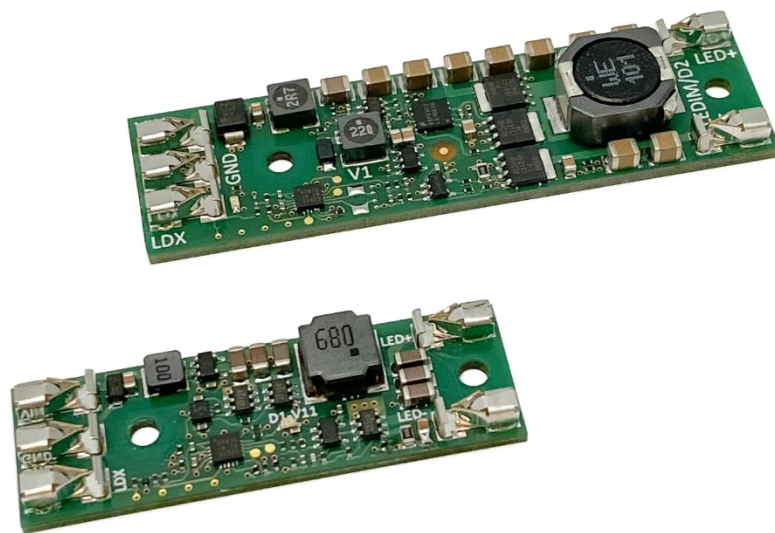


LEDIM/Dx Driver Family Application Notes



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1. Overview

Being part of the LEDIM/ModularSystem, the analog, flicker free LED drivers D1 and D2 offer the luminaire designer a wide range of application possibilities. In order to be able to cope with this exuberant flood of scope for development, this document provides an overview of the various scenarios.

2. Stand-alone usage

Besides their use in a modular cluster, LEDIMs Dx drivers can also be used alone. This opens up sophisticated possibilities for applications, not only due to their very compact dimensions, but also due to the advanced integrated dimming controls touch, push button and potentiometer dimming. In both scenarios, they offer exceptional operational reliability combined with the best integration capabilities.

2.1 Potentiometer Dimming

A very basic way to dim e.g. a table- or floor standing lamp is by a rotary knob. LEDIM/Dx drivers can be dimmed by connecting a variable resistor ($50\text{ k}\Omega^1$) to the control input:

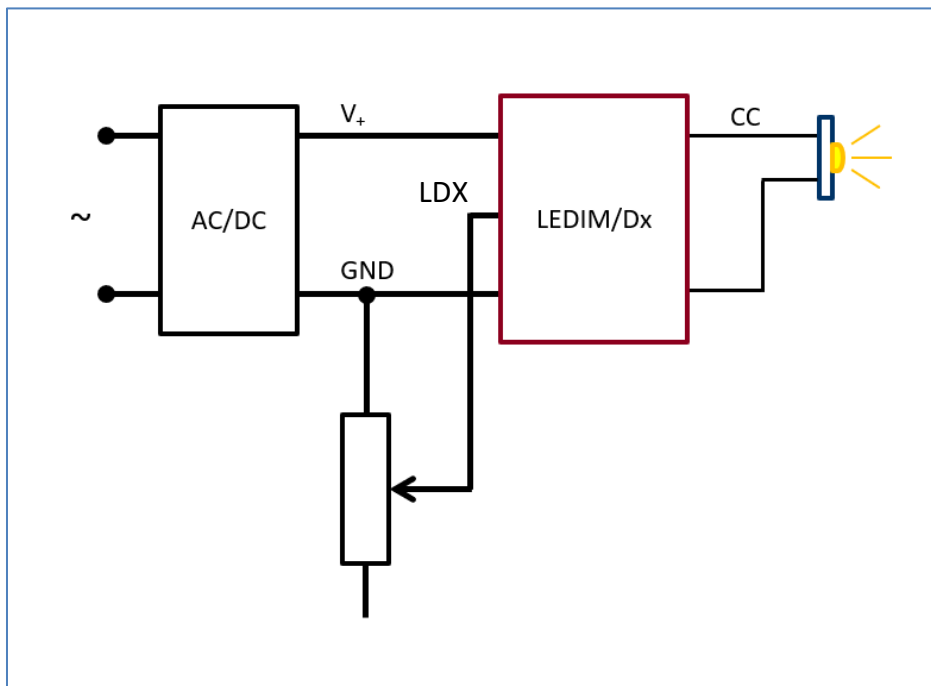


Figure 1: Potentiometer Dimming illustrated

¹ LEDIM recommends to use linear potentiometer types

2.2 Touch/Pushbutton Dimming

LEDIM/Dx can also be dimmed by 'relative dimming' using a pushbutton connected to its control input or in touch dimming configuration.

