



**ilumi MeshTek® 0-10V Smart Lighting Controller
(SLC)**

Horticultural Lighting Control

**User Manual
Revision 1.8**

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TO OUR VALUED CUSTOMERS

It is our intention to provide you, our valued customer, with the best possible documentation to ensure successful use of your ilumi solutions products. To this end, we will continue to update our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced. Please note: images used in the manual are for reference purposes and may be different than the actual product. If you have any questions or comments regarding this publication, please contact the Marketing Communications Department via Email at info@ilumisolutions.com. We welcome your feedback.

Errata

An errata sheet, describing minor operational differences from the data sheet and recommended workarounds, may exist for current devices. As device/documentation issues become known to us, we will publish an errata sheet. The errata will specify the revision of silicon and revision of the document to which it applies.

To determine if an errata sheet exists for a particular device, please check with one of the following:

- Contact the ilumi team
- Contact your local ilumi sales representative

When contacting a sales office, please specify which device, revision of MeshTek[®] 0-10V Smart Lighting Controller (SLC), user manual and data sheet (include literature number) you are using.

Chapter 1 Introduction

The MeshTek[®] 0-10V Smart Lighting Controller (SLC) is a plug & play controller providing an interface between a standard 0-10V LED driver and LED load to make an LED fixture/luminaire smart. It is available in two SKUs: a Single-Channel 0-10V and a Four-channel 0-10V Controller. They can be configured to have 0-10V analog or 10V PWM control signal; these signals are interfaced with the LED driver with dimming functionality. The SLC allows user to control the LED fixture remotely through the ilumi iOS and Android app over a simple Bluetooth Low Energy (BLE) protocol. Multiple lighting fixtures can be controlled individually or together as a group.

All 0-10V SLCs form a reliable, secure and dynamic mesh network extending the range of the network. Each SLC has a PA/SLA (Power Amplifier/Sensitivity Level Amplifier) built-in for high signal strength and sensitivity that allows it to communicate to other SLCs up to a 200m range, requiring no external antenna, thereby saving costs in terms of material and assembly. The patented 0-10V SLC technology also has a Real-Time Clock for time stamping and scheduling purposes.

The simplicity of a BLE local mesh network removes the need of any additional wiring, installations and requirement of a pre-existing wireless network. This makes the MeshTek[®] SLC most suitable for horticultural, white tunable lighting control and scheduling.

Chapter 2 Overview

2.1 Device Overview

The MeshTek® 0-10V SLC integrates:

- MeshTek-H52 - Bluetooth 5.0 ready module
- Range of up to 200m, with no external antenna required
- Real time clock for scheduling tasks
- 0-10V Analog or Single 10V PWM control signal

2.2 Package Contents

Package contains the following:

- Plug & Play ilumi MeshTek® 1 Channel 0-10V SLC

2.3 0-10V SLC Board

- Representation of end user interface and connectors to MeshTek® 1 Channel 0-10V SLC is shown in [Figure 2-1](#)

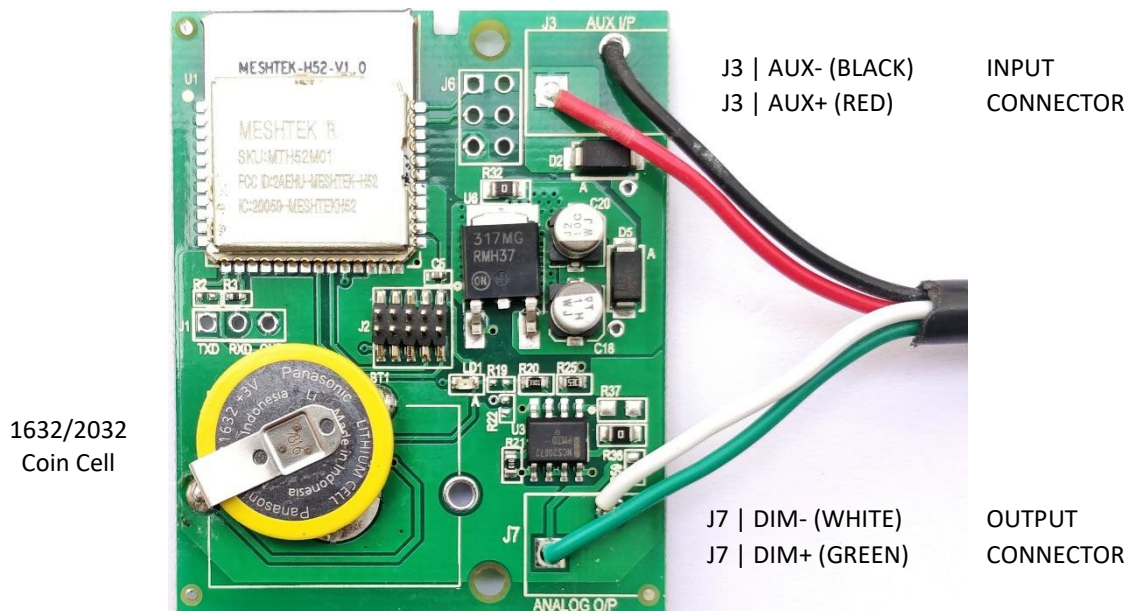


Figure 2-1 A. MeshTek® 1 Channel 0-10V SLC (41.5mm X 50mm)

