LED control: unaddressed protocols

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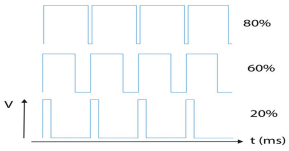

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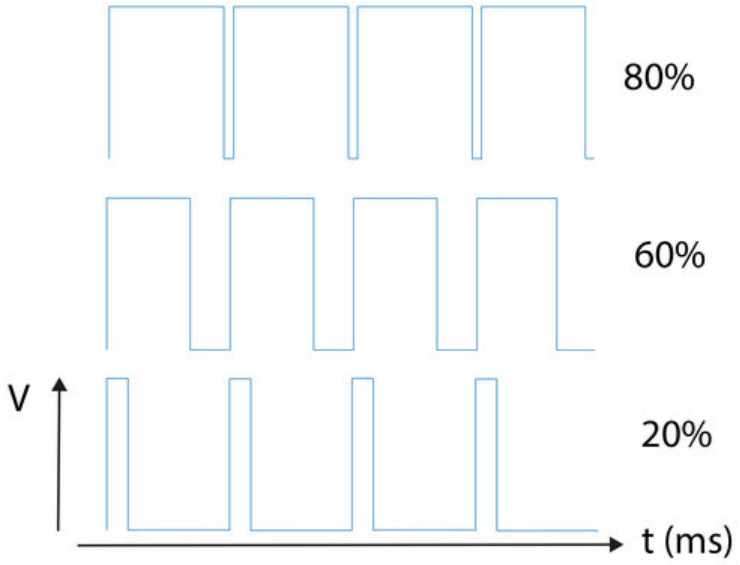
What are the protocols for controlling LED lighting so that all PWM, 1-10 V and 0-10 V lights behave the same way? Technical summary.

PWM: Pulse-Width Modulation

The light is controlled by a 10 or 24V signal. It is the time gap between the peak and valley that defines the product's luminous intensity. If the frequency of the control signal is sufficiently high, the human eye perceives no variation in lighting.

Depending on the lighting equipment, the signal may be directly over the mains, or over controlled circuits. Identical products connected to identical systems will behave identically. This principle is very sensitive to electromagnetic disturbances, and therefore cannot use standard cables.



PWM signal curve

0-10 V or 1-10 V

The light is controlled by a dimmer that varies the voltage from 0 to 10V. The lights are at maximum output at 10V. There are three lower voltage gradients:

- Continuous from 0 to 100% for 0-10V models
- Minimum dim 10% for 1-10V models. The light is always on, if only at minimum.
  he light never turns off completely.
- A hybrid of the two allows the light to be turned off completely below 1V, but with no gradation at those low voltages.

Identical lights connected to the same 1-10V controller or that behave in the same way, ie., that start up at the same time and with the same light output.

This protocol is unaffected by electromagnetic disturbances. This means that a standard 4-wire cable can be used for:

- a copper circuit for power supply,
- a copper circuit for 0-10V control.

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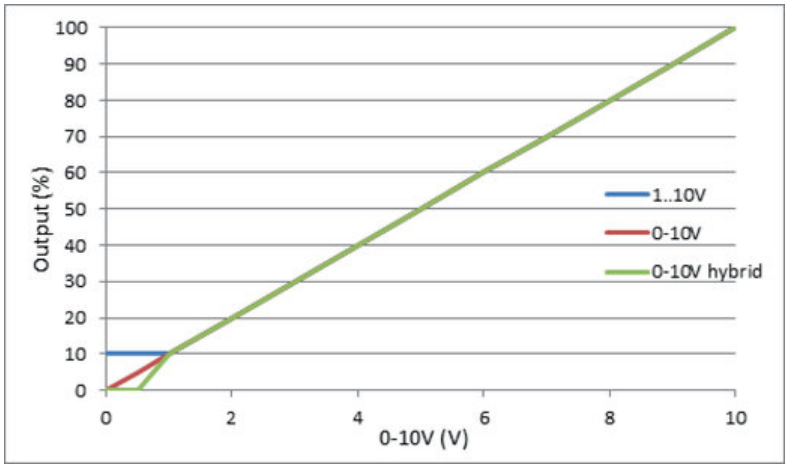
The very low power consumption (less than 1mA) of the 0-10V input, limits any voltage drops. This means that conductor sizes (diameters) do not have to be increased to compensate for it.

The robustness and simplicity of this robustness principle explains the large number of products compatible with this technology. For complex specifications, one ought to choose an elaborated solution allowing control of dynamic lighting facility, that is a protocol with addresses.



0-10 V signal curve