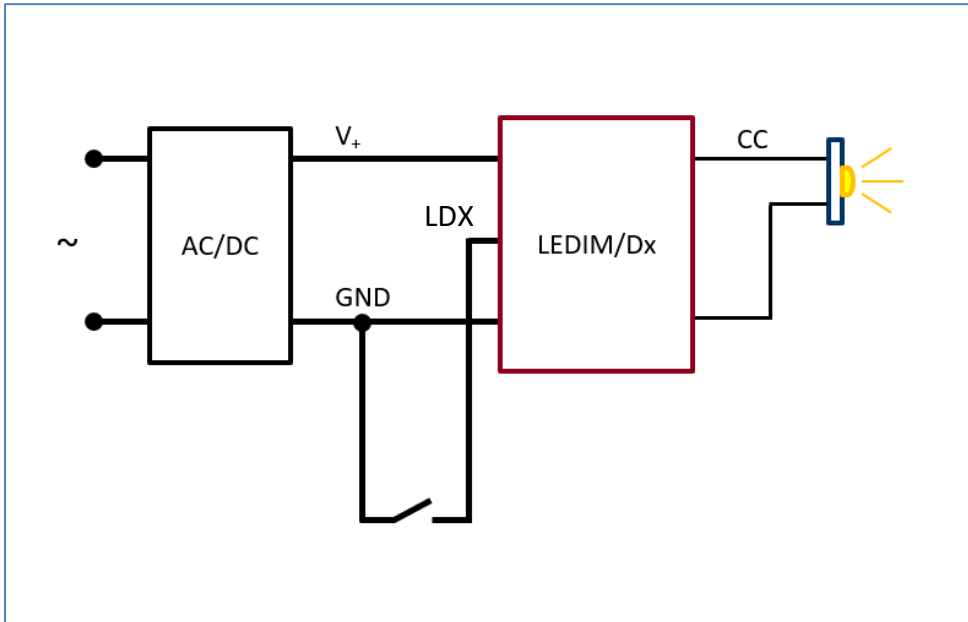


Figure 2: Pushbutton wiring illustrated

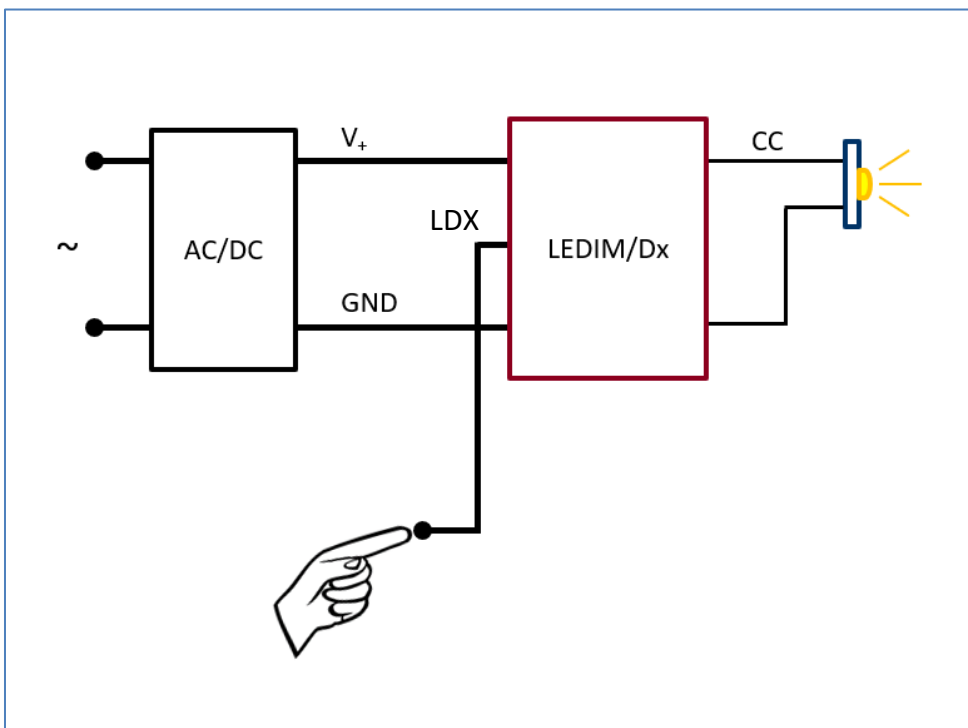


Figure 3: Touch wiring illustrated

2.3 Touch/Pushbutton Dimming Commands

Beside the most obvious touch command – the “short touch”, which simply switches the light on and off² – there are several more commands, which are explained in the datasheet of your device.

