



User Operations Guide for Qandim apps for Android and iPhone

Confidentiality Notice

Copyright © 2020 Lightspring Corporation – All rights reserved.

This document is authored by Lightspring Corporation and is Lightspring Corporation's intellectual property, including the copyrights in all countries in the world. This document is provided under a license to use only with all other rights, including ownership rights, being retained by Lightspring Corporation. This file may not be distributed, copied, or reproduced in any manner, electronic or otherwise, without the express written consent of Lightspring Corporation.

TABLE OF CONTENTS

1 Introduction	4
1.1 Supported Devices	4
1.2 Acronyms & Abbreviations	
1.3 Document Conventions	
2 System Overview	5
2.1 Range and distance	
3 Creating a Network	6
3.1 Familiarize with the Home screen.....	7
3.2 Add and provision devices to the network	
3.3 Remove Devices from the network.....	8
4 Logging out of network	8
5 Join network as Master/Guest	8
5.1 Join the network.....	8
5.1.1 Sharing the QR code	9
5.2 Join as Master User	9
5.2.1 Scan Network	9
5.2.2 Import Network	10
5.3 Join as Guest User	10
5.3.1 Scan Network	10
5.4 Keep the Network Information in Memory	10
5.5 Delete a network from Memory	10
6 Refresh	11
7 Update Guest User Password	11
8 Group Management	11
8.1 Create Groups	12
8.2 Remove Devices from Groups.....	12
8.3 Delete Groups	12
9 Control Operations	12
9.1 Individual Device Control	13
9.2 Grouped Devices Control	13
9.3 Dimmer Setting Persistence.....	13
9.4 Power interruption restart Safety Level.....	13
10 Firmware Upgrade Using OTA	13
11 Network Reset	14

- 12 Premium App Operation 15**
- 12.1 Scenes..... 15
- 12.1.1 To Create Scene 16
- 12.2 Schedule..... 16
- 12.2.1 Clock Accuracy of Schedules..... 17
- 12.2.2 Past Events..... 17

1 Introduction

Qandim is wireless control system built into your Qandim equipped LED drivers. The LED drivers would have the hardware and firmware to respond to commands issued by the Qandim app in your smart phone. The app can control the LED drivers to turn the light on, off and dim the light to different levels. There are 2 versions of the app, the “**basic**” app and the “**Pro**” app. The **Basic** app can perform basic functions as setting up the network, adding devices to network, forming groups and basic on/off and dimming functions. The **Pro** app, in addition to performing the basic functions, can also set scenes and schedule to turn light on/off or dim based on a preprogrammed schedule. The Qandim apps are available for Android smart phones and iPhones.

1.1 Supported Devices

The Qandim apps can work with the following operating systems:

- For iPhone: iOS version 11 or above
- For Android smart phones: version 6.0 or above

1.2 Acronyms & Abbreviations

Terms	Definition
BLE	Bluetooth Low Energy
OTA	Over The Air
Control Operations	To turn on/ off the LED (Testing indicator) or change the brightness
Provisioning	It is the process of adding the Qandim equipped LED drivers to the network
BLE device	A device that is equipped with BLE hardware. Typically a light fixture equipped with a BLE equipped LED driver in our system

1.3 Document Conventions

	This element signifies a useful information or tip or suggestion
	This element signifies a warning or proceed with caution
	This element signifies that the action should be avoid

2 SYSTEM OVERVIEW

QANDIM equipped LED drivers will respond to commands from the Qandim mobile app to control dimming and lighting ON/OFF. With this app, user can create networks of up to 24 driver units using BLE mesh technology. The user can create up to 5 groups devices within the network and control devices as a group or individually. The app can create and store information of multiple networks using the app. So inside a large building, there can be multiple networks of 24 devices in a building and all can be created and control from a single mobile phone.