2.4 Single Channel 0-10V SLC Connectors

J3 - INPUT POWER; INPUT CONNECTOR	J7 - 0-10V ANALOG OUTPUT; OUTPUT CONNECTOR
J2 - PROGRAMMING CONNECTOR	

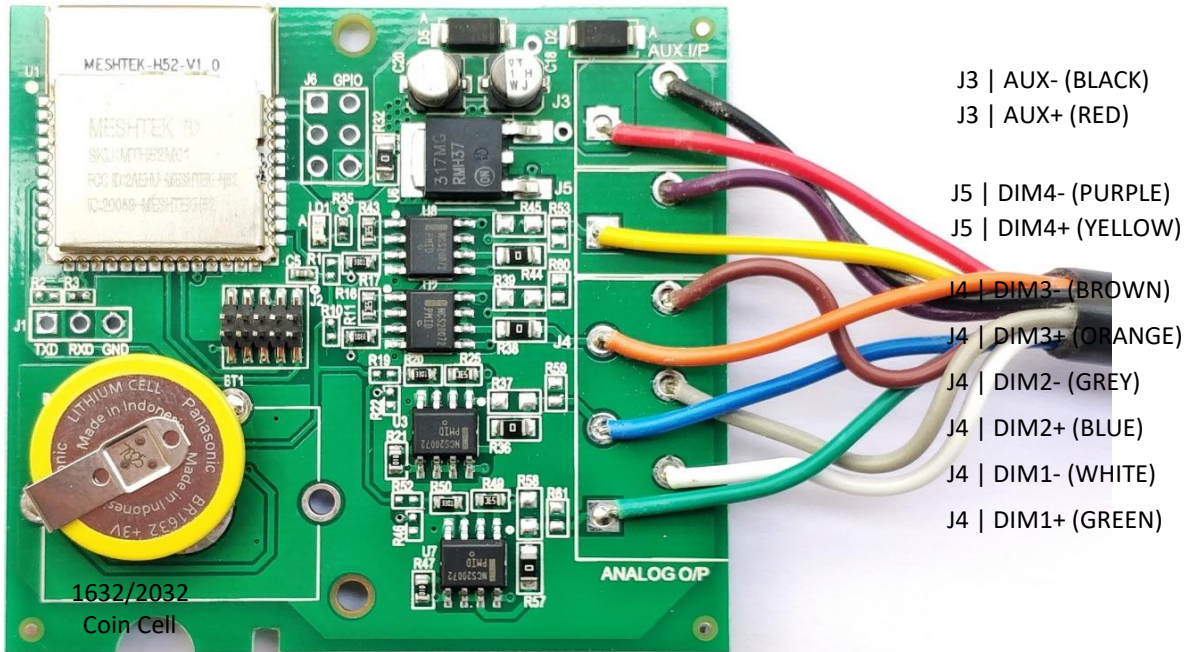


Figure 2-1 B. MeshTek® 4 Channel 0-10V SLC (56mm X 52mm)

2.5 Four-Channel 0-10V SLC Connectors

J3 - INPUT POWER; INPUT CONNECTOR	J4 - 0-10V ANALOG OUTPUT; OUTPUT CONNECTOR
J5 - 0-10V ANALOG OUTPUT; OUTPUT CONNECTOR	J2 - PROGRAMMING CONNECTOR

2.6 Benefits

- One 0-10V analog or 10V PWM control signal suitable for horticultural lighting control
- Stores up to 50 repeatable daily schedules such as ON/OFF and various brightness levels
- Plug & play integration between LED driver and LED load
- Proven BLE Mesh Technology with over 100,000 MeshTek® end devices installed in the world
- Proven state-of-the-art iOS and Android apps
- The only BLE solution with auto Firmware Over The Air (FOTA) update in a meshed network
- The only self-healing BLE Mesh for high data transfer and reliable communication
- Built-in antenna with up to 200-meter range with reliable and secured meshing
- Input supply current 100mA in Transmit mode at +18.9dBm output power and less than 1mA in ideal mode

- Reverse polarity and ESD protection
- Built-In Real Time Clock with battery for automation and scheduling
- Small Size: 41.5mm x 50mm x 10 mm
- Available in open frame form as well with an enclosure

2.7 Control Options

- One 0–10V Analog Control Signal or a one channel PWM Control Signal at 1KHz Frequency and up to 10V amplitude

2.8 Electrical specifications

ELECTRICAL SPECIFICATIONS				
Description	Min	Nom	Max	Notes
Input Supply Voltage Channel-1 (AUX+ / AUX-)	12V	-	24V	
Input Supply Current (AUX)	10mA	-	100mA	With ilumi mesh stack running
Analog Output Voltage Channel-1 (DIM+ / DIM-)	0	-	10V	Default: 0-10Vdc Can be configured to 10V PWM
Radio Operating Frequencies	2.360 GHz		2.500 GHz	
Radio On-Air Data Rate		1 Mbps	2 Mbps	
Radio Output Power			+18.9 dBm	RF output power configured to +18.9dBm using external PA
Receiver Sensitivity @ BLE		-96 dBm		Ideal transmitter

2.9 Absolute Maximum Ratings

- Input Supply Voltage (AUX or +VIN): 26V
- Ambient Temperature range: -20°C to 50°C

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent or partial damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Chapter 3 Hardware

3.1 Connector Pinout

3.1.1 INPUT POWER CONNECTOR (J3)

J3 is available for supplying input power to the SLC. J3 pinout with wire color for reference is as noted below:

Pin No.1 (Red Wire)	Pin No.2 (Black Wire)
AUX+	AUX-

Note: AUX+ / AUX- can be powered from Auxiliary power available in the LED Driver or can be powered from an external power source.

3.1.2 0-10V ANALOG OUTPUT CONNECTOR (J7)

J7 is available for connecting 0-10V Analog Output to an LED Driver. J7 pinout with wire color for reference is as noted below:

Pin No.1 (Green Wire)	Pin No.2 (White Wire)
*DIM+	*DIM-

**Note: DIM+ / DIM- is by default configured to 0-10V Analog signal, if it is required to be configured as 10V PWM signal then remove R36 (OE resistor) and solder it at reference designator R37.*