2.4 Touch Dimming Requirements

As touch dimming only can work, when user contact “makes a difference”, please consider:

- When integrating Dx into a (metal) lamp housing, which is also the touch surface, the driver’s CC outputs must be decoupled to reduce parasitic capacity.
- When the LED engine’s PCB is made of Aluminum, it might be a critical condition to have the engine’s heat sink electrically connected to the touch surface (e.g. the lamp housing). The parasitic capacity of the LED engine can cause malfunctions in touch dimming here. Please use thermal conducting pads³ instead of thermal paste (blue pad in Figure 4) to avoid.
- COBs or LED engines made of ceramic material are less critical in terms of parasitic capacity. So are cases, where the LED engine is electrically separated from the touch surface (see Figure 5).
- For further questions please contact support@ledim.de.

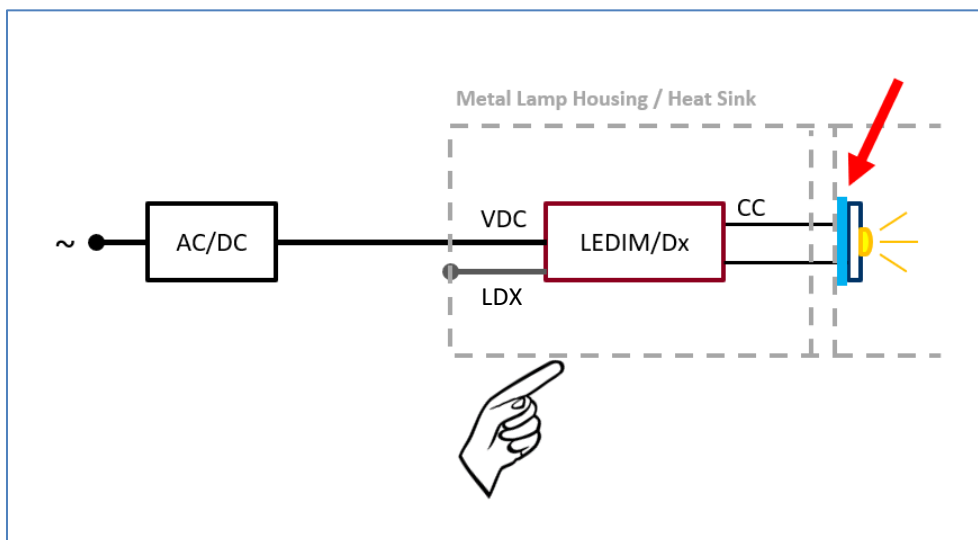


Figure 4: Critical Condition: Heat Sink connected to lamp housing with Alu PCB

² If the device is not in locked state.

³ Use thermal pads with thickness of at least 0.3 mm.

