

DIAMEX LED CONTROLLER-L (Rev. 2)

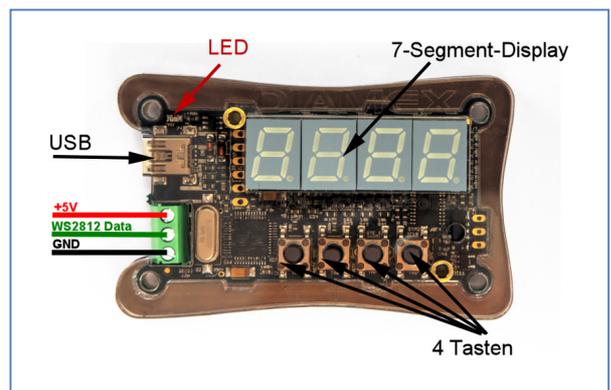
Effect controller and TPM2 player for LED stripes with remote control

FUNCTIONS

The LED controller-L2 generates various static or dynamic effects and outputs these at connected LED stripes or single light-emitting diodes of type WS2812 (RGB), SK6812 (RGBW) or compatible. By pressing buttons on the device and the 4-digit 7-segment display, effects can be selected and settings can be changed. With the infrared remote control, all functions can also be controlled wirelessly. A random mode with an adjustable time period selects static, dynamic or all effect sequences from the permanently integrated effect memory. The LED controller-L2 can also play effects directly from the PC via the USB port. For this purpose, any program which outputs data in TPM2 format via the serial interface (for example JINX or Glediator) can be used.

Technical specifications:

- Connection for LEDs or strips with WS2812 (RGB), SK6812 (RGBW) or compatible LEDs
- Maximum number: 512 light emitting diodes
- USB 2.0 port, virtual COM port
- Serial data in TPM2 format (Jinx, Glediator)
- 4-digit 7-segment display to display the functions
- 4 buttons for operation
- Infrared remote control for wireless selection of effects
- Controlled by a powerful 32-bit ARM-Cortex-M4 microcontroller
- Bios can be updated via USB
- Power supply via USB or the 5V LED connector
- Power consumption at 5V max. 100mA



POWER SUPPLY

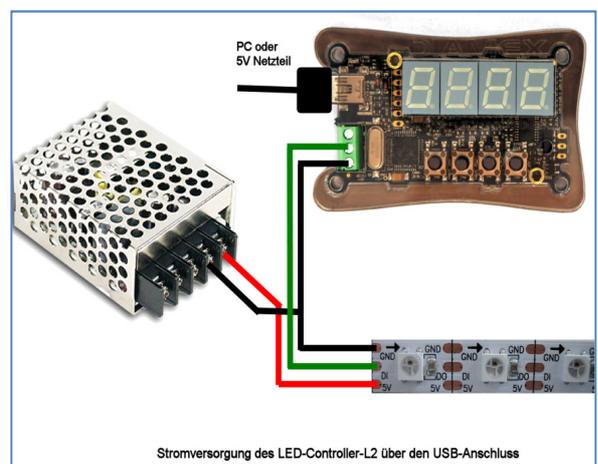
LEDs require only a relatively small current. However, this can add up to impressive values for long stripes or large panels. The current consumption of a WS2812 LED serves as an example. At 100% white this LED needs 60mA at 5Volt. This is not very much at first, but with 10 LEDs, this is already 600mA, which means that a normal USB 2.0 port is already overloaded since it can usually deliver a maximum of 500mA (according to the USB specification). For this reason, we always recommend the use of a power supply designed according to the required LEDs.

Version 1:

LED controller L2 via USB port

This variant is always required when you directly play data from JINX or GLEDIATOR via USB. The LED player is automatically powered by the USB port.

The + 5V screw terminal remains unconnected in this case.