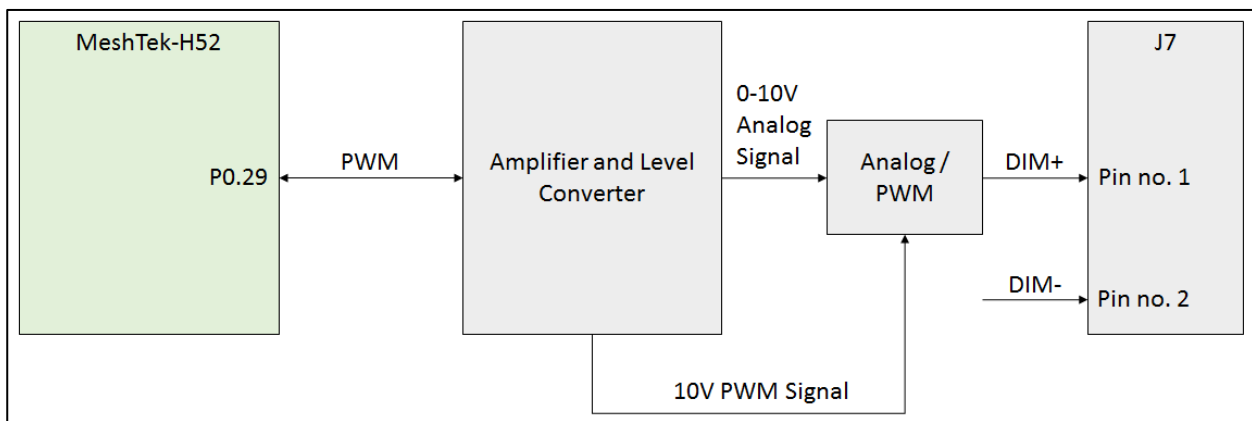


Figure 3-1 MeshTek® 1 Channel 0-10V SLC; Internal Connection Diagram for 0-10V Analog Output

3.1.3 PROGRAMMING CONNECTOR (J2)

J2 is 5X2 1.27mm pitch programming connector

Pin No.1	Pin No.2	Pin No.3	Pin no.4	Pin No.5
3.0V	SWDIO	GND	SWDCLK	GND
Pin No.6	Pin No.7	Pin No.8	Pin No.9	Pin no.10
NC	NC	NC	GND	P0.21/RESET

Chapter 4 Getting started

It is recommended that a wrist band or anti-electrostatic glove be used when handling the SLC.

4.1 Connecting the 0-10V SLC to LED driver

Application setup for LED driver with dimming functionality (0-10V Analog or 10V PWM)

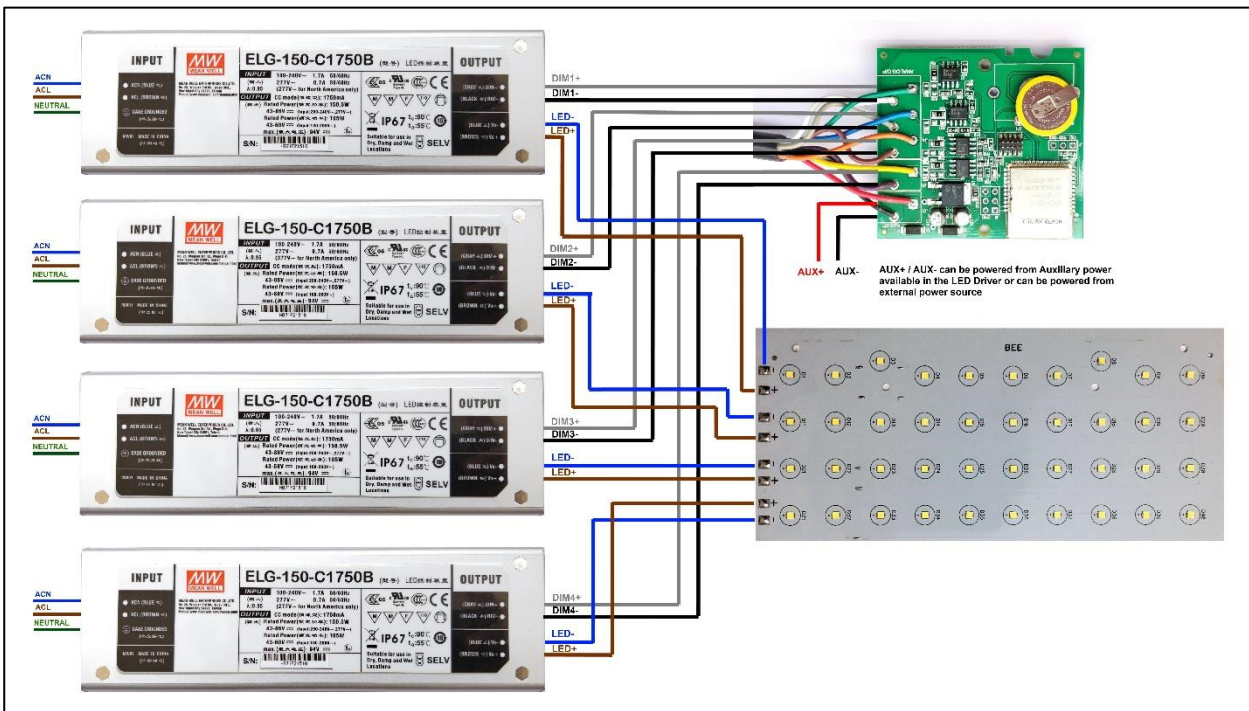
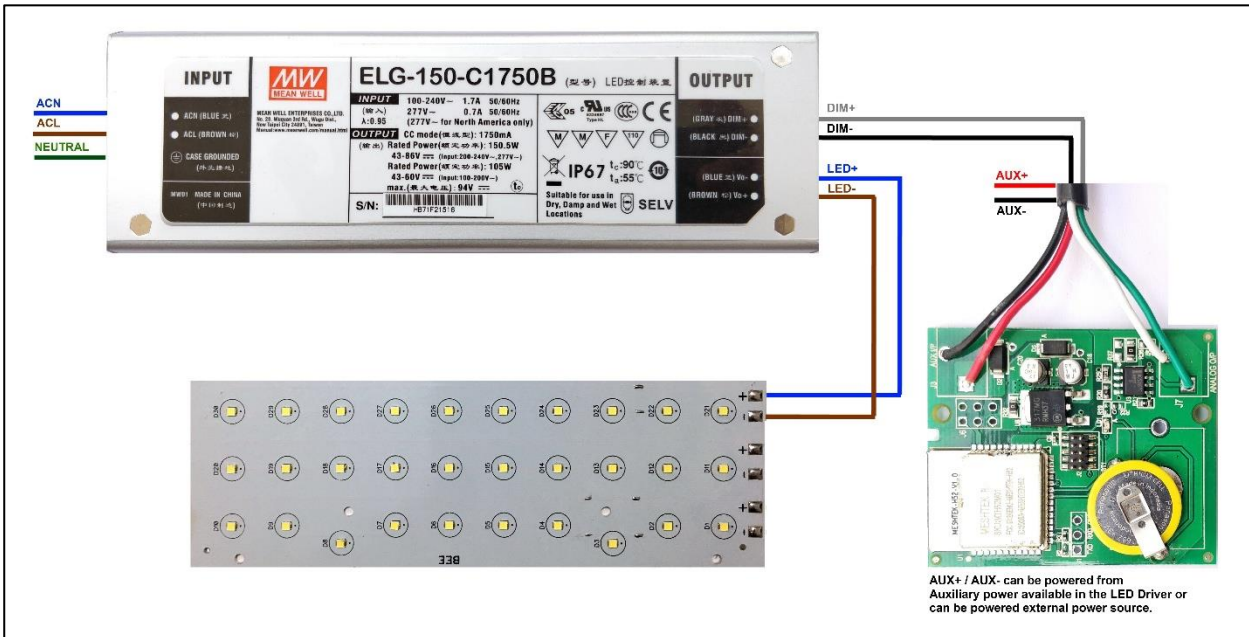


