlled
- Universal - suitable for any LED
- User-friendly application software with GUI
- Full-featured SDK
- Capable of driving variable loads

APPLICATIONS

- Microscopy
- Lighting
- Machine vision
- Display
- Semiconductor equipment
- Testing instruments
- Medical instruments

2. **Strobe Mode:** A Pulse-Width-Modulated (or PWM) periodic strobe pattern is output from the channel, which can be turned on by a software trigger. The strobe pattern may last indefinitely or for a preset number of cycles. In addition, each channel can be individually DISABLED and ENABLED. No voltage or current is output from a DISABLED channel.

3. **External trigger mode:** An external trigger signal could be used to turn on each individual channel, generating driving current with any user-defined waveform. Alternatively, each output channel can work under the "Follower" mode, in which the current output follows the waveform of the trigger input.

SOFTWARE CONTROL

LED controllers within this category allow users dual software control of individual LED channels, normal mode and strobe mode. These models are solely software-controlled. User-friendly application software and SDK are provided.

Key Definitions

Normal and Strobe Modes
Universal

No external trigger

MODELS

Compact Universal USB LED controllers |

SLC-MA01-U | 1 channel, 1mA current resolution
SLC-MA02-U | 2 channels, 1mA current resolution

Universal 12-Channel LED Controllers |

SLC-MA12-U | USB, 1mA current resolution
SLC-MA12-S | RS232, 1mA current resolution
SLC-CA12-U | USB, 5mA current resolution
SLC-CA12-S | RS232, 5mA current resolution

Universal 16-Channel LED Controllers |

SLC-MA16-U | USB, 1mA current resolution
SLC-MA16-S | RS232, 1mA current resolution
SLC-CA16-U | USB, 5mA current resolution
SLC-CA16-S | RS232, 5mA current resolution

PERFORMANCE SPECIFICATIONS

Models[1]	SLC-MA01-U SLC-MA02-U	SLC-MA12-U SLC-MA12-S SLC-MA16-U SLC-MA16-S	SLC-CA12-U SLC-CA12-S SLC-CA16-U SLC-CA16-S
Power Supply Input Voltage (V_{dc}) | V	9 ~ 24		
Maximum Output Voltage (V_{max})[2] | V	(Vdc- 3)		
Maximum Per Channel Output Current (I_{max}) | mA	1,000		
Maximum Per Channel Output Power (P_{max})[3] | W	10		
Output Current Resolution | mA	1		5
Output Current Accuracy | mA	±5 mA or ±1.0%, whichever is larger		±10 mA or ±1.0% whichever is larger
Output Current Repeatability | mA	±2 mA or ±0.5%, whichever is larger		±5 mA or ±0.5% whichever is larger
PWM Timing Resolution[4] | µs	100		
PWM Timing Minimum Step Size[4] | µs	1,000		
Interface	USB	USB (-U) or RS232 (-S)	

[1] For SLC-MA12, SLC-MA16, SLC-CA12, and SLC-CA16 models, proper heat dissipation should be provided to the LED controller in order to prevent overheating, which may lead to self-shutdown by the LED controller for protection purposes. In addition, the total output current of all channels should not exceed the capacity of the power adapter.
[2]Maximum Output Voltage V_{max} is 3V less than the Power Supply Input Voltage (V_{dc}). For instance, with a Power Supply Input Voltage of V_{dc} = 24V, the Maximum Output Voltage V_{max} would be 21V.
[3] If the channel output voltage is V_d and the output current is I_d, they must simultaneously satisfy: (a) $V_d \le V_{max}$; (b) $I_d \le I_{max}$; and (c) $V_d * I_d \le P_{max}$.
[4] Each period of a PWM square wave comprises of ON time and OFF time, i.e., two (2) 'steps'. The minimum value for each step is 1,000µs and the minimum increment is 100µs.

DIMENSIONS

Models	Weight | **g**	Size (lxwxh) | **mm**
SLC-MA01 | SLC-MA02	60	80x64.3x23.7
SLC-MA12 | SLC-MA16 **SLC-CA12 | SLC-CA16**	400	180.5x180x34.5

SOFTWARE & EXTERNAL TRIGGER

LED controllers within this category allow users dual software control of individual LED channels - normal mode and strobe mode - plus external TTL trigger control mode. User-friendly application software and SDK are provided and models come with USB and RS232 interfaces. For models with arbitrary waveform, one can use up to 128 pairs of data points [current (mA), duration (us)] to define the shape of the waveform and consequently the LED's optical output. Models with forward voltage monitoring capability have an accuracy of ±10mV. A Linux driver is also available upon request.