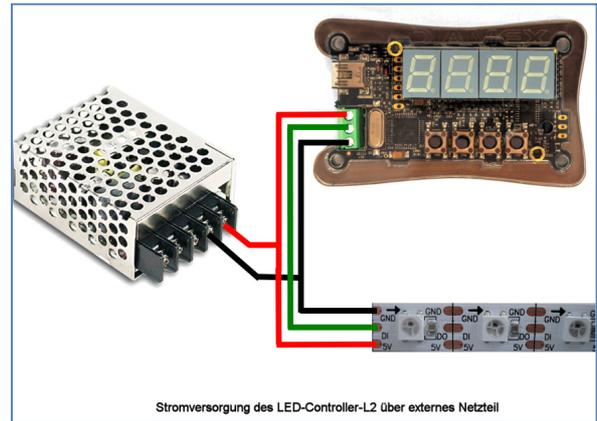
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Variant 2:

LED controller-L2 over power supply

In this variant, the LED controller-L2 must not be connected to the USB port of the PC. It is used here only for playing the internal effects.

The + 5V line of the power supply is connected to the + 5V terminal of the LED player and supplies it with power.



IMPORTANT INSTRUCTIONS

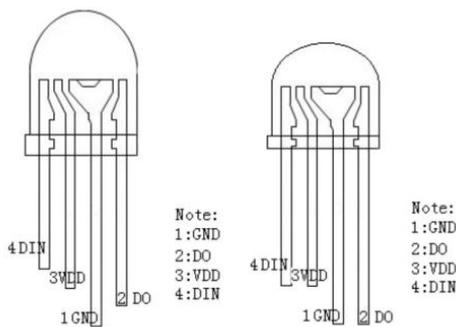
Do not connect both power supplies at the same time. Either connect the power supply via USB or power supply via the terminal block.

Never connect a higher voltage than 5 volts to the LED controller-L2.

Make sure the polarity of the power supply is correct. A polarity reversal leads to the immediate destruction of the LED controller L2 and the connected LEDs.

LED CONNECTION

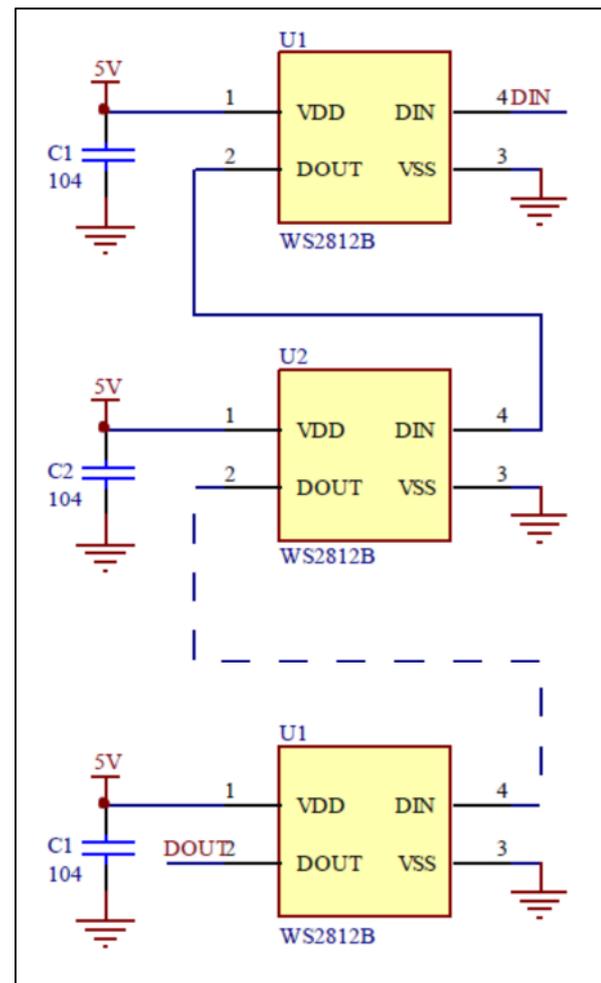
LEDs like WS2812B, PL9823, APA-106, SK6812, and compatible have a data input (DI) and a data output (DO) in addition to the power supply pins (ground and + 5V). If several LEDs are required, the data output (DO) of the first LED must simply be connected to the data input (DI) of the next LED (daisy chain principle).