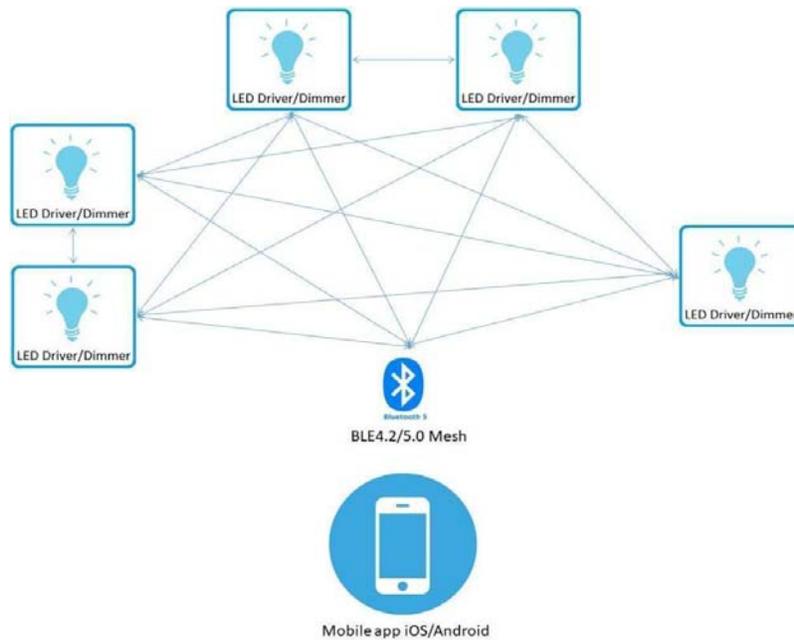


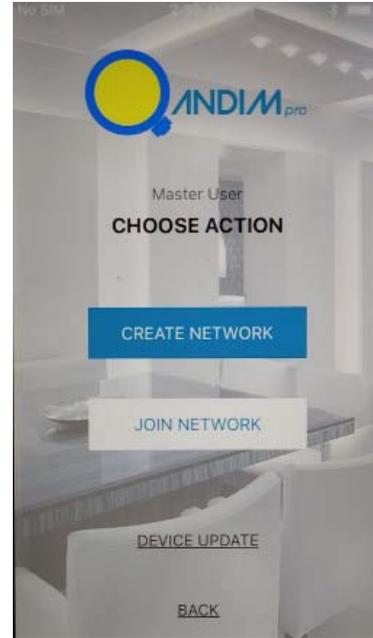
Figure 1: System diagram

2.1 Range and distance

The maximum distance between any devices is 30 feet for network to communicate effectively. So the drivers/dimmers should not be more than 30 feet apart and the mobile phone should be at least within 30 feet of a device for the network to respond to commands from mobile phone. Theoretically, if the 24 drivers are all lined up in a single line 30 feet apart, the user can be 30 feet from the first driver and send command to a driver that is 750 feet away to the last driver in the line and it will response to the command.

3. Create a Network

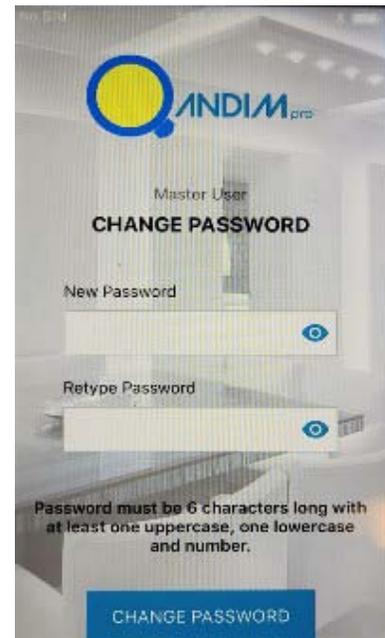
The Qandim app is accessible by two user roles: Master and Guest. Only the Master User can create the network and add devices to it. Bluetooth function in the smart phone must be activated for the app to work to create network and control devices. Please first activate Bluetooth function prior to starting the process. Open the Qandim app. When the app is opened, the splash screen on left will show. To create a network, tap on the “Login As MASTER” button on bottom left of screen. On the next screen (see left) tap the



“CREATE NETWORK” button. This will bring up the Create Network screen. (Below left). User now can enter a network name. The network name can be alpha-numeric with up to 16 characters. Initially when Master user accesses the mobile application, it asks for initial password which is predefined at firmware end. When creating a brand new network, the app will ask the Master User to enter a password. The first password to create the network is “Q4ndim”. Once this initial password is entered, the app will redirect the Master User to the update password screen. (Bottom left)



The Master User must enter a different password than initial one. The password must be 6 characters in length, only letters and numbers will be accepted (no special characters). Passwords must have at least one number, one uppercase letter, and one lowercase letter. Upon successful update of password, the Master User is redirected to Device scanner screen where BLE devices are listed. These devices are not part of any network until the device has been provisioned and added to the network.



