

Understanding Smart LED Light Dimming System

LED lightings are becoming popular these days and have already started to replace compact fluorescent lamp (CFL) as well as halogen lightings. LED lightings are often advertised as green lightings, environmental friendly and last much longer than any other kind of lighting solutions.

A typical LED light fixture consists of a LED driver (or occasionally being referred to as a transformer) and the LED itself. The LED can be a Chips-on-Board (COB) LED or a series of little LEDs linked together on a printed circuit board.

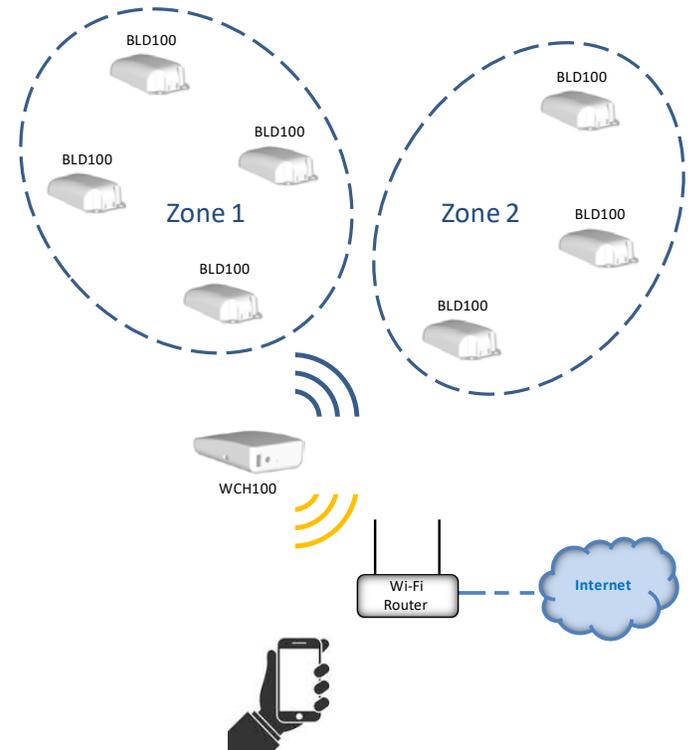
Dimmable LED lightings have several benefits. They include creating a comfortable ambiance to reduce eye strain, lowering power consumption, generating less heat, and prolonging the life span of the LED.

Various kinds of LED dimming method are available on the market. Most, but not all, LED light bulbs accept traditional triac dimmers. Other dimming methods are the analog 0-10V, pulse width modulation (PWM), and Digital Addressable Lighting Interface (DALI).

Amptek Technologies has developed a IoT solution for LED lightings. This solution allows multiple LED light fixtures to be grouped as a zone and connects multiple zones together to form a network. Users can dim or schedule various zones independently. Cloud service is also available, allowing users to control their LED lightings while they are away. This becomes an added security feature when users left their home on vacations. The IoT system consists of a iCon (model WCH100), one or many Bluetooth Low Energy Dimmers (model BLD100), and a custom designed mobile app.

The iCon is the brain of the system. It is a wireless control hub which handles all network management processes, scheduling, communicating to all dimmers, and bridging over to the mobile phone as well as to the Internet. The BLE Dimmer, on the other hand, listens to messages originating from the iCon, changes the dimming signal (0-10V), and propagates the messages

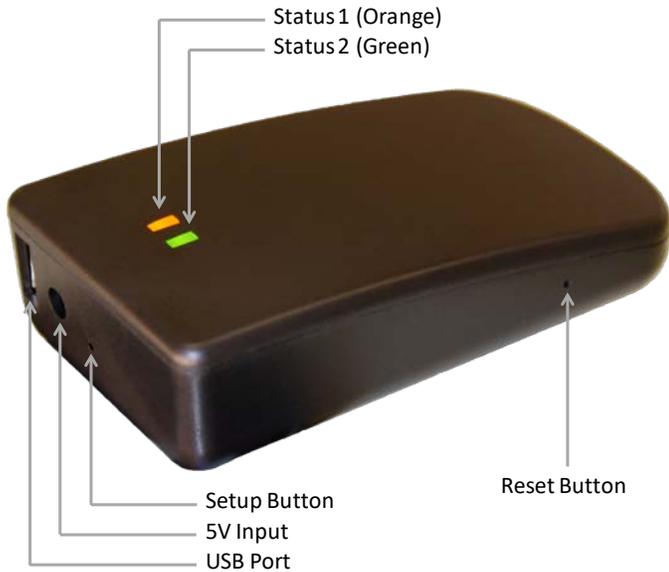
to other BLE Dimmers. Layers and layers of BLE Dimmer then create a zone within a light network.