PL9823 LED



LED-Stripe with WS2812



WS2812 Daisy-Chain

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NUMBER OF LIGHT DIODES

The LED controller-L2 controls a maximum of 512 LEDs. The exact number can be set via the setting menu. This means that only small amounts of data have to be generated and transmitted.

ARRANGEMENT OF COLORS

The arrangement of the colors can vary from manufacturer to manufacturer. For classic WS2812 LEDs, the green-red-blue (GRB) is the default setting of the L2 LED controller. If you find that the colors are not correct, you can change this via the setup menu.

RGBW LIGHT DIODES

The support for RGBW light-emitting diodes (SK6812) can be activated via the setting menu. These LEDs have integrated a fourth white system in addition to the three standard colors red, green and blue. This guarantees a clean white that is not produced from the three basic colors. For internal effects or when playing TPM2 data via USB, the LED controller L2 controls the additional white system when the red, green, and blue values are the same.

USB-PORT

The LED controller-L2 can directly play TPM2 data from the PC. For this purpose, a virtual COM port is set up via USB. For your PC to recognize the LED player, the INF driver file is required, which you can download via a link at the end of this guide. Via the device manager of Windows 7 or 8.x, select the "Update driver software" function and then select the file `led-controller-l2.inf`

If you are still using Windows 8.x, you may need to disable "Force Windows 8 driver signing". You can find out how to do this on the Internet by searching for "Driver Signature Windows 8" in Google.

Under Windows 10, no driver installation is required; the LED controller L2 is automatically registered as a "serial USB device" after plugging it into the PC for the first time. Please ensure that your Windows 10 PC is up-to-date, the first Windows 10 versions had extreme problems when controlling virtual COM ports via USB.

Programs such as JINX or GLEDIATOR can output TPM2 data directly to the virtual USB COM port. The baud rate setting is ignored; USB automatically uses the maximum possible speed.

LIGHT DIODE RED

The red LED is only used to visualize the data output to the light-emitting diodes. If you are not sure whether the connected LEDs are working, you can use the flicker of the red LED to see that data is being transmitted to the light-emitting diodes.

4 BUTTONS

The 4 buttons on the LED controller-L2 are used to operate the device and to configure it. The functions of the individual keys vary from function to function and we explain in detail the description of the operation

INFRARED REMOTE

All functions can also be controlled via the wireless infrared remote control supplied with the unit. The key assignments vary from function to function. Since it is a universal remote control, the labeling of the keys is not always identical with the function.

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TPM2 PLAYER ABOUT USB

TPM is the abbreviation for "Transport Protocol for Matrices", a popular data protocol for the control of LED stripes and panels. Several freely available programs now support this protocol, e.g. JINX or GLEDIATOR. The data transfer from the PC to the LED player takes place via the USB interface at maximum speed, so that a rate of 25 frames per second can be achieved and a flicker-free output is guaranteed. A virtual COM port is usually set up via USB for the control, the COM port number of the LED controller L2 can be determined via the Windows device manager and must be set in the play program.

The play programs cannot read out the number of LEDs connected to the LED controller L2 and therefore always output the data set in the program (corresponds to the number of LEDs in the matrix * 3) via the TPM2 data. If this quantity is too large for the number of LEDs set at the LED controller L2, the excess data is simply ignored. If the amount of data is too low, LEDs at the end of the connected strip may remain dark.

When the LED controller L2 has received valid TPM2 data via the USB interface, it automatically switches to the USB mode (also from the OFF mode) and outputs the received data to the light-emitting diodes. 2 seconds after the end of data transmission, the LED controller L2 automatically returns to the last mode



INTEGRATED EFFECTS

The LED controller-L2 has many factory-integrated static and dynamic effects optimized for the connection of LED stripes. Static effects always affect the entire length of the connected strip. However, many dynamic effects output their data in so-called segments, these are areas on the stripe in which the effects are repeated. The length of these segments can be configured in the LED Controller L2 setting menu.