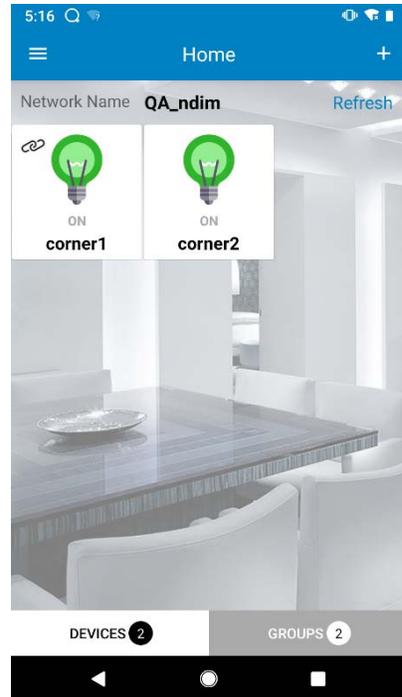


Please be sure to use a unique password. Master User password can not be changed once it is set. Carefully record this password for future use. Passwords can not be recovered once it is forgotten.

To create network, the Master User must provision at least one device and add it the network. User can created as many networks as the user desires with the same app. Only one Master User will be allowed to log on to each network. **Note:** Do not interrupt the “Add Device” function while the app is adding a device. Example, answering a phone call or making a call during the add process will write incorrect information into the device and it will become unreachable by the network and uncontrollable.

3.1 Familiarize with the Home Screen

Upon creating the network or logging into the network, the Home screen will show on the smart phone app. (See figure on right) The word “Home” will appear at the center of the blue band to signify that the user is in the Home screen. The 3 bars on the top left is the menu button. The “+” on the top right is for adding devices or groups. In the main section just below the blue band, the network name will be shown. All the devices in the network will be represented with an icon with a light bulb. Each icon represents one BLE device. If there are no devices added to the network, the main screen will show blank. On the bottom of the Home screen, there is a “DEVICES” icon and a “GROUPS” icon. The number next to the legend tells the number of devices or groups in the network. Tap on *GROUPS* icon and the icon turns white and the screen displays all the groups. Tap on *DEVICES* and the icon turns white and the screen displays all the devices. Green light bulb means the device is on, yellow is off, grey means device is offline.

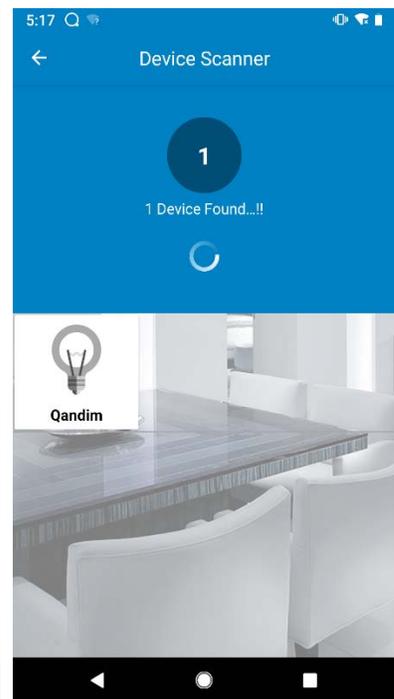


3.2 Add and Provision Devices to the Network

Once the Master User has created a network, devices can be added to the network at any time by the Master User.

To add new devices to the network:

- Tap on “+” (add button) at the top right corner of the Home screen.
- Tap on the “Add Device” option and user is redirected to *Device Scanner* screen where active BLE



devices are listed which are free to be added in the network.

- Tap on any of the device icons.
- User will be redirected to the Add Device screen. (next page)
- Tap on the “Identify Your Device” Button and the device that is represented by this icon will flash 5 times. Tap on the Device Name box and a keyboard will pop up to allow the user to change the name of the device.
- Once the new name has been entered, tap on “Save” and the device name will be saved and the device will be added to network. It normally takes one minute for each device to be provisioned.

This procedure can be repeated for all devices to be added to network.

-  During initial commissioning of a system in a big building with many devices, it is best to only power up a few devices in the vicinity of the Master User doing the commissioning. This will help easily identify devices for easy of provisioning.



3.3 Remove Device from the Network

The Master User can remove devices from the network. The device which is removed from the network will be available to be added to other network or the same network again. To remove the device from the network, go to Home screen and tap on the device which user wants to remove. Then tap on the *Delete* icon represented by the trash can. Tap on *Yes* in the confirmation popup.

4 Log out of Network

To log out of network, tap the 3 bar menu icon on top left of Home screen. Tap on “Logout” and the app will log out of the network.

5 Roles of Master/ Guest

Only one Master User can be logged into any network at the same time. The Master User and multiple Guest Users can be logged in the network at the same time.

5.1 Join the Network

The smart phone that has created the network will have the network information stored in the phone’s memory. When using this phone to log back into the network, tap “JOIN NETWORK” button and the networks that are in memory will be displayed and Master User can log in by tapping on the desired

network and enter the Master User's password to log in. If as phone that has no memory of the network, this phone can join the network by scanning or importing the network QR code.