The iCon is a simple-looking box measured 109 x 60.9 x 28.5mm. A 5VDC power supply is all that is needed to get the unit up and running. Setting up the system is all done through the mobile app. The USB connector is not for powering. It is only being used when a software upgrade is ever needed in the future. Both Wi-Fi and Bluetooth antennas are embedded inside the enclosure, hence a clean appearance with no antennas sticking out. Two status lights are provided to indicate the operating conditions of the device.

The first time setting up the iCon requires the device to be paired with a mobile phone through Bluetooth at the beginning. User then enters the Wi-Fi network information under the "Setup" page within the app. Once the setup is completed, all operations will go through the Wi-Fi network automatically.

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The BLE Dimmer measures 100 x 50 x 25.5mm and weighs only 76 grams. This device operates at 100-375VAC, thus suitable for any lighting applications including industrial lightings. In addition, its IP55 rating allows the device to be used in indoor as well as outdoor environment. During operation, the dimmer listens to encrypted messages coming from the iCon and nearby BLE Dimmers and outputs a 0-10VDC voltage to the dimmable LED driver attached to it. At the same time, it relays the messages to other BLE Dimmers. However, only dimmers in the same zone will respond to the messages.

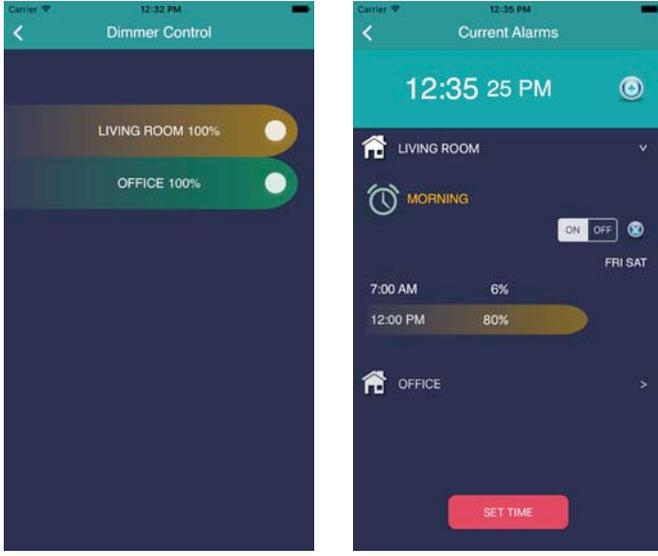


Care must be taken in choosing the LED driver. There is a large number of 0-10V dimmable LED drivers available

on the market. However, not all of them have the so-called “dim-to-off” capability. For those drivers that do not support “dim-to-off”, the LED light will remain dimmed at about 5-10% when the dimmer control voltage is at its minimum. Users must flip the power switch in order to completely turn off the light. On the other hand, for those drivers that support “dim-to-off”, the LED light will be turned off whenever the dimmer control voltage is below 1VDC in most cases.

For optimum performance, it is recommended that the iCon to be placed well within the range of the Wi-Fi router. Furthermore, one or more BLE Dimmer inside a particular zone must be placed within 50 meters from the iCon. To extend the reach of a zone, the distance between any two BLE Dimmers must be within 50 meters.

A free mobile app called iConDimmer is available at the app store. The app allows users to setup the Wi-Fi connection of the iCon, setup each LED lighting zone by automatically searching for available BLE Dimmers, dim or schedule each zone, and access the cloud service for remote control. Shown below are couple of screen shots of the app.



For inquiry, please contact sales@amptek-tech.com.