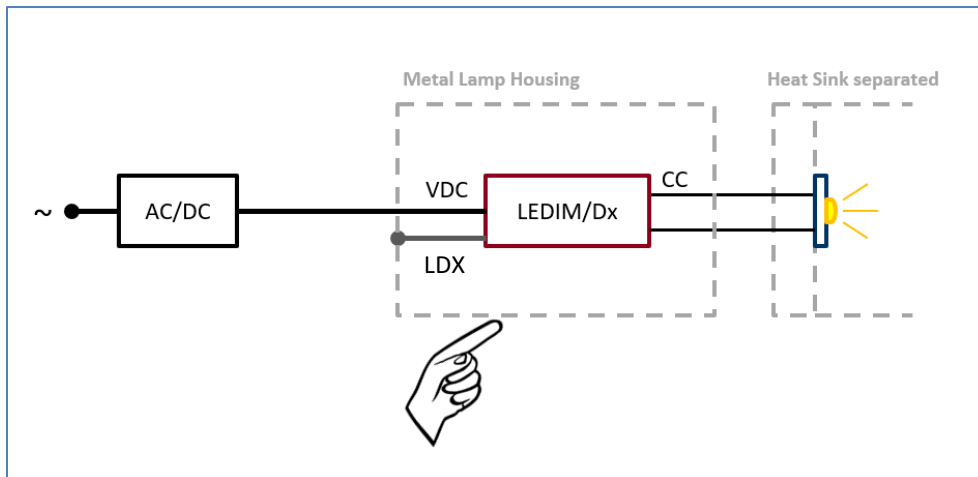


Figure 5: Less Critical Condition: Heat Sink not connected to lamp housing

3. Using in a Modular Cluster

The use as stand-alone dimmer already offers many possibilities, but LEDIM's Dx drivers show their true strengths when used as part of the ModularSystem. Here they give the luminaire designer the ultimate freedom, as there is now no longer any need to find a separate monolithic dimmer for each variant when planning a luminaire family. Instead, all members of the family can be operated with the same technology.

LEDIM breaks the stiff relationship between dimming technology and driver and replaces it with an ultra-flexible system of dimming control ("Bridge") and separate drivers for different power ratings.

3.1 LDX Dimming Principle

LDX is LEDIM's interconnecting control signal. The use is fairly simple: Just connect the LDX output of the Bridge with the LDX input(s) of one or more Dx drivers.