Figure 4-1 Application Setup (Single Channel and Four Channel 0-10V SLC)

Chapter 5 Using The MeshTek[®] Smart Lighting Controller App

5.1 Launch Mobile App

[DOWNLOAD MeshTek[®] iOS APPLICATION BY CLICKING HERE.](#)

PLEASE FOLLOW BELOW INSTRUCTIONS TO INSTALL AND USE THE APP:

Trust Enterprise apps on iPhone/iPad after download.

1. Launch Settings from your Home Screen.
2. Tap on General.
3. Tap on Device Management.
4. Tap the name of the distributor under the Enterprise App section. (ilumi Solutions, Inc.)
5. Tap to trust.
6. Tap to confirm and now open Horticulture.

You can use the QR Code below to download iOS app as well.



Once registered on the HockeyApp, you will see the Horticultural Lighting App that you can download on your mobile device. Ensure to follow the 6 steps listed on the page to be able to run the app on the phone. Registering on HockeyApp will also help the user in getting a notifications of new app availability.

[DOWNLOAD MeshTek[®] Android APPLICATION BY CLICKING HERE.](#)

You can use below QR Code scanner to download Android app as well.



Once registered on the HockeyApp, you will see the Horticultural Lighting App that can be downloaded on the mobile device. Registering on HockeyApp allows the user to receive notifications of new app availability.

This app is designed for horticultural related features only. Please contact info@ilumisolutions.com for white labelling the app and enhancements with additional features and functionality.

When the MeshTek[®] App is launched, click on “I have MeshTek” button (we assume you have purchased a MeshTek Lighting Controller). A new screen will pop up asking you to Create Account and Login. If you are a first time user then click on “Create Account” button, enter your email ID and password as shown in [Figure 5-1](#). If you are a registered user then click on the Login “button” and enter your account credentials as shown in [Figure 5-2](#).



Figure 5-1 ilumi MeshTek[®] Horticultural Lighting App

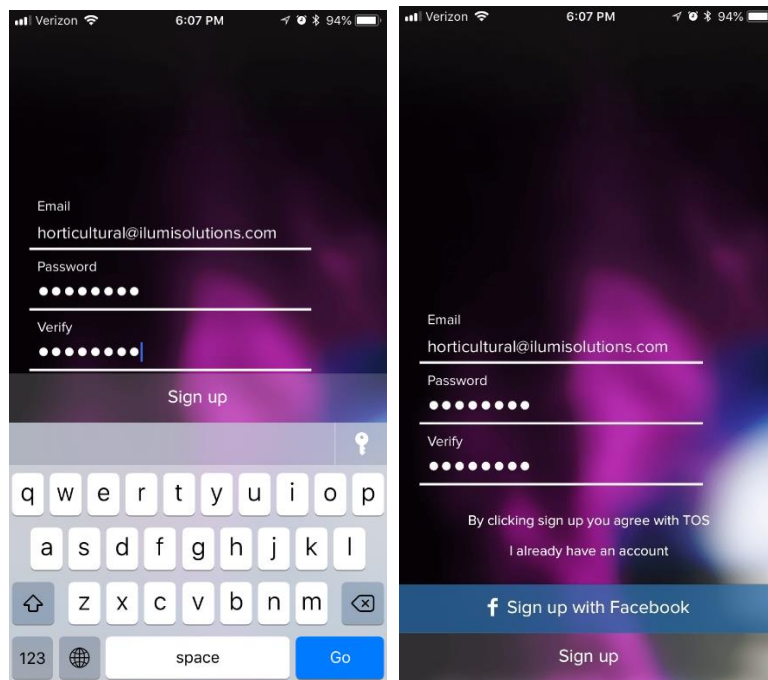


Figure 5-2 Login Credentials

Once you are logged in, the app will automatically search for the SLC. If the app doesn't search for SLC or by mistake you have clicked on the "Later" tab, then scroll to "More" section present on the right side of the Dashboard icons and click on "Search for New MeshTek Devices" button. Prior to all this, please make sure that all the SLCs are powered up. The app scans for the powered SLCs and initiates the commissioning/pairing process. Please see Figure 5-3. The maximum number of mesh SLCs that can directly connect with an iOS/Android device is configurable.

5.2 Control through the Mobile App

5.2.1 **Select** and **drag** a SLC to the "New Group" item. It will bring up a screen and prompt you to enter a Group name. Provide this Group name and click the "Next" button. On the Setup screen, press "Done" to finish the setup. After finishing the installation settings, the New Group Item will appear on the screen, showing the number of SLCs available in the Group. Click on top left "<" button to return to the dashboard screen.

