Integrating Home Appliances with Power over Fiber cables

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ABSTRACT

Powers over fiber circuits provide several advantages when compared to systems using electrical connections. In spite of advantages such as electromagnetic immunity and high galvanic isolation, power-over-fiber technologies are still only used for special high-end applications due to their high costs compared to conventional power distribution. The main reason for this is the use of high-power laser diodes and photovoltaic cells for most power-over-fiber systems. Therefore, a new cost-effective power-over-fiber approach can be developed to implement these sensors to moderate and control home applications so that more effectiveness and ease could be provided.

1. INTRODUCTION

Power-over-fiber is a technology in which a fiber optic cable carries optical power, which is used as an energy source instead of carrying data. This allows a device to be remotely powered, while providing electrical isolation between the device and the power supply. Such systems can be used to protect the power supply from dangerous voltages such as from lightning, or to prevent voltage from the supply from igniting explosives. It also provides high reliability especially in harsh environmental conditions. It's also rather easy to install and maintain and is also very cost effective. Hence if such a system is implemented to power home appliances, it would provide comfort and ease to control/operate household devices.

1.1 LITERATURE SURVEY

J. D. López-Cardona[1], Carmen Vázquez, David Sánchez Montero, Pedro Contreras Lallana proposed work on how power over fiber systems can be implemented in hazardous environments.

Christoph Budelmann[2], proposed work on Opto-Electronic Sensor Network Powered over Fiber for Harsh Industrial Applications.

M. Roeger et al.[3] , has demonstrated how optically powered fiber networks work in detail.

M. Ari M. C. Taplamacioglu[4], work on electrical power over fiber optics demonstrates the detailed use of fiber optics and power over fiber cable.

F. V. B. De Nazaré M. M. Werneck[5], work on temperature and current monitoring system for transmission lines using power-over-fiber technology.

2. PROPOSED SYSTEM

The proposed system consists of a power source, the target appliance and power over fiber connections. The idea is to replace the electric circuits with the suggested system.

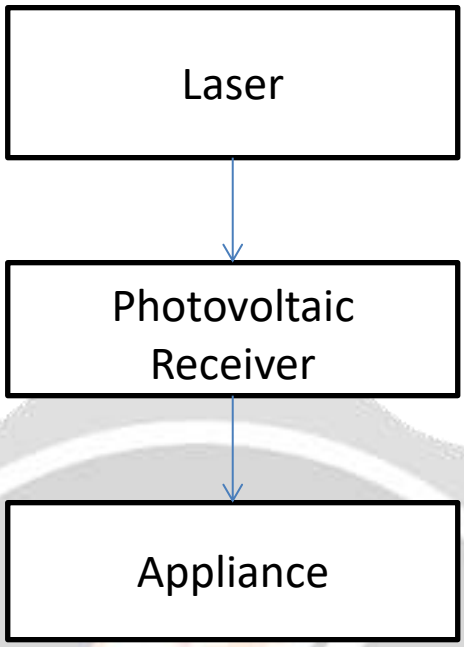

Fig -1:proposed system design

The system consists of a laser which converts electricity into light which travels through power over fiber cables and is connected to a photovoltaic receiver which converts light into electricity which is then used to power up the necessary device.

2.1Component description

Laser: The power beaming system uses a laser running from a power supply. To define the beam size at its destination, the laser's light can be shaped by a set of optics. This light energy can be sent through air or the vacuum of space, onto a photovoltaic receiver, where it is converted back into electricity. The electrical-to-optical conversion efficiency of modern laser technology can be over 85%, and off-the-shelf lasers can have an output efficiency of around 50%. The optical-to-electrical conversion efficiency of a photovoltaic receiver can be over 50% for monochromatic (or laser) light.

Photovoltaic Receiver: The device which converts the light energy back into electrical energy to power the required appliances.

3. CONCLUSIONS

The proposed system is a very cost effective measure to advocate electrical circuits at every household which will improve the existing model by conquering its flaws and providing effective results at costs.

4. REFERENCES

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