Once the network is created by Master User can allow other users to join the network both as Master User or as Guest User by sharing the QR code of the network and sharing the password

5.1.1 Share the QR Code

The Master user can display the QR Code to be shared by tapping the menu button to call up the menu of actions. Then select "Manage Network". The "Manage Network" screen will come up. Scroll down and tap on "Share Network". The QR Code of the network will display in the Share Network screen (left). Other users (Master or Guest) can scan this QR Code to join the network. The QR Code can also be shared by email, text message, or other options that are available in your smart phone. This QR Code can also be uploaded to icloud or Google drive for later recall. The Master User can also print the QR Code and the print out of the QR Code image can be scanned to join the network.



We recommend that users keep a backup of the QR Code for future in the event that the smart phone breaks or is replaced

5.2 Join as Master User

Any smart phone with the app can join the network as Master User. The user can join using the "Scan Network" function or the "Import Network" function. From the splash screen, user selects the "Log As Master" button. Then tap the "JOIN NETWORK" button. The "ACCESSIBLE NETWORKS" screen will be displayed. If there are networks already in the phone's memory, the networks will be display with network name and 3 symbols to the right of the network name. (1) The concentric arcs symbol means that the network is active and in range.

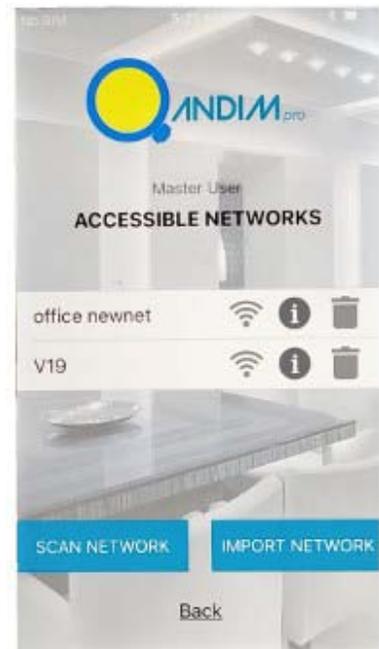
(2) The "i" in a circle is to access information on the network. Tapping on it will display the QR code for this network. It can be share for scanning by other phones with the Qandim app.

(3) The trash can symbol is for deleting the network information from the phone's memory. Tapping on this button will delete the network from the phone's memory. Once deleted, the network will be not visible for future use.

If there are no networks in the phone's memory, the screen will be blank.

5.2.1 Scan Network

From the Accessible Network screen, tap the "SCAN NETWORK"



button. Then aim the rectangle outline on the phone screen at the QR Code shared by Master User's phone until there is a blip or the app goes back to the "ACCESSIBLE NETWORK SCREEN" and the desired network is displayed on screen. Tap on the desired network and proceed to log into the network with password provided by the Master User.

5.2.2 Import Network

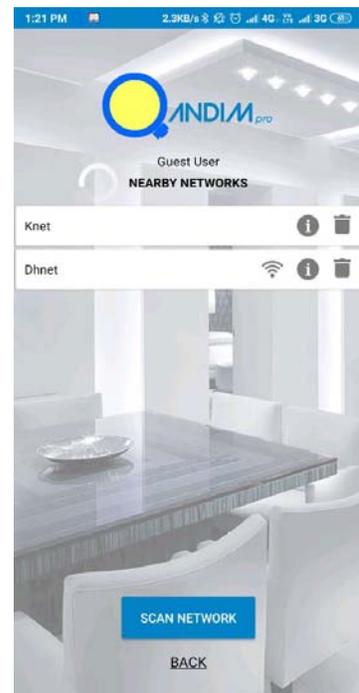
From the Accessible Network screen, tap the "IMPORT NETWORK" and select the QR Code image that the user has obtained and stored in the photo gallery. Once selected, the app will return to the Accessible Network screen and tap on the desired network to log in.

5.3 Join as Guest User

Any smart phone with the app can join the network as Guest User. The user can join using the "Scan Network" function.

5.3.1 Scan Network

From the splash screen, user selects the "Log As Guest" button. Then tap the "JOIN NETWORK" button. Then the Guest User "ACCESSIBLE NETWORK SCREEN" will appear. (see right) User then tap the "SCAN NETWORK" button. Then aim the rectangle outline on the phone screen at the QR Code on Master User's phone or a printed page until there is a blip or the app goes back to the and the desired network is displayed on screen. Tap on the desired network and proceed to log into the network with password provided by the Master User.



