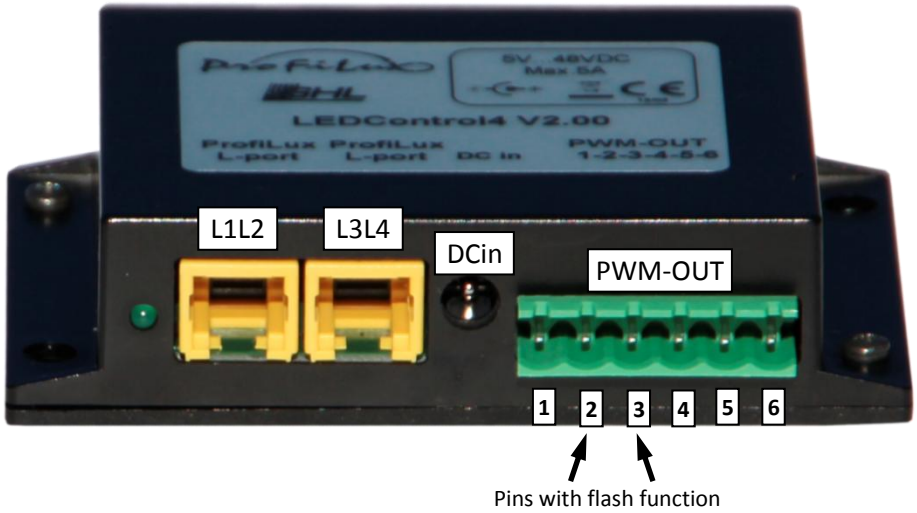
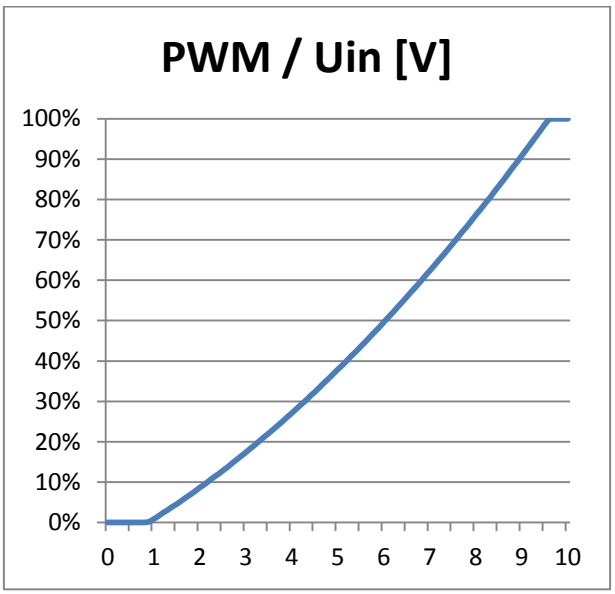
Electronic controller for LED-lamps *LEDControl4 V2*



Characteristics

LEDControl4 V2 converts 4 analog input voltages into 4 pulse width modulated (PWM) signals (Open-Drain) and includes drivers for the direct connection of LEDs (max. 5 A in total). Furthermore with *LEDControl4* external LED-drivers with PWM-input can be controlled. In order to protect the connected *ProfiLux* from possible interferences, the input side is galvanically isolated from the output side through optocouplers. In the delivery status, for 0% PWM the transistors are insulating (output is high-resistance), for 100% PWM the output is permanently pulled to minus potential. The polarity of the PWM can be inverted. Through this you achieve that for 0% PWM the outputs are permanently pulled to minus potential and for 100% PWM the outputs are high-resistance. Through a new inversion you can switch again to the original state.
LEDControl4 can produce „flashes“ during a thunderstorm simulation in *ProfiLux*. During a flash the PWM-signal is set for a short time to 50%, 75% or 100%, independently from the belonging analog input. Flashes can be output at channel 3 and channel 4, the flashing behavior can be set, see below. Not all L-ports are suited for the generation of a flash. Presently the onboard interfaces of *ProfiLux* and the interfaces in the *ExpansionBox* support the flash function.
According to the connection, *LEDControl4* can be used for the operation with LED-lamps or with LED-drivers.

