

TECHNOLOGY BRIEF

How LIFI™ Light Sources Work

INTRODUCTION

LIFI™ is a new class of high intensity light source of solid state design bringing clean lighting solutions to general and specialty lighting. With energy efficiency, long useful lifetime, full spectrum and dimming, LIFI™ lighting applications work better compared to conventional approaches. This technology brief describes the general construction of LIFI™ lighting systems and the basic technology building blocks behind their function.

LIFI™ CONSTRUCTION

The LIFI™ product consists of 4 primary sub-assemblies:

- Bulb
- RF power amplifier circuit (PA)
- Printed circuit board (PCB)
- Enclosure

The PCB controls the electrical inputs and outputs of the lamp and houses the microcontroller used to manage different lamp functions. An RF (radio-frequency) signal is generated by the solid-state PA and is guided into an electric field about the bulb. The high concentration of energy in the electric field vaporizes the contents of the bulb to a plasma state at the bulb's center; this controlled plasma generates an intense source of light. All of these subassemblies are contained in an aluminum enclosure.

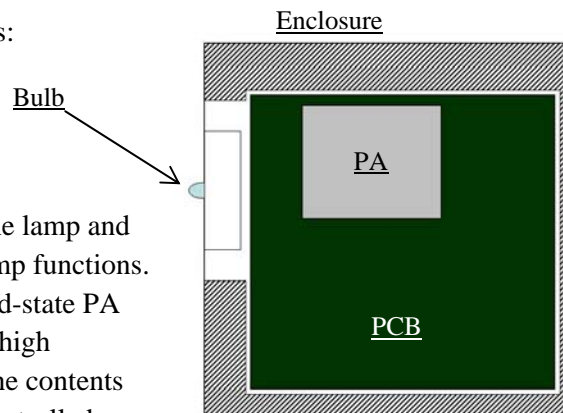


Figure 1: LIFI™ Block Diagram

FUNCTION OF THE BULB SUB-ASSEMBLY

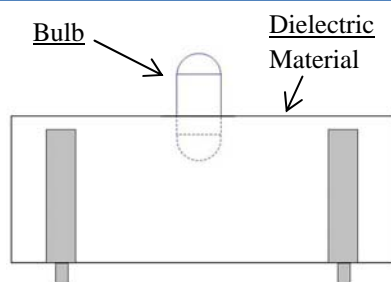


Figure 2: LIFI™ Bulb Sub-Assembly

At the heart of LIFI™ is the bulb sub-assembly where a sealed bulb is embedded in a dielectric material. This design is more reliable than conventional light sources that insert degradable electrodes into the bulb. The dielectric material serves two purposes; first as a waveguide for the RF energy transmitted by the PA and second as an electric field concentrator that focuses energy in the bulb. The energy from the electric field rapidly heats the material in the bulb to a plasma state that emits light of high intensity and full spectrum.

SUMMARY

The design and construction of the LIFI™ light source enable efficiency, long stable life, full spectrum intensity that is digitally controlled and easy to use.

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