5.4 Keep the Network Information in Memory

Once a network is scanned or imported, it stays in the phone's memory. User can log out and log back into the network or log into another network. The smart phone can store up to 5 different networks in memory. There can be unlimited number of networks in the building. Users can access all the networks by simply scanning or importing using procedures above.

5.5 Delete a Network from Memory

Users can delete any network that is in the phone's memory. To delete the network, go to Accessible Network screen and tap on the trash can of desired network to delete. Users can log back in using the same procedures outlined above. This action does not delete the network. It just deletes the network information from the smart phone.

6 Refresh

Once logged into the network, users can get updated information about devices in the network. Simply go to Home screen and tap on “Refresh”. Refresh will display current status of individual devices only.

7 Update Guest User Password

For security reasons, it is important to change the Guest User password so that unauthorized people can not log into the network and make changes. The default password for Guest User is “Guest0”.

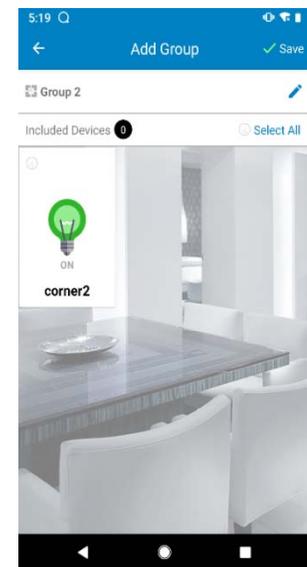
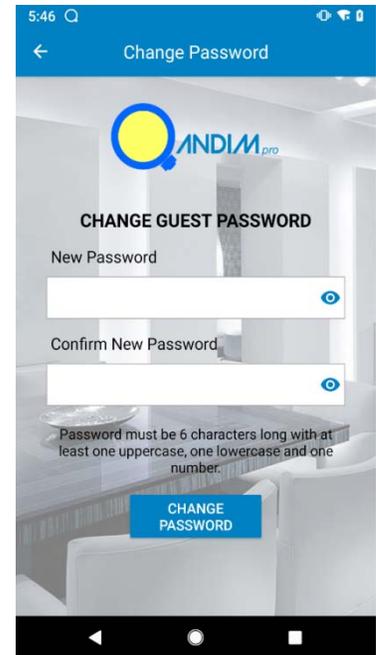
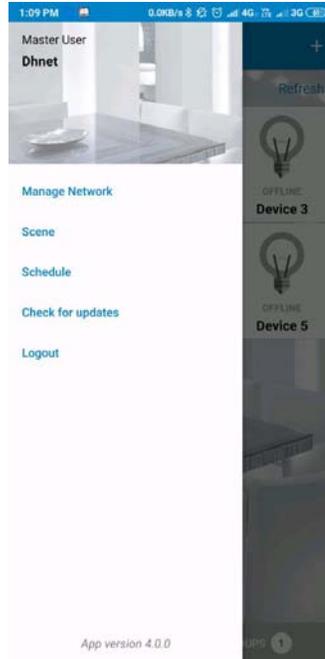
Only the Master User can update the guest user. To change Guest User password, tap menu button from Home screen. The pull out menu will appear. Tap on “Manage Network”. The Manage Network screen will appear. Options available in this screen are:

- (1) Change User Password
- (2) Show Guest Password
- (3) Show Master Password
- (4) Share Network
- (5) Reset entire network.

To change Guest password, tap on “Change Guest Password”. The change password screen will appear. Tap on the “New Password” box to enter the new password. Pressing the “eye” icon will display the password as it is typed in. The password must be 6 characters long with at least one number, one uppercase letter and one lowercase letter. No spaces or special characters allowed.

8 Group Management

For ease of controlling many lights, the Qandim app allows user to group devices into groups so the multiple devices can be controlled at the same time. Only the Master User can set groups and add



devices to particular groups. This app allows the user to create a maximum of 5 groups in a network. Each group can have 1 to 8 devices. Note: If more than 5 groups is needed in a space or building, the user can set up multiple networks to accommodate the need for more groups. For instance, in a 10 storey building, user can create 2 networks per floor and thus have total of 20 networks in the building. Also, networks can be vertical, that is, all stair lights in the building can be in one network, so that the Master User can control all the stairway lights (floors 1 to 10) from any floor.

8.1 Create Groups

To create a group, from the Home screen:

- Tap on *Add* icon (+) shown at the top right corner,
- Select *Add Group* option.
- Select the devices to be added to a group.
- Tap on the *pencil icon* to change the name of the group
- Tap on *Save* button.