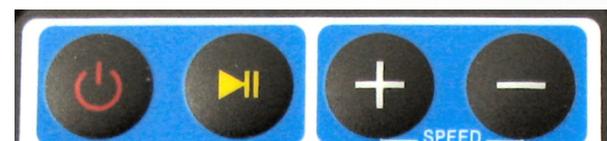
The brightness of all effects as well as the playback speed of many dynamic effects can be changed at any time by pressing the buttons or remote control.

The random mode plays the effects randomly and changes to the next effect after a set time. The setting menu can be used to select whether only static, dynamic or all effects should be selected by chance.

The type and number of built-in effects can vary from version to version of the LED controller-L2 bios and are therefore not described in detail in this manual. Just try the effects.

OPERATION

The LED controller-L2 is operated via the 4 buttons on the device or alternatively via the infrared remote control. The functions of the (OFF) (SEL) (+) (-) buttons on the unit correspond largely to the upper 4 buttons on the remote control (Pause) (+) (-).



To avoid unwanted calls to some functions, they can only be called up by pressing the keys for a long time. These are found in the description of the key functions of the various function modes.

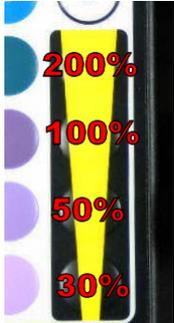
The function menu and all option menus are automatically exited when no button has been pressed for 30 seconds on the unit or on the remote control. All menus are exited immediately with the OFF button; any settings made are stored in the EEPROM of the LED controller-L2.

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After restarting the LED controller-L2 by applying the supply voltage, the last mode is automatically started: OFF (no function), EFFECT (last set effect), RANDOM (random next effect).

While playing back effects (Normal, Random) or USB mode, pressing one of the 4 brightness buttons directly changes the brightness of the connected LEDs with fixed values. A fine adjustment of the brightness is made via the option menu (key SELECT, remote control PAUSE).



Brightness levels in USB mode.

TPM2 sequences stored too dark can be brightened when the setting is over 100%.

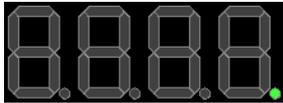


Brightness levels in effect and random mode.

All effects are designed for 100% brightness, therefore only a reduction is possible.

Mode: OFF

No output of data to the light-emitting diodes.



Keys on the device:

[OFF] Call up the function menu

[SELECT] Call up the setup menu (press for 2 seconds)

Remote Control:

[OFF] Call up the function menu

[PAUSE] Call up the setup menu (press for 2 seconds)

[FAST] Start playback

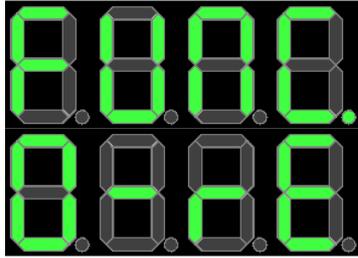
[FLASH] Start random playback

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Mode: FUNCTION MENU

Select the function.

The menu is automatically exited when no key is pressed for 30 seconds.



Keys on the device:

[-] Start playback

[+] Random playback Start

[OFF] Switch to OFF mode

Remote Control:

[-] Start playback

[+] Directly to random playback

[OFF] Switch to OFF mode

Mode: USB

TPM2 data are received via USB and output to the LEDs. This function is started automatically when data is being received and left again if no data has been transferred for 2 seconds.



Keys on the device:

[SELECT] Call up the option menu (here: adjust brightness)

Remote Control:

[PAUSE] Call up the option menu (here: Set the brightness)

[BRIGHTNESS BUTTONS] 200%, 100%, 50%, 30%



USB option: Brightness in% (default value: 100%)

Keys on the device:

[-] Reduce brightness (in 5 steps, minimum = 5%)

[+] Increase brightness (in steps of 5, maximum = 200%)

[OFF] Exit the Options menu

Remote Control:

[-] Reduce brightness (in 5 steps, minimum = 5%)

[+] Increase brightness (in steps of 5, maximum = 200%)

[OFF] Exit the Options menu

[BRIGHTNESS BUTTONS] 200%, 100%, 50%, 30%

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Mode: EFFECT PLAYBACK

Effect is displayed with the number displayed.



