



Vision Smart Lighting Technology Guide

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Technology Guide

Infrared

Infrared (IR) is a wireless technology used for device communication over short ranges. It is a common, inexpensive and easy-to-use system, with a wavelength undetectable to the human eye, making it perfect for wireless communication.

IR encounters some limitations because it requires line-of-sight, has a short transmission range and is unable to penetrate walls. This means that it is a simple way to control luminaires directly.

Benefits

- Very reliable
- Inexpensive

Considerations

- One way communication
- Requires line of sight transmission

Ideal Applications

- Suitable for applications where individual control and setup is required

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Wi-Fi

Wi-Fi creates a network in your home or office, through the use of radio waves. This zone is sometimes referred to as a WLAN (Wireless Local Area Network).

The router converts the information into a radio signal and sends it.

The router acts as a mini radio station, broadcasting these signals.

The 'audience' for these transmissions is the luminaire node which receives the radio signal via a gateway.

The whole process, meanwhile, works in reverse, with the luminaire node sending information to the gateway. It then converts them and sends the information back to the router.

Benefits

- Robust solution for commercial and domestic installs

Considerations

- Gateways normally have a maximum range and cannot transmit radio signal through concrete

Ideal Applications

- Suitable for commercial and domestic installs. When partnered with other systems it can be suitable for larger applications

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BLE

BLE, also known as Bluetooth 4.0, is a short range wireless signal. BLE uses less battery power and provides higher data speeds than previous versions of Bluetooth, but it isn't compatible with older Bluetooth devices.

Bluetooth mesh allows us to establish a many-to-many (m:m) relationship between wireless devices. A device can indirectly relay data to a second device out of radio range, by passing the message through other devices. In this way, mesh networks can span very large physical areas and contain large numbers of addresses.

This new mesh capability enables many-to-many (m:m) device communications and is optimized for creating large-scale device networks. It is ideally suited for building automation, sensor networks, and other IoT solutions where tens, hundreds, or thousands of devices need to reliably and securely communicate with one another.

Benefits


- Low energy consumption
- High data rates

Considerations


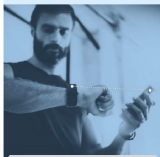
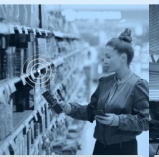

- Very Short Range
- Requires key coordination at both endpoint and access point
- Needs access point

Ideal Applications

- Bluetooth mesh networking is the most robust and powerful low-power radio technology for connected lighting in commercial spaces


Bluetooth®

the global wireless standard for simple, secure connectivity

BR/EDR <i>for continuous connections</i>		Low Energy (LE) <i>for short burst connections</i>	
			
point-to-point 1:1	point-to-point 1:1	broadcast 1:m	mesh m:m
audio streaming <ul style="list-style-type: none"> • wireless headsets • wireless speakers • in-car audio 	data transfer <ul style="list-style-type: none"> • sports & fitness devices • health & wellness devices • peripherals & accessories 	localized information <ul style="list-style-type: none"> • point of interest beacons • item finding beacons • way finding beacons 	large device networks <ul style="list-style-type: none"> • building automation • wireless sensor networks • asset tracking



the global wireless standard for simple,
secure connectivity

BR/EDR

for continuous connections



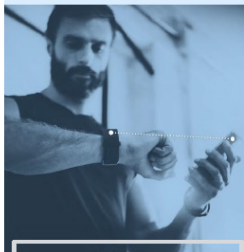
point-to-point 1:1

audio streaming

- wireless headsets
- wireless speakers
- in-car audio

Low Energy (LE)

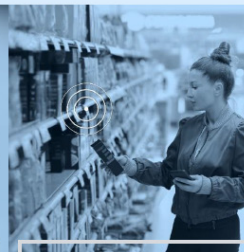
for short burst connections



point-to-point 1:1

data transfer

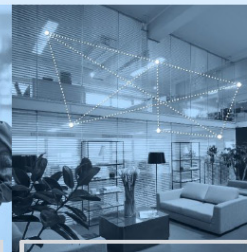
- sports & fitness devices
- health & wellness devices
- peripherals & accessories



broadcast 1:m

localized information

- point of interest beacons
- item finding beacons
- way finding beacons



mesh m:m

large device networks

- building automation
- wireless sensor networks
- asset tracking

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POE

Power over Ethernet (POE) is a technology that lets network cables carry electrical power.

In lighting, a control system normally requires two connections to be made when it is installed:

- A network connection, in order for the luminaire to be able to communicate with the control system
- A power connection, to deliver the electrical power the luminaire needs to operate

However, if the lighting is POE-enabled, only the network connection needs to be made, as it will receive its electrical power from this cable as well.

Benefits

- Without being tethered to an electrical outlet, devices can be located wherever they are needed most

Considerations

- Not compatible with emergency lighting
- Is a wired-wireless solution as network cable is required to all fittings

Ideal Applications

- Suitable for large area application where network wiring can be installed

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868MHz

Short Wave Radio Devices (SRD'S) are frequencies which can be used for industrial, scientist and medical applications.

The unlicensed ISM bands below 1GHz are widely used for various consumer and industrial applications where long range, system cost, and long battery life concerns are critical.

The transmission is not disturbed by obstacles such as human bodies. Interferences are rare because this frequency is only used for industrial, scientist and medical applications.

Due to excellent propagation characteristics at sub-GHz frequencies, greatly extended ranges can be obtained at much lower current consumptions than from the 2.4GHz band solutions.

In addition, these sub-GHz bands are free from microwave, WiFi and Bluetooth interference making links substantially more robust than their 2.4GHz counterpart solutions.

Benefits

- Easily configurable
- Very reliable
- Good line of site commissioning 100m

Considerations

- Cannot be fully enclosed in metal

Ideal Applications

- Most lighting applications

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Zigbee

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ZigBee is a standards-based wireless technology developed to enable low-power wireless machine-to machine (M2M) communication. ZigBee is a low-cost, low-power, wireless mesh network control.

Zigbee delivers low-latency communication, and ZigBee chips are normally integrated directly into devices.

ZigBee operates on a 2.4GHz bandwidth. It's low power consumption limits transmission distances from 10-100m line of sight. ZigBee's effectiveness does rely on the environment it is installed in.

It is very popular in domestic lighting controls as normally a hub/gateway is required to push a signal out to all luminaires in a close proximity.

Benefits

- Low energy consumption
- Mid range communication

Considerations

- Not compatible with emergency lighting
- Requires line of sight transmission
- Multiple gateways will be required on large applications and can become costly

Ideal Applications

- Suitable for domestic, commercial and small industrial installs

Lighting for **a Living**



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