Repeat this process to create additional groups.

Once groups have been set. The groups can be access by tapping Groups from Home screen. In the Group Detail screen, user can toggle between *CONTROLS* view and *DEVICES* view. In *CONTROLS* view, user can control the group. In *DEVICES* view, user can see all the devices in the group.



8.2 Remove Devices from Groups

To remove the devices from the group:

- Tap on *Groups* tab on Home screen,
- Tap on particular group and tap on *pencil icon*,
- *Uncheck* the devices to be removed from group,
- Tap on *Save* button.

8.3 Delete Groups

To delete groups:

- Tap on *Groups* tab on Home screen,
- Tap on the group to be deleted,
- In the *Group Detail* screen, tap the trash can,
- Tap *Yes* to confirm deletion, *No* to cancel.



9 Control Operations

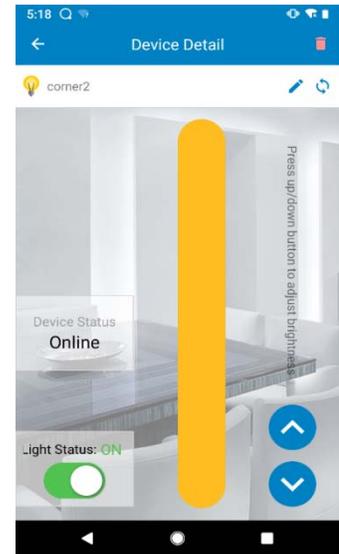
Any user regardless of the role (Master and guest both) can control the BLE devices in the network. Devices can be control individually or as a part of a group. Control options are light on – off and brightness level.

9.1 Individual Device Control

To control the device:

- Tap on the device user wants to control,
- There is a toggle button to turn ON/ OFF the device.
- There is a brightness indicator bar and *Up (arrow up)* and *Down (Arrow down)* button to increase/decrease brightness of device. Brightness can be adjusted by tapping *Up* button to increase the brightness. Tapping *Down* button decreases the brightness. The brightness level has a range of 4% to 100%.

There is also refresh button to refresh particular device and not all the devices in the network.



9.2 Grouped Devices Control

To control a group:

- Tap on *Groups* tab on Home screen,
- Tap on the group to be controlled and the Group Detail screen appears,
- Tap on *CONTROLS* to display control screen. Use the *toggle button to turn ON/OFF* the group devices.
- There is a brightness indicator bar and *Up (arrow up)* and *Down (Arrow down)* button to increase/decrease brightness of device. Brightness can be adjusted by tapping *Up* button to increase the brightness. Tapping *Down* button decreases the brightness. The brightness level has a range of 4% to 100%.

9.3 Dimmer Setting Persistence

After the brightness level of a device or a group has been set, this brightness level remains the same until it is changed. When user uses the on/off toggle to switch the device off, the brightness level is remembered by the device. When the device is switched on again, the device will to th the previously set brightness level.

9.4 Power of Safety Level

For safety reason, when the device is powered off and powered on again, the device will be turned on and will go to 70% brightness level regardless of previous setting. User will need to set the brightness to desired level after a power off/on event.

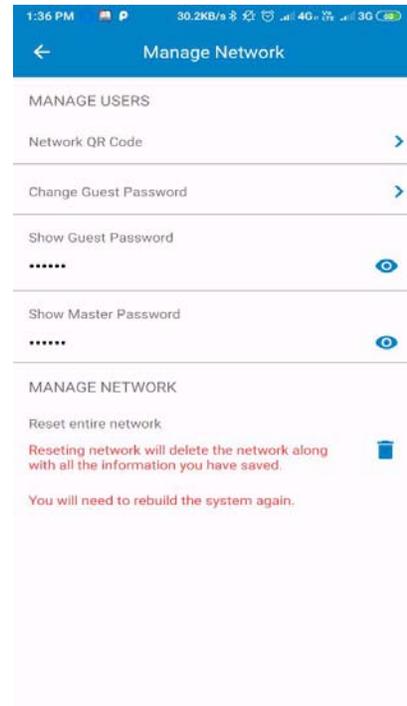
10 Firmware Upgrade Using OTA

Qandim enhanced devices are usually shipped with the latest firmware. In the event the there are new upgrades to the firmware, user can upgrade the firmware using the OTA feature. It is recommended that

users perform a firmware upgrade when installing a new system.

To perform the OTA:

- From home screen, tap on menu icon and select *Check for Update* option.
- The list shows the device which are in network.
- Tap on the device which user wants to upgrade. If the device is up to date, it will say device is up to date and no further action is needed on this device. Tap on the next device. If device needs update, the Update screen will be displayed.
- Tap on *Connect* to set the device to the OTA mode.
- Tap on *Upload* to install the available update of firmware.