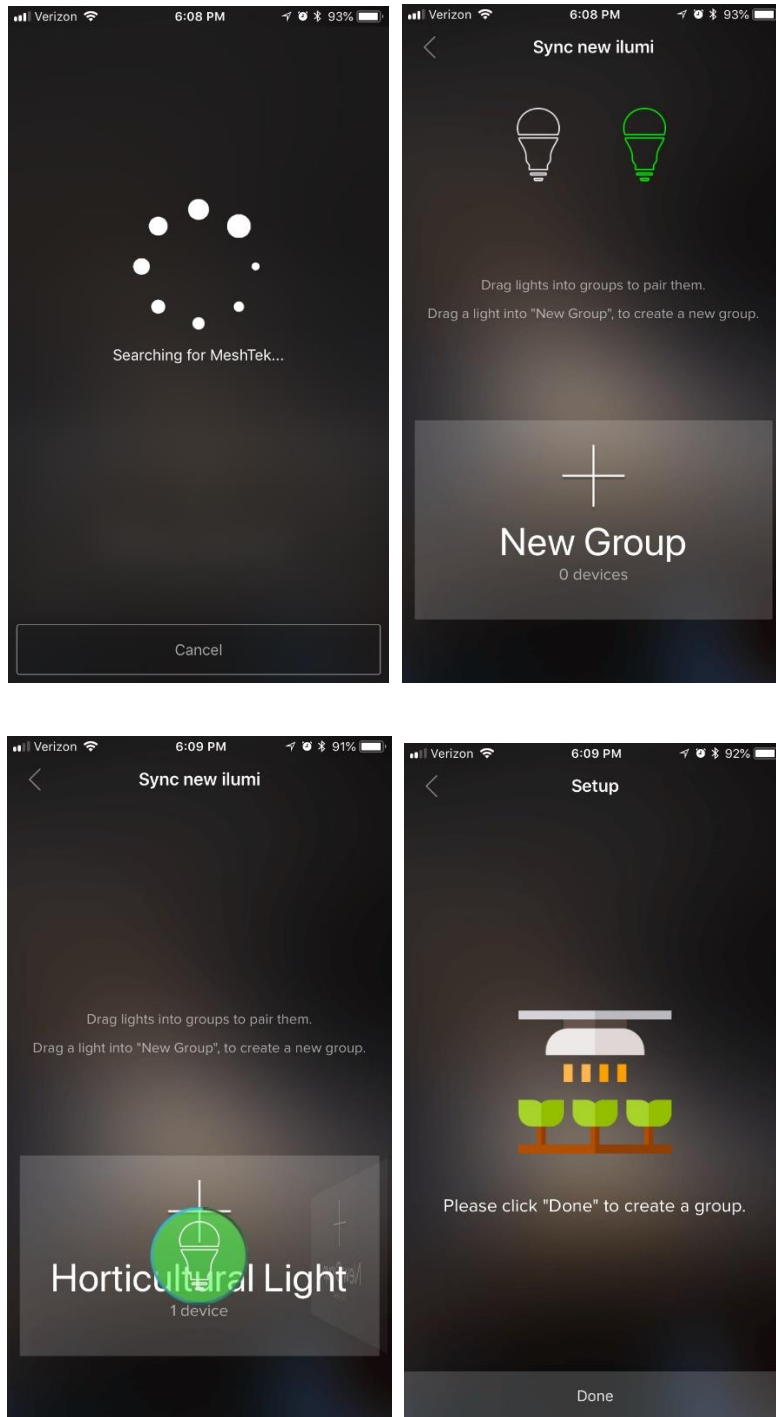


Figure 5-3 Commissioning / Pairing Process

5.2.2 Click the “Horticultural Light” button from Dashboard items, to take you inside the Group level and show all of the commissioned SLCs in this Group. Scroll left to the Dashboard screen to control and vary brightness of individual channels as shown in last image of [Figure 5-4](#). The Brightness bar present at the bottom allows users to control the brightness of all the connected channels.

For MeshTek® 1 Channel 0-10V SLC change White (CH 1) and Brightness buttons to control the LED Load.