Keys on the device:

- [-] Reduce effect number
- [+] Increase effect number
- [SELECT] Call up the option menu (adjust brightness / speed)
- [OFF] Call up the function menu (press for 2 seconds)

Remote Control:

- [-] Reduce effect number
- [+] Increase effect number
- [PAUSE] Call up the option menu (adjust brightness / speed)
- [OFF] Call up the function menu (press for 2 seconds)
- [COLOR KEYS] Display all LEDs with key color
- [BRIGHTNESS BUTTONS] 100%, 50%, 30%, 15%



Effect option: Brightness in% (default: 50%)

Keys on the device:

- [-] Reduce brightness (in 5 steps, minimum = 5%)
- [+] Increase brightness (in steps of 5, maximum = 100%)
- [SELECT] Call up the next option (if possible)
- [OFF] Exit the Options menu

Remote Control:

- [-] Reduce brightness (in 5 steps, minimum = 5%)
- [+] Increase brightness (in steps of 5, maximum = 100%)
- [PAUSE] Call up next option (if possible)
- [OFF] Exit the Options menu
- [BRIGHTNESS BUTTONS] 100%, 50%, 30%, 15%



Effect option: Speed (not possible for all effects)

Keys on the device:

- [-] Reduce speed (minimum = 1)
- [+] Increase speed (maximum = 10)
- [SELECT] Call up the next option
- [OFF] Exit the Options menu

Remote Control:

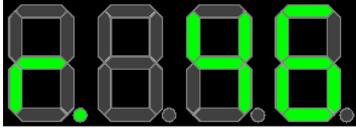
- [-] Reduce speed (minimum = 1)
- [+] Increase speed (maximum = 10)
- [PAUSE] Call up the next option
- [OFF] Exit the Options menu

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Mode: RANDOM PLAY

Effects are randomly rendered.

The type of effects and the time between the changes are defined in the setup menu.

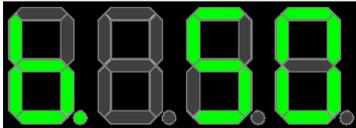


Keys on the device:

- [-] Immediately change random effect
- [+] Immediately change random effect
- [SELECT] Call up the option menu (adjust brightness / speed)
- [OFF] Call up the function menu (press for 2 seconds)

Remote Control:

- [-] Immediately change random effect
- [+] Immediately change random effect
- [PAUSE] Call up the option menu (adjust brightness / speed)
- [OFF] Call up the function menu (press for 2 seconds)
- [BRIGHTNESS BUTTONS] 100%, 50%, 30%, 15%



Effect option: Brightness in% (default: 50%)

Keys on the device:

- [-] Reduce brightness (in 5 steps, minimum = 5%)
- [+] Increase brightness (in steps of 5, maximum = 100%)
- [SELECT] Call up the next option
- [OFF] Exit the Options menu

Remote Control:

- [-] Reduce brightness (in 5 steps, minimum = 5%)
- [+] Increase brightness (in steps of 5, maximum = 100%)
- [PAUSE] Call up the next option
- [OFF] Exit the Options menu
- [BRIGHTNESS BUTTONS] 100%, 50%, 30%, 15%



Effect option: Speed (Speed)

Keys on the device:

- [-] Reduce speed (minimum = 1)
- [+] Increase speed (maximum = 10)
- [SELECT] Call up the next option
- [OFF] Exit the Options menu

Remote Control:

- [-] Reduce speed (minimum = 1)
- [+] Increase speed (maximum = 10)
- [PAUSE] Call up the next option
- [OFF] Exit the Options menu