Note: The device will be in provision state after successful upgrade.

11 Network Reset

The Master User is allowed to reset the network which means all the devices in the network is removed from the network and will be available to be added to other networks. The network information will be deleted from the smart phone.



Caution: Once is function is performed, user will have to rebuild the entire network.

To reset the network:

- Tap on the menu icon and select *Manage Networks* option,
 - Tap on *Trash Can* icon shown beside *Reset Network*,
 - Wait till the process is completed.
-
- Upon successful completion, user is redirected to main screen of the mobile application. It takes approximately 1 minute to complete.
 - There is one point to remember: Only online devices will be factory reset using *Reset Network* option.
 - If is offline during the above network reset, user needs to perform reset of the device again after the device is powered up again. Use the QR code to sign into the network. At this time, the other devices will show offline and only the devices that are not reset in the first round will show online. At this time delete the devices from the network one by one using the delete function. Then log out of the network and use the trash can function to delete the network from the smart phone's memory.

12 Premium App Operations

We also offer a premium app that will give many more benefits. The premium app is called Qandim Pro and is available for purchase in the App Store or Google Play. In addition to turning on and dimming, the premium App let you set 6 different lighting scenes and set daily schedule for up to 6 events, to turn lights on and off, and to bring lights up and down that you can easily program. A good application would be to slowly bring up the lights in the morning and slowly bring down the lights at night to help with your circadian cycle, or just leave 1 light on a lowest level to be the night light. Adding schedules to various lights on and off will also help deter burglars when the house is not occupied. The system is also good for businesses to help change the light level depending on the time of day to make use of sunlight or in according to food service schedules in a restaurant. For households, it will improve you well being, for businesses it will help you manage the light environment and safe on electricity bills.

12.1 Scenes

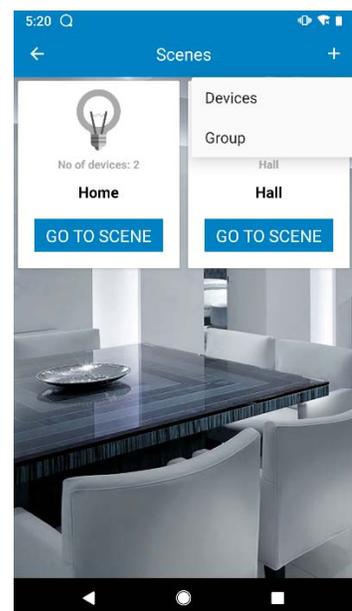
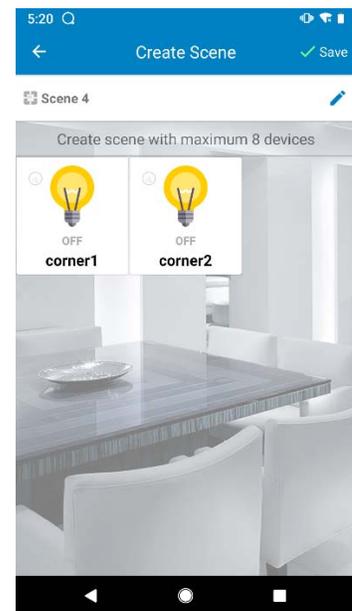
Only the Master User is allowed to create scenes. Scenes can be created using devices or a group. The scene is used to apply the control quickly to the devices. This is also particularly helpful for setting schedules (Refer to the next chapter for schedules). User is allowed to create up to 8 scenes. (User can make a scene to set all devices in a group to the scene or select devices that belong to different groups to be part of a scene) For example, all devices in a group such as “Kitchen” can be in the same scene, or 1 device from each group of 1 or 2 and up to 8 devices at different locations of the building can be part of a scene.

12.1.1 To create a scene:

- Go to Home Screen. Tap the 3 bar menu icon on top left of the screen and select *Scene* option.
- Tap on *Add* icon and select option: *Devices or Group*.
- *Check* the devices/ group which user wants to add to the scene.
- Tap on *Save* button.

The scene is created, and user is redirected to Scenes List screen.

Next, user can set the scene to the desire light level. To set the scene’s light level, tap on the light bulb of the scene icon which user wants to set the level. The “Scene Detail” screen will come up. Use the control buttons to set the light to off or on and use the up/down buttons to set the desire light level for this scene. Tap the *Save* button to save the setting for this scene. Once the setting is saved, user will be redirected to the “Scene” screen. The scene is applied



once user taps on the “Go to Scene” button of the desired scene.