Input voltage (control voltage of L-ports) vs. PWM-output:



Assignment of screw terminal PWM-OUT:

Pin	Signal	Description
1	LED +	Here the plus potential of the power supply applies, the + line of the LEDs of LED-lamps is connected here
2	LED PWM 4	Here the PWM of the fourth channel (L4, right L-port) applies, at this channel a flash is always generated
3	LED PWM 3	Here the PWM of the third channel (L3, right L-port) applies, at this channel the flash function can be disabled
4	LED PWM 2	Here the PWM of the second channel (L2, left L-port) applies
5	LED PWM 1	Here the PWM of the first channel (L1, left L-port) applies
6	LED -	Here the minus potential of the power supply applies, for LED-drivers here the ground of the PWM-inputs are connected

Operation with LED-lamps:

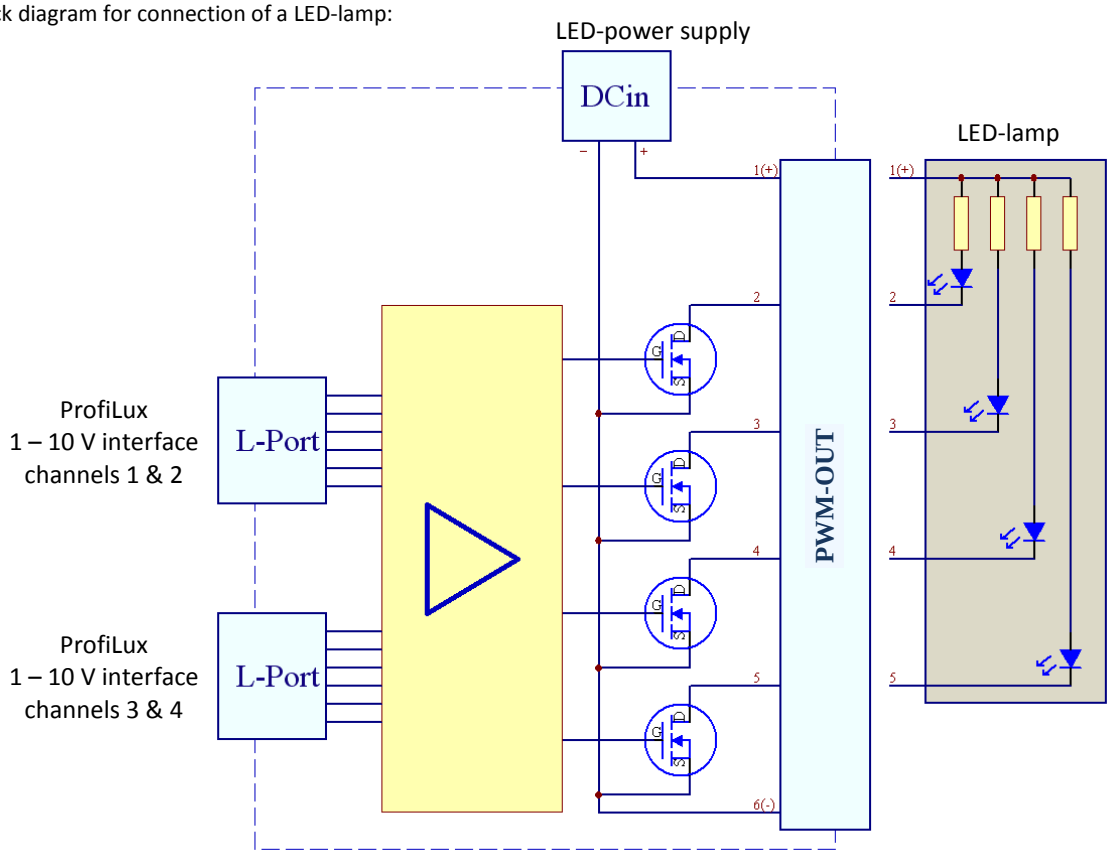
Preconditions (not included in shipment)