Key Definitions

- **Normal, Strobe & Trigger modes**
- **Universal**
- **External trigger**
- **Arbitrary waveform**
- **Forward voltage monitoring**

MODELS

Universal 4-Channel LED controllers |

SLC-AA04-US | Arbitrary waveform
SLC-AV04-US | Arbitrary waveform, forward voltage monitoring
SLC-SA04-US |ON/OFF definition
SLC-SV04-US |ON/OFF definition, forward voltage monitoring

High-Precision Universal 4-Channel LED controllers |

SLC-XA04-US | Arbitrary waveform
SLC-XV04-US | Arbitrary waveform, forward voltage monitoring
SLC-FA04-US |ON/OFF definition
SLC-FV04-US |ON/OFF definition, forward voltage monitoring

High-Current Universal 2-Channel LED controllers |

SLC-HA02-US | Arbitrary waveform
SLC-HV02-US | Arbitrary waveform, forward voltage monitoring

PERFORMANCE SPECIFICATIONS

Models[1]	SLC-AA04-US SLC-AV04-US	SLC-SA04-US SLC-SV04-US	SLC-XA04-US SLC-XV04-US	SLC-FA04-US SLC-FV04-US	SLC-HA02-US SLC-HV02-US
Power Supply Input Voltage, V_{dc} | V	9 ~ 24				9 ~ 12
Power Supply Input Current | mA	< 4,000				4,000
Per Channel Driving Voltage (V_{max})[2] | V	V_{dc} - 0.5				
Per Channel Driving Current | mA	0 ~ 1,000[a] 0 ~ 3,500[b]		0 ~ 100[a] 0 ~ 350[b]		0~2,000[a] 0~3,500[b]
Output Current Resolution | mA	12		0.1		1
Output Current Linearity | mA	+/-4 (or +/-0.5%)				
Output Current Repeatability | mA	+/-1 (or +/-0.2%)				
Trigger Input High Level | V	3.3 ~ 10.0				
Trigger Input Low Level | V	0.8 (Max.)				
Timing Resolution | µs	20				
# of Data Points for Waveform Definition	128	2	128	2	
Trigger Pulse Width | µs	100 (Minimum)				
Max Trigger Delay | µs	25				

[1] Proper heat dissipation should be provided to the LED controller in order to prevent overheating, which may lead to self-shutdown by the LED controller for protection purposes. In addition, the total output current of all channels should not exceed the capacity of the power adapter.
[2]Maximum Output Voltage V_{max} is 0.5V less than the Power Supply Input Voltage (V_{dc}). For instance, with a Power Supply Input Voltage of V_{dc} = 24V, the Maximum Output Voltage V_{max} would be 23.5V.
[a] Under normal mode.
[b] Under strobe or trigger mode.

DIMENSIONS

Models	Weight | **g**	Size (lxwxh) | **mm**
SLC-AA | SLC-AV **SLC-SA | SLC-SV** **SLC-XA | SLC-XV** **SLC-FA | SLC-FV** **SLC-HA | SLC-HV**	600	201x147x40

MANUAL & SOFTWARE LED CONTROLLERS

Mightex's 4-channel SLC/MU-series universal LED controllers offer the flexibility for users to operate each LED channel independently.

The device has two control modes:

1. **Manual Control:** Each of the four channels can be operated manually in CW mode using a knob, and each knob is operated independently to control the output current of a specific channel. A fifth Global knob is available for the user to control all channels at the same time while keeping the relative outputs among channels constant, as in:

I_{out} = Global_Knob_Reading(0-1)·Channel_Knob_Reading(0-1)·I_{max}.

2. **Software Control:** The LED controller can also be operated via a Windows-based application software, provided with the device. Each channel can be individually configured by the software to operate in one of the following three modes:

- Disable Mode: The channel is disabled.
- Normal Mode: The output current is constant.
- Strobe Mode: A Pulse-Width-Modulated (PWM) periodic strobe pattern is output from the channel.

FEATURES

- Software/manual controlled
- Universal - suitable for any LED
- Current monitoring display
- User-friendly application software with GUI
- Full-featured SDK
- Capable of driving variable loads
- Up to 1200mA output current
- High precision with 1mA current resolution

APPLICATIONS

- Microscopy
- Lighting
- Machine vision
- Display
- Semiconductor equipment
- Testing instruments
- Medical instruments

The LED controller also has a DC output used to control a cooling fan, usually used to cool down a high-power LED. The LED controller's software allows one to control the speed of the cooling fan through a designated variable PWM signal output.

