# Exemption for control gears used in entertainment application

Control gear for this application is exempted in 1194/2012

Issues with bringing control gear under this regulation are:

- Many control gears in this application do not meet standby requirement of 0.5W.
- Standby requirement is not relevant for this application since luminaires are switched off after the show.
- Forcing the industry to redesign luminaires to meet standby requirement is enormous burden due to large diversity of luminaires and corresponding diversity in control gears, while it does not give any significant energy saving.
- Lighting Europe strongly advises to exempt control gear used in entertainment application. Essential to enable replacement of control gears in existing installations (HID,LED and some Halogen)

# Proposal for control gear exemption for entertainment application

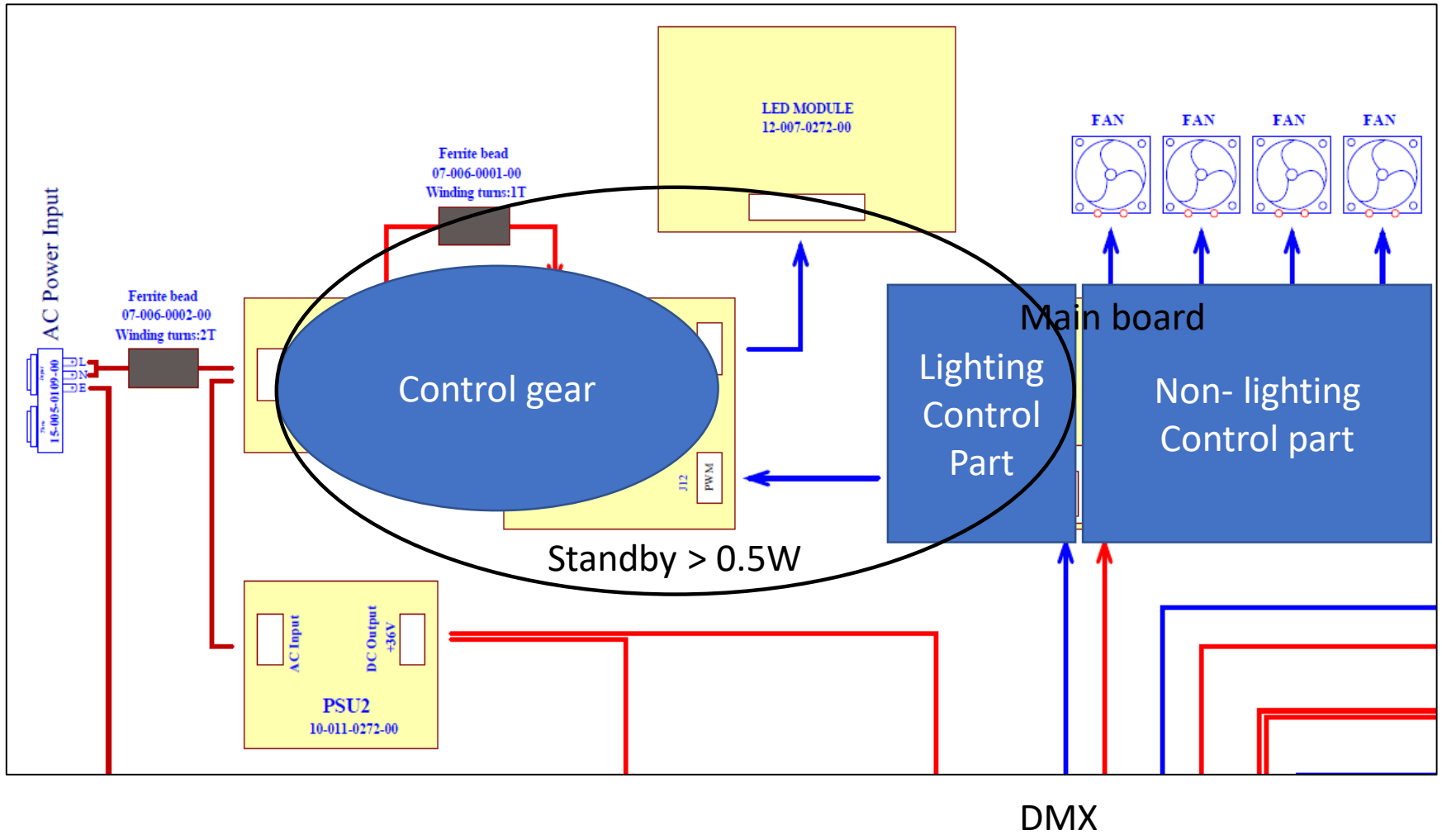
Unique technical characteristic:

- Entertainment lighting uses DMX/RDM interface for communication
- DMX/RDM interface is not used in general lighting applications
- Light source power is relative high (typically above 100W for LED)


- Proposal to exempt the following products :
  - Control gear with output powers of at least 100W having a communication interface based on DMX/RDM communication protocol*.
  - Light source of at least 120W having a communication interface based on DMX/RDM communication protocol*.