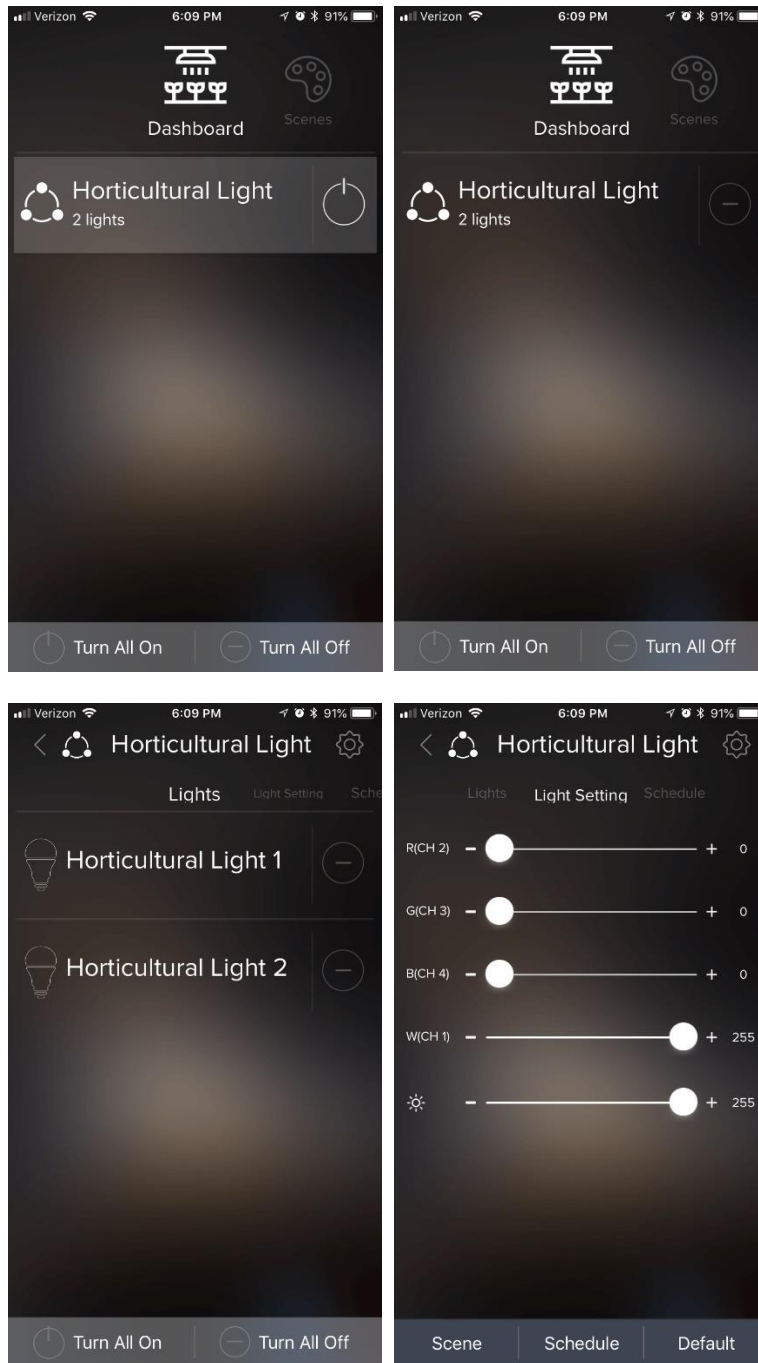


Figure 5-4 Dashboard Control and Brightness Control Screens

5.3 Creating Defaults and Scenes

A user can set a default or a scene by creating a specific setting on the Light Setting Screen for a Group or individual light. Refer to Figure 5-5 and Figure 5-6 to do so.

The light will turn on to a Default every time level when powered ON unless there is any other schedule running, which is explained later in this manual.

A user can set multiple scenes by clicking on the Scene Tab on the Light Setting Screen. The scenes created can be accessed, modified, renamed, deleted and run from the Scenes screen which can be navigated from the Dashboard screen.