MODELS

Dual-Mode (Manual/Software) LED controllers |

SLC-CA04-MU | 5mA current resolution
SLC-MA04-MU | 1mA current resolution

PERFORMANCE SPECIFICATIONS

Models	SLC-CA04-MU	SLC-MA04-MU
Power Supply Input Voltage (V_{dc}) | V	12 ~ 24	
Maximum Output Voltage (V_{max}) | V	V_{dc} - 3.0	
Maximum Per Channel Output Current (I_{max}) | mA	1,200	
Maximum Per Channel Output Power (P_{max}) | W	18	
Output Current Resolution | mA	5	1
Output Current Accuracy | mA	±5 mA or ±1.0%, whichever is larger	
Output Current Repeatability | mA	±2 mA or ±0.5%, whichever is larger	
PWM Timing Resolution | µs	100	
PWM Timing Minimum Step Size | µs	1,000	
Interface	USB	

[1] Maximum output voltage is 3V less than the Power Supply Input Voltage (V_{dc}). For instance, with a Power Supply Input Voltage of V_{dc} = 24V, the Maximum Output Voltage V_{max} would be 21V.
[2] If the channel output voltage is V_d and the output current is I_d, they must simultaneously satisfy: (a) $V_d \le V_{max}$; (b) $I_d \le I_{max}$; and (c) $V_d * I_d \le P_{max}$.

DIMENSIONS

Models	Weight | **g**	Size (lxwxh) | **mm**
SLC-CA04-MU **SLC-MA04-MU**	400	180.5x180x34.5

LED CONTROLLERS ACCESSORIES

POWER ADAPTORS

Part Number	Description
ACC-SLC-12V5A	Replacement Power Adaptor. 12V 5A AC-DC.
ACC-SLC-24V	24V AC-DC Power Adaptor for SLC-series LED drivers.
ACC-SLC-24VU	Upgrade from 12V to 24V AC-DC Power Adaptor for SLC-series LED drivers. [Note: If you already received the 12V adapter and would like to upgrade to 24V, please return the 12V adapter to Mightex, or order the stand-alone 24V adapter ACC-SLC-24V.]
ACC-SLC-7V	7.5V 6A AC-DC Power Adaptor for SLC-series LED drivers.
ACC-SLC-7VU	Upgrade from 12V to 7.5V/6A AC-DC Power Adaptor for SLC-series LED drivers. [Note: If you already received the 12V adapter and would like to upgrade to 7.5V/6A, please return the 12V adapter to Mightex, or order the stand-alone 7.5V adapter ACC-SLC-7V.]

ELECTRICAL POWER PLUG ADAPTORS

Part Number	Description
ACC-PLUG-EU	American To European German Outlet Plug Adapter.
ACC-PLUG-UK	American To United Kingdom Outlet Plug Adapter.
ACC-PLUG-AUS	American To Australian Outlet Plug Adapter.
ACC-PLUG-SUI	American To Swiss Outlet Plug Adapter.

BLS I/O CONTROL MODULE

Mightex's Analog and Digital I/O Control Module is a system-level control solution to be used in conjunction with the BLS series Manual/Analog Controlled LED Controllers and with the Polygon DMD Illuminator.

The I/O Control Module features four (4) independent channels. Each channel has an external trigger input (TTL), an analog voltage output (0-5V) and a digital output (Standard TTL). All I/O connectors are BNC-type to work seamlessly with laboratory equipments. Intensity waveform of up to four (4) high-power LED light sources is controlled by the I/O Control Module, each can output light at a different wavelength (i.e. color). Up to thirty-two (32) different waveforms can be programmed onto the I/O Control Module via USB or RS232. Each waveform can be associated with any one of the four LED's to form a catalog of up to 128 unique Color/Waveform pairs.

Key Definitions

- **Four (4) independent channels**
- **One TTL input, one analog voltage output (0-5V) and one digital output (LVTTL) per channel**
- **All I/O are BNC-connectorized**
- **0.1% Output voltage resolution**
- **20µs time resolution**
- **25µs maximum trigger delay**
- **Up to 1024 color/waveform pairs in a sequence**

MODELS

BLS Analog & Digital I/O Control Module

BLS-IO04-US