- 2 or 4 free 1-10 V-interfaces (1 or 2 L-ports) at *ProfiLux*
- LED-lamps with common anode (+) which can be controlled via PWM (Open Drain)
- power supply with adequate voltage and power

Connection and operation

To the DC-socket (DCin) a suited power supply unit is connected. Alternatively pins 1 (+) and 6 (-) can be used for the power supply.
The supplied control lines (Western cables) are at one end connected to the corresponding sockets of *LEDControl4* (L1L2, L3L4), on the other end to free sockets with 1-10V-interface (e.g. *L1L2* and *L3L4*) of *ProfiLux*.
The LED-lamp is connected via the supplied screw-type terminal to (PWM-OUT), here *Plus* applies permanently, *Minus* is pulsed with PWM.
Several LED-lamp manufacturers offer suited adapter cables for connecting their lamps to *LEDControl4*.
Please note that pin 6 of the LEDControl4 V2 socket remains free if the plug has 5 pins!

Block diagram for connection of a LED-lamp:



Example 1:
Connection of two light stripes red and white with a nominal voltage of 24V.

In this case a power supply unit with 24V (with DC-plug, plus pole inside) is needed. The plus line of both LED-stripes must be connected to the PWM-OUT connection leftmost (Pin 1). The minus line of the white LED-stripe must be connected to the PWM-channel 4 (Pin 2) and the minus line of the red LED-stripe must be connected to the PWM-channel 3 (Pin 3). Since only the first two PWM-channels (Pin 2 & Pin 3) are used, only the right L-port (L3L4) of *LEDControl4* has to be connected with a free L-port at *ProfiLux*, the other L-port is unused and can left free. If only white flashes shall be generated, *LEDControl4* must be programmed to „Flash at channel 1“ in order that the other channel with the red LEDs doesn't generate a flash.

Example 2:
Connection of a light stick or light stripe with 4 colors (red, green, blue and white). The light stick resp. light stripe has a nominal voltage of 12 V and a common anode (+) for all colors.

In this case a power supply unit with 12 V (with DC-plug, plus pole inside) is required. The common plus line must be connected to the PWM-OUT connection leftmost (Pin 1). The colors white, blue, green and red are connected with Pin 2 to Pin 5. It is recommended to connect the white LEDs to PWM-channel 4 (Pin 2), since here a flash can be generated. If you like to have white-blue flashes, then connect the blue LEDs with PWM-channel 3 (Pin 3) and program in ProfiLuxControl „Flash at channel 1 & channel 2“. The connection rightmost (Pin 6) remains free.

Operation with LED-driver:

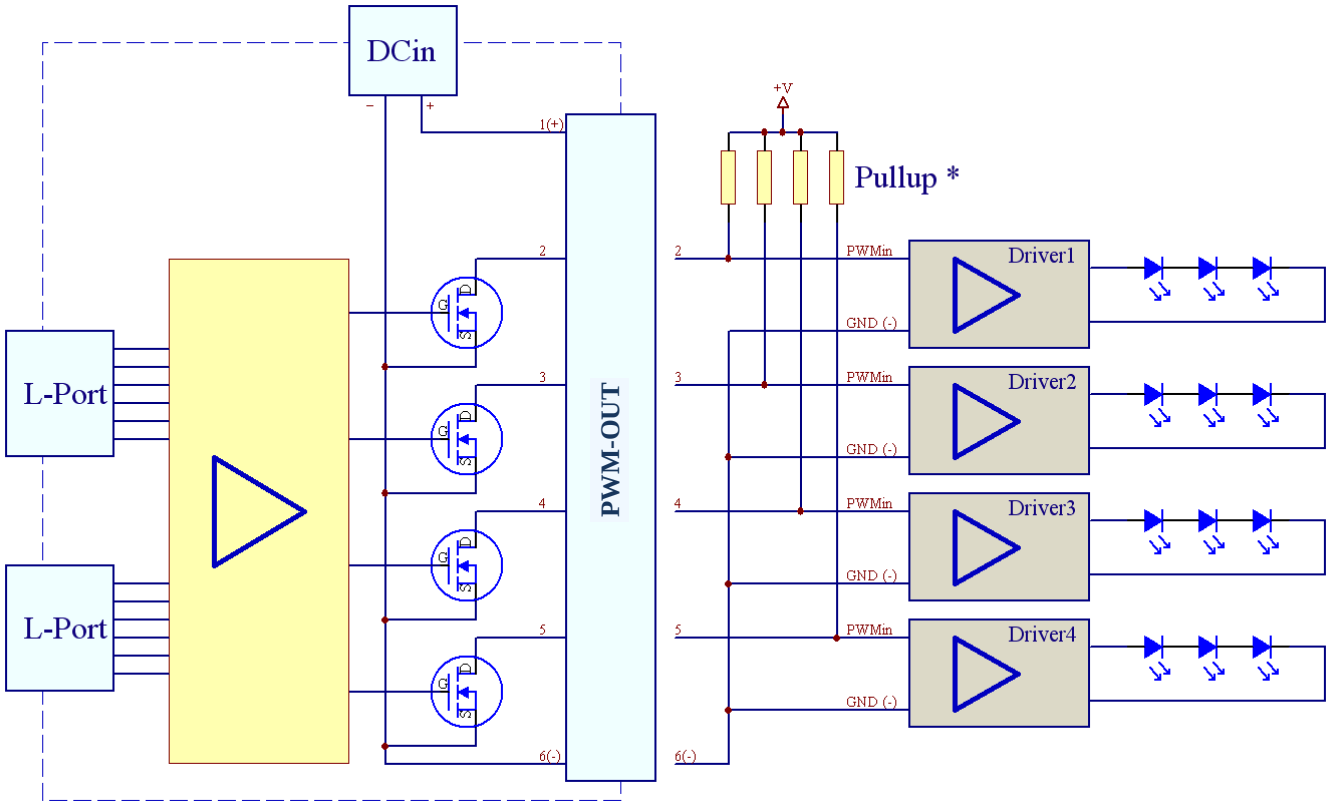
Preconditions (not included in shipment)

- 2 or 4 free 1-10 V-interfaces (1 or 2 L-ports) at *ProfiLux*
- LED-driver which can be controlled (dimmed) via PWM (Open Drain)

Connection and operation

The supplied control lines (Western cables) are at one end connected to the corresponding sockets of *LEDControl4 V2* (L1L2, L3L4), on the other end to free sockets with 1-10V-interface (e.g. *L1L2* and *L3L4*) of *ProfiLux*. The control inputs of the LED-drivers are connected via the supplied screw-type terminal to (PWM-OUT).
Possibly pull-up-resistors on the control inputs of the drivers are required.

Block diagram for connecting four LED-drivers:



* The pull-up-resistors are necessary if in the LED-driver internally at the PWM-input no pull-up-resistor is integrated.

Example 1:
The LED-driver has a PWM-input with integrated pull-up-resistor.

Here it is sufficient to connect the PWM-input of the LED-driver with a PWM-output (Pin 2, Pin 3, Pin 4 or Pin 5) of PWM-OUT.
If several drivers or one driver shall be connected with several PWM-inputs, then for the separate dimming you have to connect one PWM-input with one PWM-output of *LEDControl4 V2* each. The ground of the PWM-input (often named with 0 V or GND) is connected to the PWM-OUT connection rightmost (Pin 6) – for several drivers the ground has to be connected in parallel. The PWM-OUT connection leftmost (Pin 1) remains free.