  * USITT DMX 512 interface according ANSI E1.11 or an RDM interface according ANSI E1.20 with optional additions ANSI E1.37-1 and ANSI E1.37-2

# Annex 1: Example architecture.



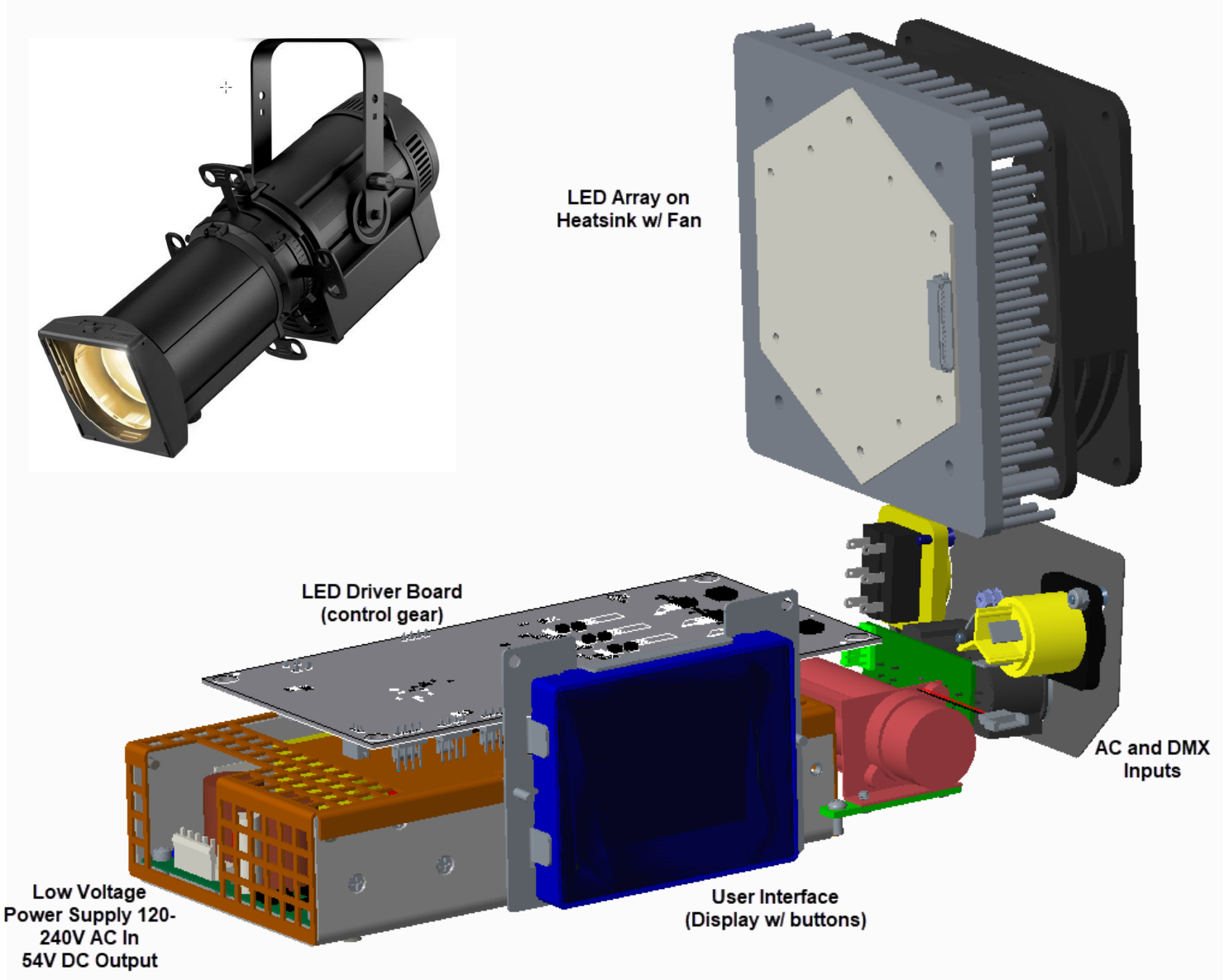

Main Board controls:

- light
- Non-lighting functions
  - Runs fans and monitors fan speeds
  - Controls motors for lenses and objects.
  - Display

- DMX communication (= Lighting control part) energy consumption cannot be separated from other functions.
  (all functionality runs in one microprocessor)

- DMX communication needs to be fast, e.g. needs to be synchronized with music.
  Higher data rate communication requires more energy.