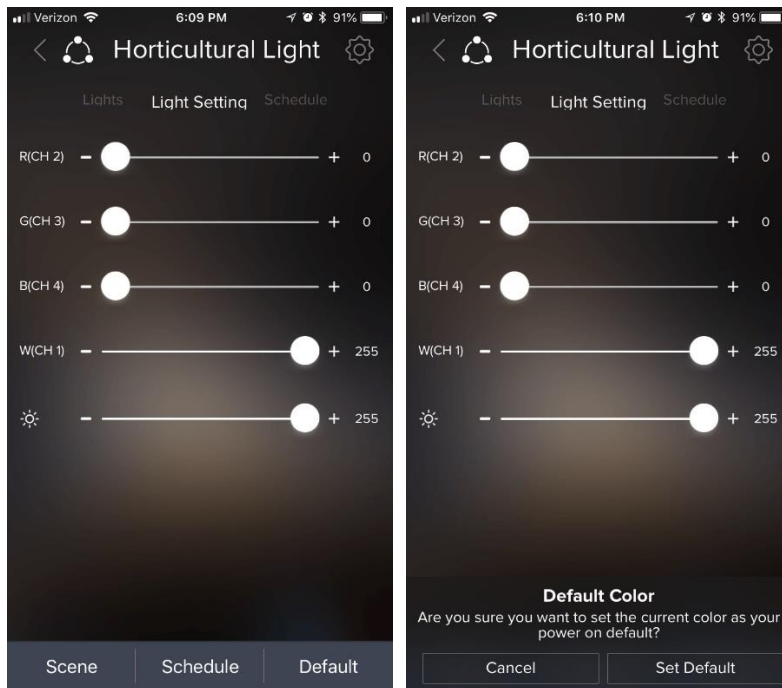


Figure 5-5 Set Default

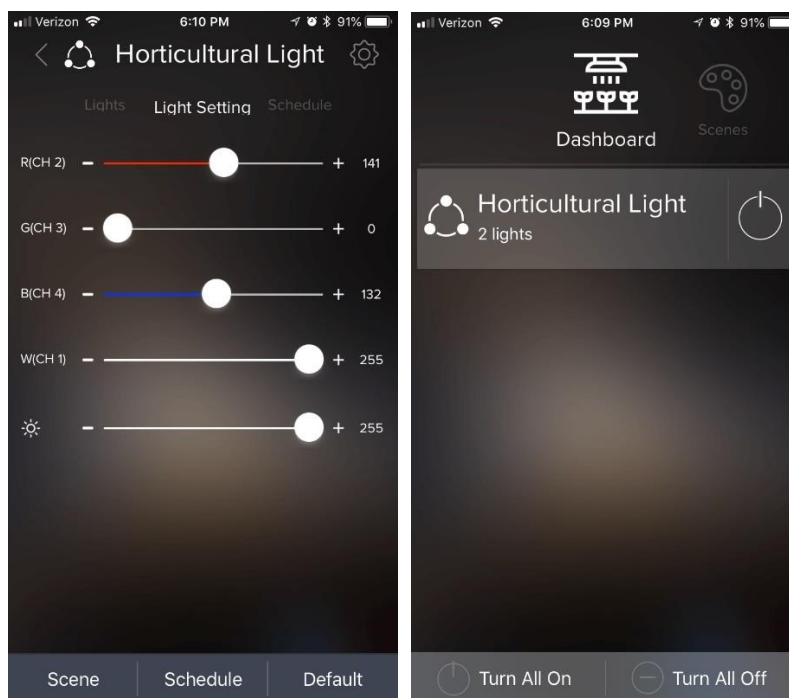
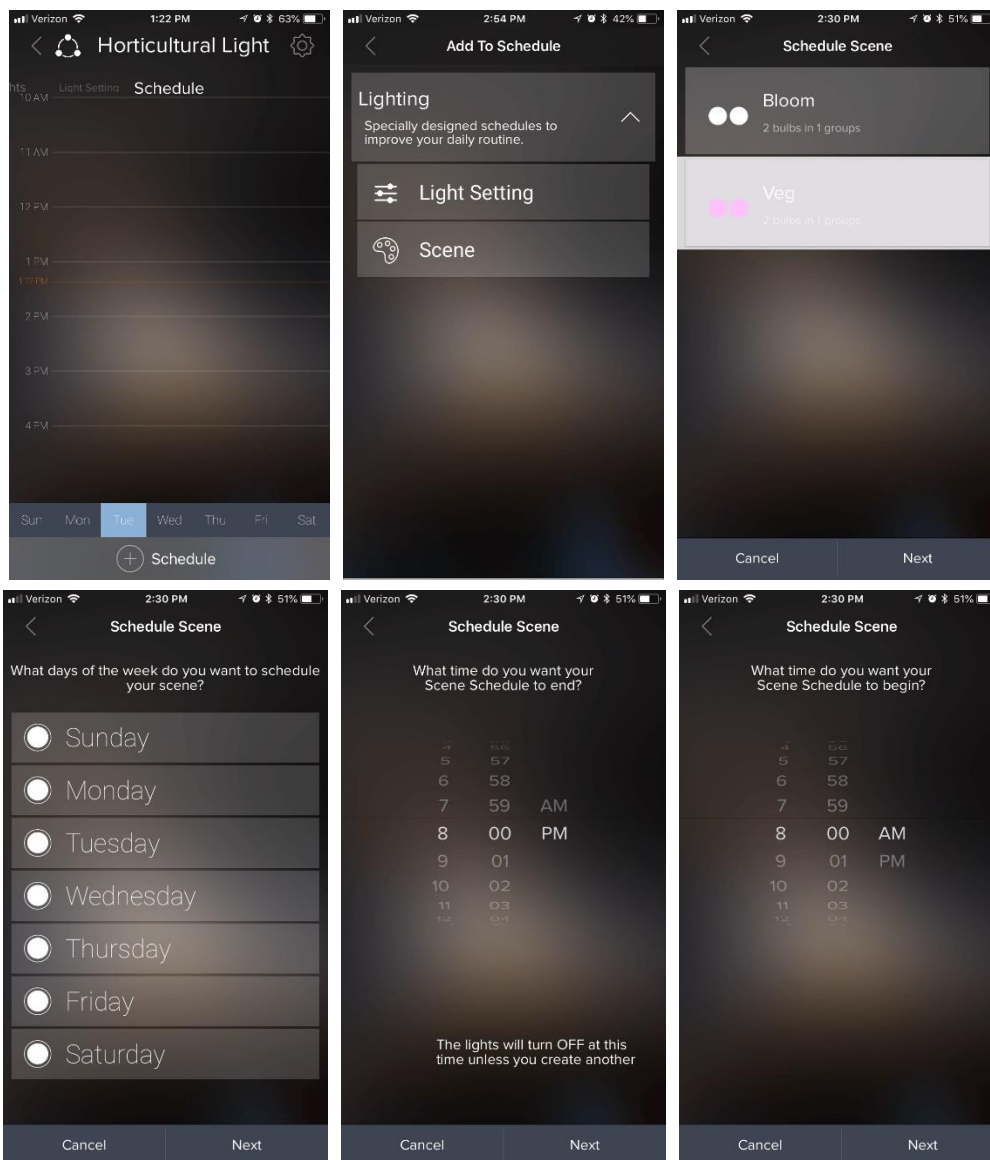


Figure 5-6 Set and Run Scenes

5.4 Creating Schedules through App

The Scheduling feature enables a SLC to schedule specific previously-created Light Settings and Scenes. More than one schedule can be set via the app for an individual light or the Group, following the below process. To create a schedule the user needs to be near the lights to be scheduled and the lights should be powered on and connected to the app.

5.4.1 Click on the Group, or individual light inside the Group, and scroll to the right until the Schedule tab appears as a screen, as shown in first image of Figure 5-7. Click on the Schedule button and then select Light Setting or Scenes as needed for scheduling as in Figure 5-8. Select the SLCs to which the schedule needs to be applied and follow the process until the finished.



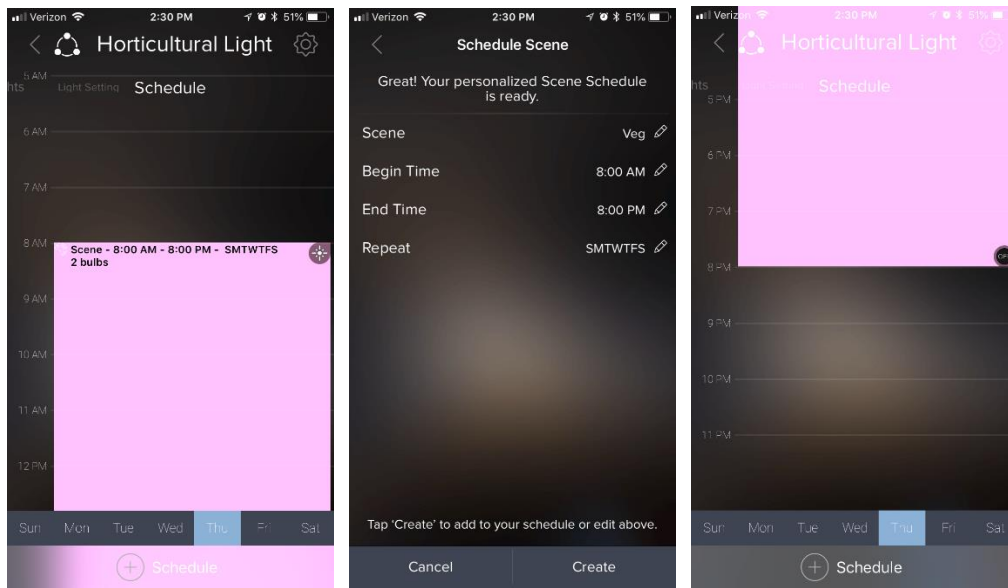


Figure 5-7 Schedule Screen

The created schedule is transferred to the SLCs memory and each SLC with a schedule runs the light settings or scenes as required.

By clicking (double tap) on the schedule in a calendar view, the user can enter “Schedule Settings”, as shown in Figure 5-8. The user can then edit any parameter of the schedule or delete that schedule as well. Please note that, in order to remove the schedule from the SLC, the user needs to be close to the SLC and the SLC should be connected to the app.