Example 2:
The LED-driver disposes of a TTL-compatible PWM-input (control input for 5 V-level). But no pull-up-resistor is integrated in the driver. At the driver, no connection for the control voltage supply (here in the example 5 V) is available.

For the control of a TTL-compatible PWM-input a power supply unit with 5 V and external pull-up-resistors are necessary. The value of the resistors should be 470 Ohm to 10 kOhm according to the requirements of the PWM-input of the LED-driver.
Further information you will get from the data sheet of the LED-driver or from the manufacturer of the LED-driver.
The wiring must be made according to the example before. But in this case additionally the power supply unit is connected to the DCin-socket.
Furthermore one end of the pull-up-resistors is connected each to the single PWM-inputs of the drivers (or to Pin 2 … Pin 5 from PWM-OUT).
The other end of the pull-up-resistors (+V) is connected with Pin 1 from PWM-OUT.

Settings

Please don't forget to program the corresponding 1 – 10 V interfaces and illumination channels of *ProfiLux* adequately.
In *LEDControl4 V2* you can set the flashing behavior. The settings are made in *ProfiLuxControl* and are transferred via *ProfiLux* to *LEDControl4 V2*. These settings are stored in *LEDControl4 V2* and remain also without operating voltage. The following settings are possible:

- Reaction to Flash 1, Flash 2 or Flash 1 & 2
- PWM for Flash at 50%, 75% or 100%
- Invert output signal (Change between inverted and not inverted PWM-output signal)
- Change between Flashes at PWM channel 4 and Output Flashes at PWM channels 3 & 4

You can find more information regarding the settings in the manual of your *ProfiLux*.

Problem description	Cause
The brightness of the LEDs can't be set (is permanently on or off), the status LED at *LEDControl4 V2* is on.	The power supply (DCin) is not connected or doesn't supply voltage. There haven't been assigned any or have been assigned false illumination channels to the 1 – 10 V interfaces (L-ports) connected to *LEDControl4 V2*. The LEDs or the external LED-driver haven't been connected correctly. At the external LED-driver the pull-up-resistors haven't been connected correctly.
The brightness of the LEDs can't be set (is permanently on or off), the status LED at *LEDControl4 V2* is off.	The 1 – 10 V interfaces (L-ports) of *ProfiLux* and of *LEDControl4 V2* are not correctly connected or are connected by mistake to another socket.
The brightness is for 0% illumination maximal and for 100% the illumination is off.	The PWM-pulsing must be inverted. This can be simply done via ProfiLux-Control.
You can't see a flash during a thunderstorm.	In the illumination settings the flash function is not activated. The flash intensity is less than the current illumination. *LEDControl4 V2* is connected to the L-ports which can't generate a flash. The respective LEDs are not connected to PWM channel 3 or PWM channel 4.
During the programming of *LEDControl4 V2* the brightness of the connected LEDs changes and the status LED blinks.	The status LED shows the programming state. The brightness change of the LEDs is a normal behavior during programming.

Important hints

- **Electrical installations must always be made by a qualified person.**
- **Please pay attention that the LED-lamps that are connected are compatible, currents, voltages and polarity have to be considered.**
- **Protect *LEDControl4 V2* from splash water and too high humidity.**
- **Make in any case sure that the device is used according to the technical data above – wrong installation or an overload will destroy *LEDControl4!* If you are not sure about the connection data of your lamp ask the lamp manufacturer for details.**

The non-observance of this manual or the improper use may lead to damages, the repair of these damages are not covered by warranty!

Technical data

Input voltage range	5 V … 48 V, Polarity: + inside, - outside, DC-socket 5.5/2.1mm
Maximal current per channel or in sum	5 A
Number of channels	4
Input voltage range analog inputs	0 V … 10 V
PWM-switching frequency	122Hz

Disclaimer

The manufacturer refuses any liability for (consequential) damages which occur through the use of this device as far as legally allowed.

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