# Annex 2, Example of internal structure




Why are functions integrated in other way as in general lighting application? (No clear separation between control gear and other functions).

- more functionality requirements beyond lighting (e.g. fans, motor drives)
- Size restrictions

>> Many different solutions on the market.
>> Industry cannot redesign most products before 2021 due to too large variety of products

Proposed Regulation will result in:

- ban of many of the existing LED luminaires
- lack of spare parts for HID and LED luminaires
- back sliding to old technologies (halogen) until new LED products are available.

# High brightness LED

Modern high brightness LEDs, also called high luminance light sources (HLLS), are replacing HID in entertainment lighting.

Benefits of LED in this application:

- Energy saving
- Heat reduction (HID do not have instant restart functionality)
- Longer light source life and thus higher operation reliability

Issue:

These high brightness LED light sources cannot meet efficiency requirements as proposed in draft regulation, see examples on next slides.

>>>New regulation will exclude the use of LED in many luminaires for entertainment lighting .

# High brightness LED example

## (High luminance light sources)

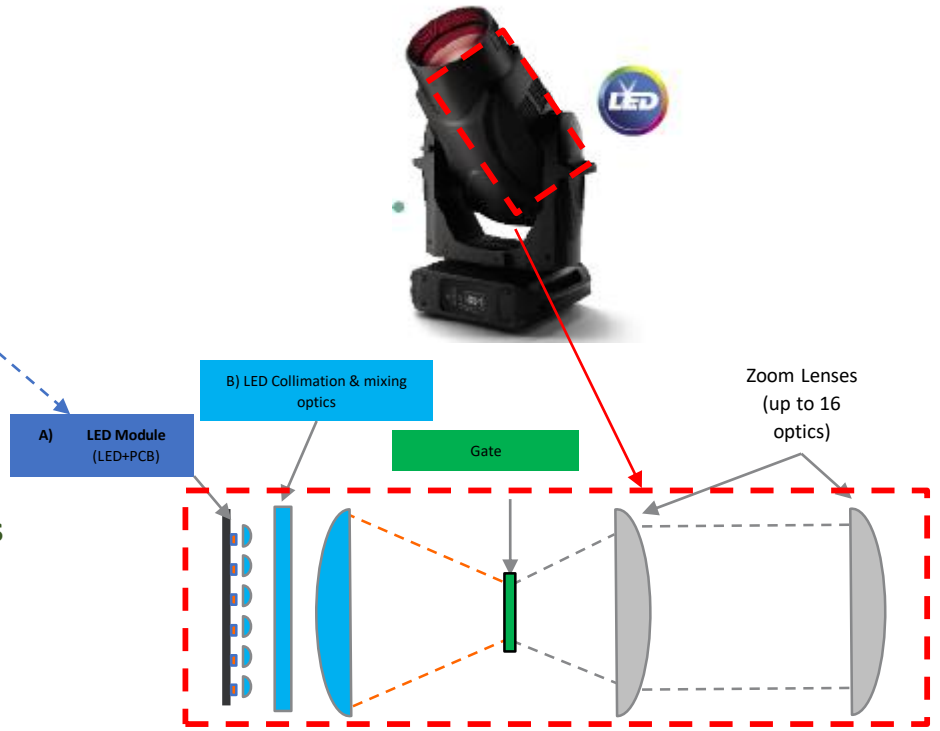
**Example: NEW entertainment fixture**

- **LED Module**: $\Phi_{use}$= 30 klm, $P_{module}$ = 550 Watt, Tc=8000K, CRI 82,

- $P_{onmax} = C * (L + \Phi_{use} /( F * \eta)) * R$
  - L = 1.5
  - F = 1 (NDLS)
  - $\eta$ = 120 lm/W
  - R = (82 + 80) / 160 =1,0125

  >> C = 1 + 1.16 ($P_{onmax} = P_{module}$ )

**Existing module (PCB+LED) cannot fulfill the ED efficiency targets without additional C bonus of 1.16**



# High brightness LED example

## (High luminance light sources)

**example in NEW entertainment fixture**

- **LED Module**: $\Phi_{use}$= 20 klm, $P_{module}$ = 445 Watt, Tc=3200K, CRI 96,

- $P_{onmax} = C * (L + \Phi_{use} /( F * \eta)) * R$
  - L = 1.5
  - F = 1 (NDLS)
  - $\eta$ = 120 lm/W
  - R = (96 + 80) / 160 =1,1

  >> C = 1 + 1.41 ($P_{onmax} = P_{module}$ )

**Existing module (PCB+LED) cannot fulfill the ED efficiency targets without additional C bonus of 1.41.**