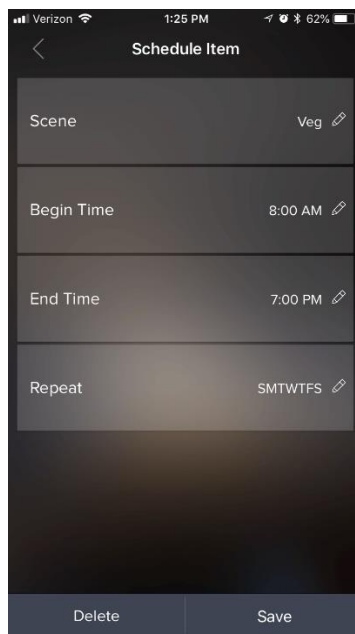


Figure 5-8 Schedule Settings

5.5 Creating additional networks for your MeshTek controllers

Please follow the link below which showcases this feature of MeshTek powered ilumi smart bulbs:

<https://ilumi.zendesk.com/hc/en-us/articles/115000609874-Creating-Additional-ilumi-Networks-Locations->

5.6 Sharing Access to Your MeshTek Controller Lights

Please follow the link below which showcases this feature of MeshTek powered ilumi smart bulbs:

<https://ilumi.zendesk.com/hc/en-us/articles/115000626754-Sharing-Access-to-Your-ilumi>

5.7 Reset SLC

There are two ways to reset a SLC: a hard reset or a soft reset.

Hard Reset:

Power the SLC ON / OFF four times (approx. one Sec ON, approx. one Sec OFF).

**Note: Power ON/OFF duration for a hard reset might change depending on the charge holding capacity of the driver. The ideal way is to look for the Green POWER ON LED on the Controller to turn OFF and then turn back the driver ON/OFF again.*

Soft Reset:

Have the SLC ON and connected to the App. On the Dashboard screen, click on the Group name. It will take you inside the group, which consists of all paired SLC as shown in Figure 5-9. Click on the top right “Setting” icon in same screen, then click on the “Pencil” icon which appears in front of each paired SLC. The app provides the functionality to remove individual SLCs or the entire Group. Deleting the Group will reset all the SLCs within the Group. Perform the appropriate action as needed and the SLC will reset and will be available for pairing once again.

The user can also delete individual SLCs as opposed to the entire group by clicking on the Pencil icon for that particular SLC.

Note: If a hard reset is done and the App is open, then the SLC would be restored automatically or you can delete the existing group by following the Soft Reset procedure.

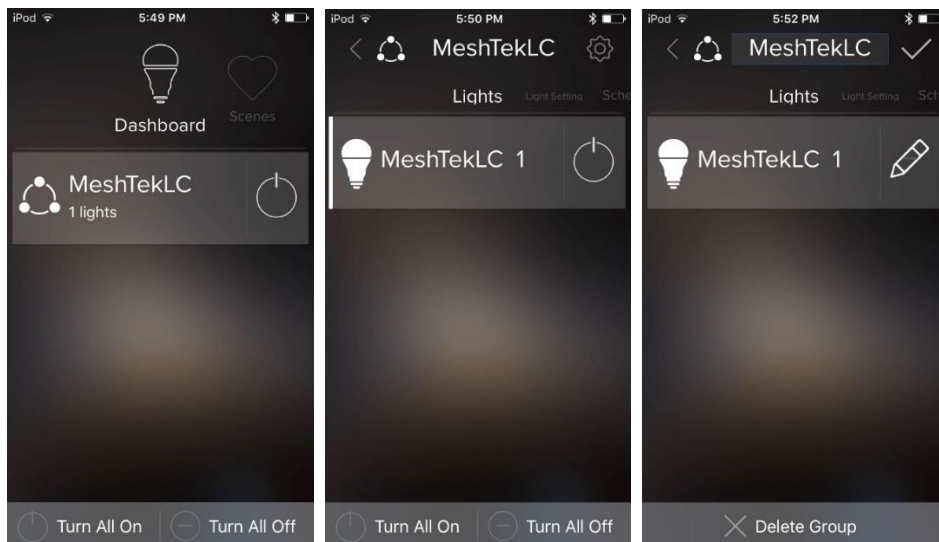


Figure 5-9 Soft Reset

Chapter 6 Packaging and Labeling

6.1 Packaging

MeshTek[®] 1 Channel 0-10V SLC in a sealed antistatic bag.



Figure 6-1 Packaging

6.2 Packaging Label



Company: ilumi solutions
 Brand: MeshTek
 SKU: MTA1SLC
 Model: MeshTek-MLC-1CHAnalog
 Description: Single Channel Analog
 Smart Lighting Controller
 Quantity: 1



For documentation, please visit www.ilumisolutions.com.

Figure 6-2 Packaging Label

6.3 Ordering Information

Ordering information for the MeshTek[®] 1 Channel 0-10V SLC

Part Number	Description
MTA1SLC	MeshTek [®] 1 Channel 0-10V SLC
MTA4SLC	MeshTek [®] 4 Channel 0-10V SLC

Note: For custom applications, contact ilumi Solutions Inc. representative.

Chapter 7 Revision History

Revision	Date	Status / Comments
1.0	March 2017	Initial Release
1.1	June 2017	<ul style="list-style-type: none"> • Updated board images • Updated electrical specifications • Added absolute maximum ratings • Added configuration settings • Updated mobile App settings • Added Reset functionality
1.2	June 2017	<ul style="list-style-type: none"> • Added packaging label information • Updated figure nos. • Updated table of content
1.3	Dec 2017	<ul style="list-style-type: none"> • Added Lighting Controller (color and brightness control) screen
1.4	May 2018	<ul style="list-style-type: none"> • Updated text in connector pinout section • Updated electrical specifications • Updated absolute maximum ratings • Updated board and setup images • Added link for downloading MeshTek app for controlling SLC
1.5	Oct 2018	<ul style="list-style-type: none"> • Updated text at multiple locations • Updated electrical specifications • Updated absolute maximum ratings • Updated board, setup images, packaging and label images • Updated MeshTek app images
1.6	Nov 2018	<ul style="list-style-type: none"> • Updated with Horticultural Specific Features and Functionality