 The point to remember: Once a scene is set, devices/group cannot be edited. Only light levels can be edited.

Only the Master User can edit the brightness or state (On/ Off) of the scene or delete the scene by Delete icon on the scene details page.

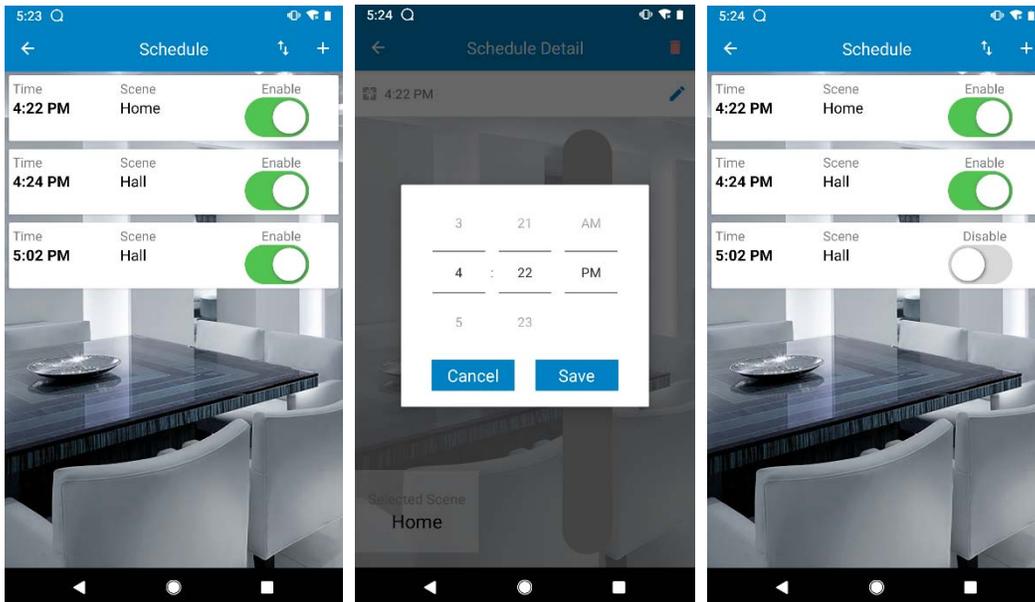
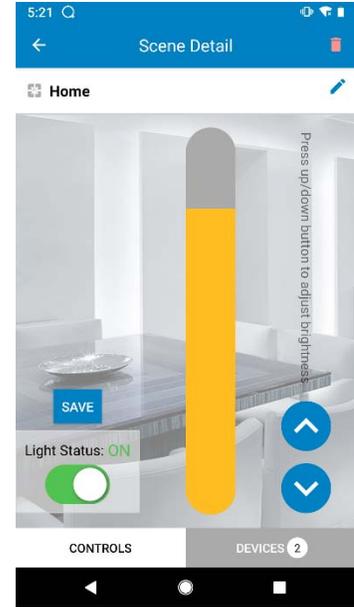
Guest users can activate a scene but cannot edit or delete scenes.

12.2 Schedule:

Only the Master User is allowed to set times for the scenes to be applied. This feature is called schedule. Up to 8 scheduled events can be programmed in a network. Each scheduled event can have only one scene. The user is allowed to enable and disable the schedule. Also, there is a sort icon to arrange schedules chronologically.

To create a scheduled event:

- From Home screen, tap on Menu icon and select the *Schedule* option.
- Tap on *Add* icon and select the scene which user wants to use.
- Set the time by clicking on *Edit* icon.
- Tap on *Save* button.



The schedules events can be programmed in random order. Use the up/down arrows icon (*Sort*) to sort the events in ascending or descending chronological order. The scenes will be applied as per the *Schedule* is set.

Master User can edit the set time of any schedule, enable or disable a schedule event by sliding the button on the right of the schedule band, and delete any scheduled event from the *Schedule Detail* screen.

Guest Users are not allowed to edit any schedules. Guest Users are only allowed to enable or disable any of the scheduled events.

12.2.1 Clock Accuracy of Schedules

The internal clock of individual devices are each independent and may drift over time. The drift can be as much as 3 minutes over a period of a month. It is recommended that scheduled events be programmed at least 5 minutes apart so that chronological schedules will happen one after another. The clocks in the devices will be synced up once as user logs on to the network and tap the *Refresh* button after logging on.

12.2.2 Past Events

In the event of a power outage, an event that is scheduled to be activated at the time when the power is out will not be activated once the power is restored.