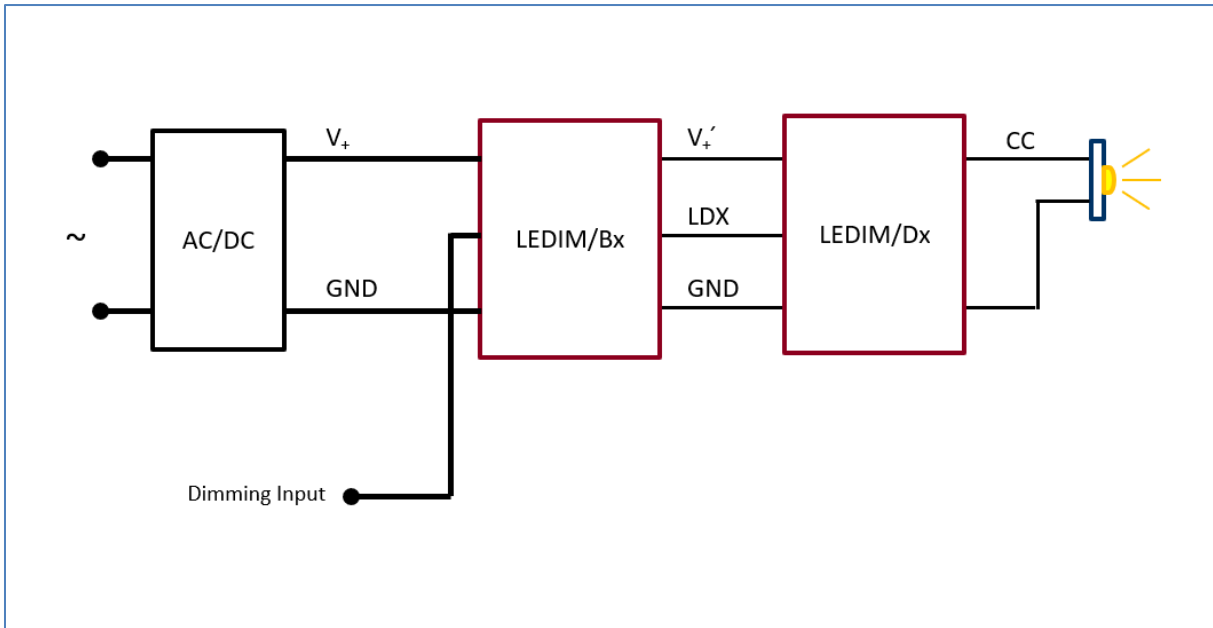


Figure 6: LDX Dimming with one single Driver

3.2 Connecting multiple Devices

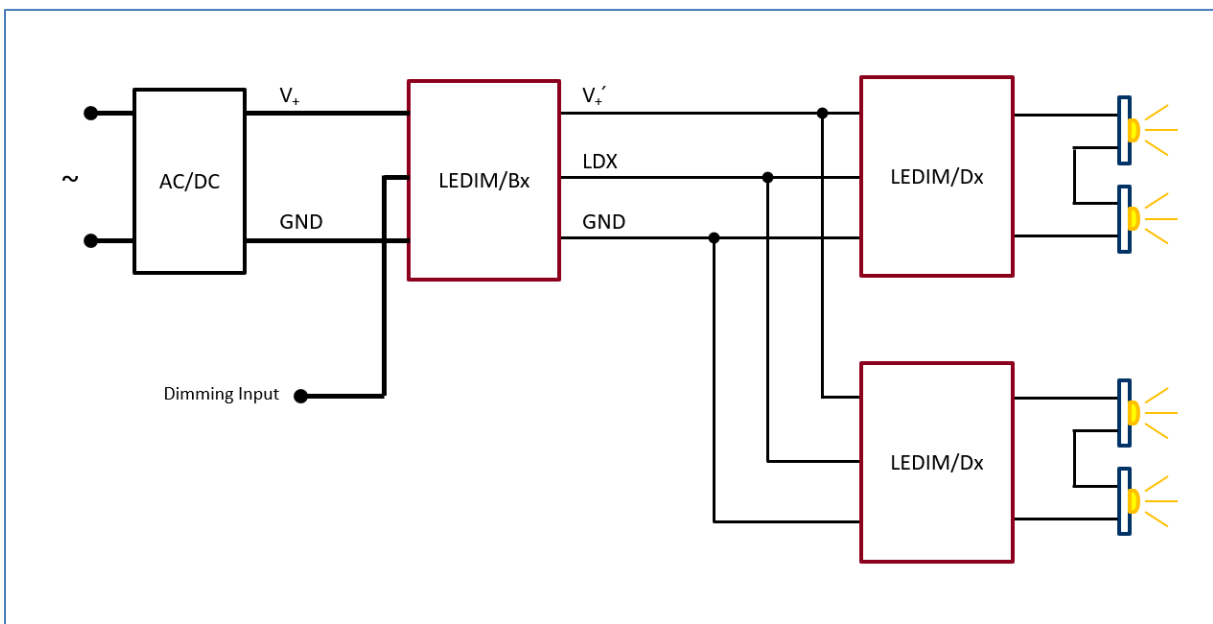


Figure 7: LDX Dimming with multiple Drivers

Multiple LEDIM/Dx devices can be wired together simply by realizing a parallel arrangement: All input signals are tied together with their respective mating signals (all V+ together, all GND together and all LDX) together.

(Please note the output circuitry in the above figure with two LED engines per driver. We will explain this in section 4)

A parallel wiring with three drivers and one LED engine per driver might look like this:

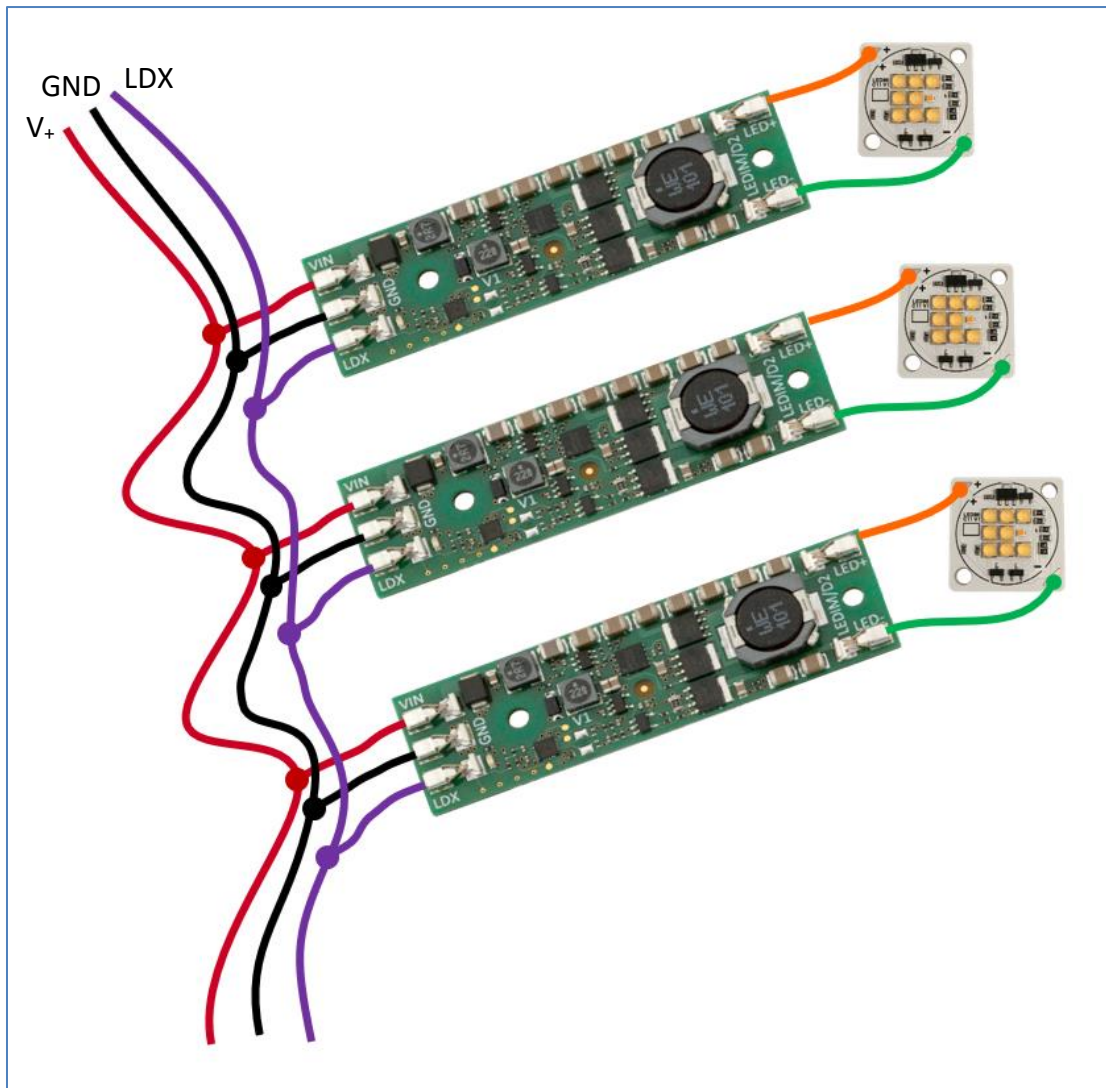


Figure 8: Parallel Arrangement illustrated



REMARK:

Parallel arrangement only works with LDX connections, **not** with touch/pushbutton nor potentiometer dimming.



CAUTION:

Please ensure, the power supply and cabling meet the electrical requirements (e.g. maximum current and voltage). Do not connect **more than 10 control signals together!**

4. Output Wiring Scenarios

As the general wiring approach for multiple LED engines per driver is quite easy – LED engines are interconnected in a row – there are some aspects to consider.

4.1 One engine wiring

Starting with the simplest configuration, one engine per driver, LEDIM offers one special feature, which outperforms most of the competition: Dim2warm via 2-wire. As this might seem as not required, when all components are in one housing...

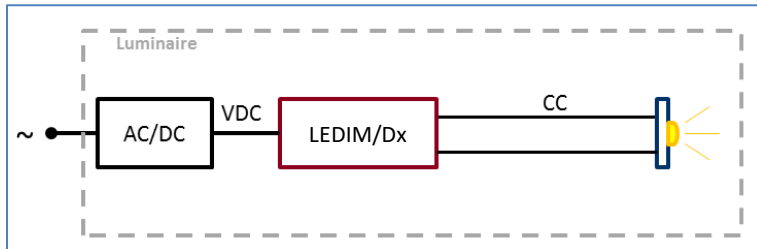


Figure 9: Wiring Scenario: All Components in One Housing

... with a separated luminaire head, this is a totally different story. For applications like pendant lamps, the lighting designer might aim for an aesthetic cable, which usually should not have more than 2 wires.

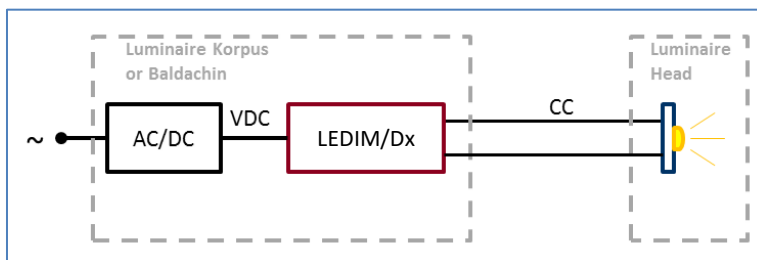


Figure 10: Wiring Scenario: Lamp Head Separated from Electronics

4.2 Wiring of two or more LED engines

When using LEDs with a constant current driver, electrically always two main parameters must be met: The maximum output current must be the operating current for the LED at 100% brightness, and the sum of the forward voltages of all LEDs must be within the drivers operating range⁴. As the first is obvious, the latter must be determined by adding all forward voltages together. As long as the capabilities of the driver are not exceeded, the wiring might look like this:

⁴ As defined in the respective datasheet

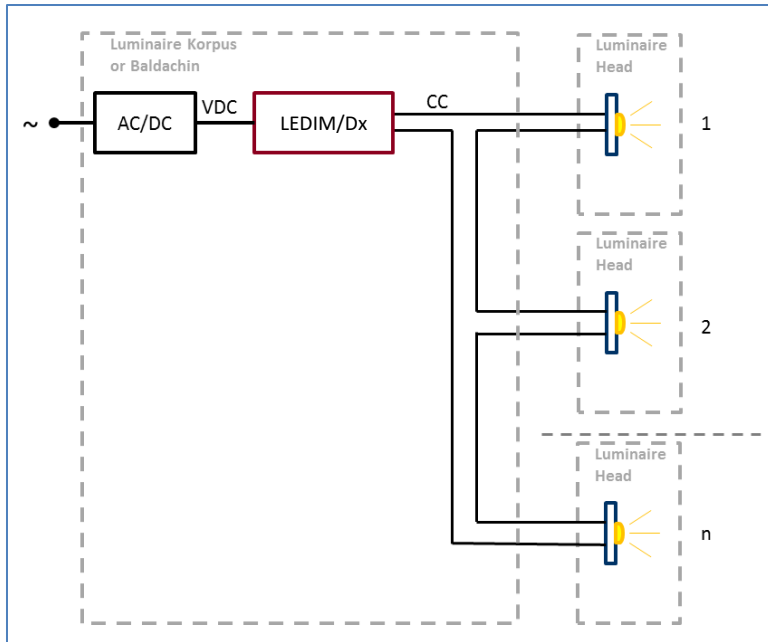


Figure 11: Multiple Engines Connected in a Row

4.3 Wiring with more than one driver

Given a case, where the capabilities of one driver are no longer met, e.g. a pendant lamp with four luminaire heads, the below-mentioned configuration of parallel operated drivers might be chosen. Both drivers are controlled by the same Bridge, both are wired with two LED engines at their outputs in this example. In your particular use case this might vary.

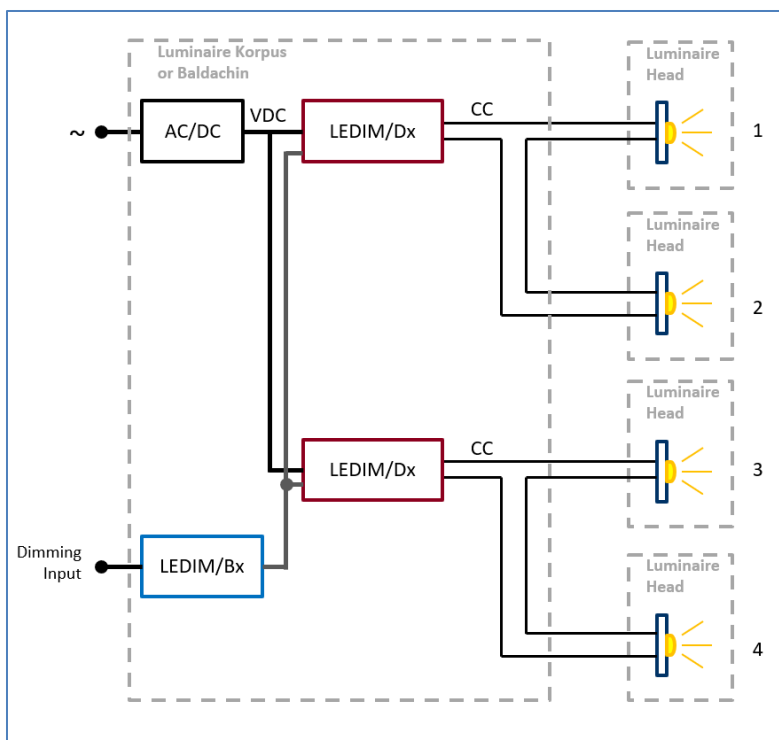


Figure 12: Multiple Drivers with multiple Engines

