

IOTA USER GUIDE

Control of Kessil A360X/XE and AP9X/XE Lighting With APEX





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INTRODUCTION

This guide will assist you in setting up IOTA-capable Kessil LED lighting fixtures to be controlled by an Apex A2 or newer controller system.

The supported models are:

AP9X™	AP9XE™
A360X Tuna Blue™	A360XE Tuna Blue™
A360X Tuna Sun™	A360XE Tuna Sun™
A500X Tuna Blue™	A360XE Refugium™

The A360X Refugium™ is not currently supported.

In this guide, you will see references to IoTa and IOTA. IoTa is an acronym of ***Internet of Things: Aquarium***. IoTa is the name of an initiative created by Neptune Systems to standardize and facilitate development of Apex control of Internet-connected aquarium equipment such as the Kessil X- and XE-series™ LED lights.

REQUIREMENTS

- An Apex A2 or A3 family controller is required; this capability is not available for Apex A1 (Classic) models.
- An Apex A2 must have AOS version 5.06_7F21 (or later) installed for use with Kessil X-series lights.
- An Apex A3 must have AOS version 5.16_AC26 (or later) installed for use with Kessil XE-series lights.
- Regardless of Apex model, the latest available AOS is recommended.
- The Apex must be connected to the local network via Wi-Fi or Ethernet.
- The Kessil LED lights which will be directly controlled by the Apex must be connected over Wi-Fi to the same IP network as the Apex.

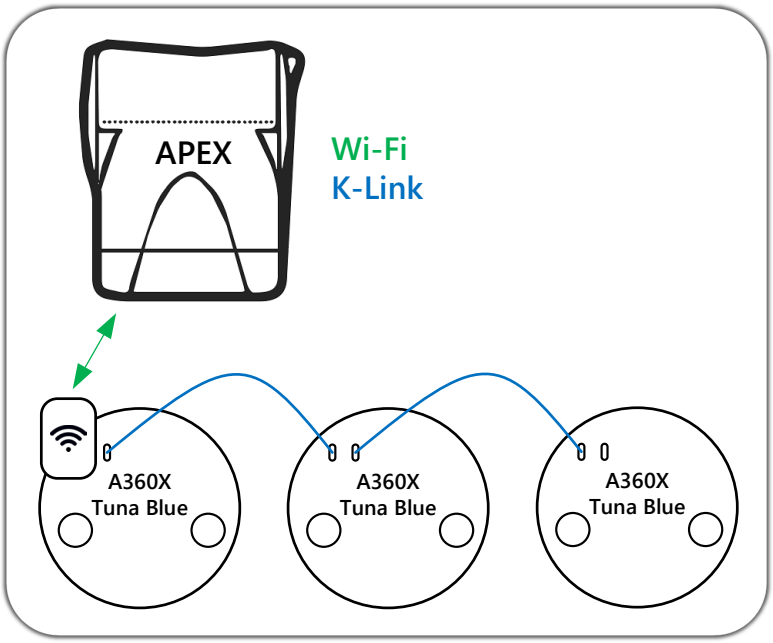
SYSTEM ARCHITECTURE

- Kessil A360X Tuna Blue and Tuna Sun lights equipped with a Wi-Fi Dongle may be directly controlled by the Apex.
- Kessil A360XE Tuna Blue, A360XE Tuna Sun, and A360XE Refugium lights equipped with a Wi-Fi Dongle XE may be directly controlled by the Apex.
- Kessil AP9X and AP9XE lights in Apex-controlled mode may be directly controlled by the Apex.
- Each IoTa device being directly controlled by an Apex counts as an Apex module and is subject to the Apex limit of 49 modules.
- The use of K-Link to daisy-chain lights is supported, subject to the following basic guidelines:
    - You MAY use K-Link to daisy-chain any X-series and/or XE-series lights of the same spectrum from an Apex-connected A360XE or AP9XE
    - You MAY use K-Link to daisy-chain any X-series lights of the same spectrum from an Apex-connected A360X or AP9X
    - You MAY NOT use K-Link to daisy-chain any XE-series lights from a X-Series light.
    - YOU MAY NOT mix lights of different spectrums in the same K-Link chain.

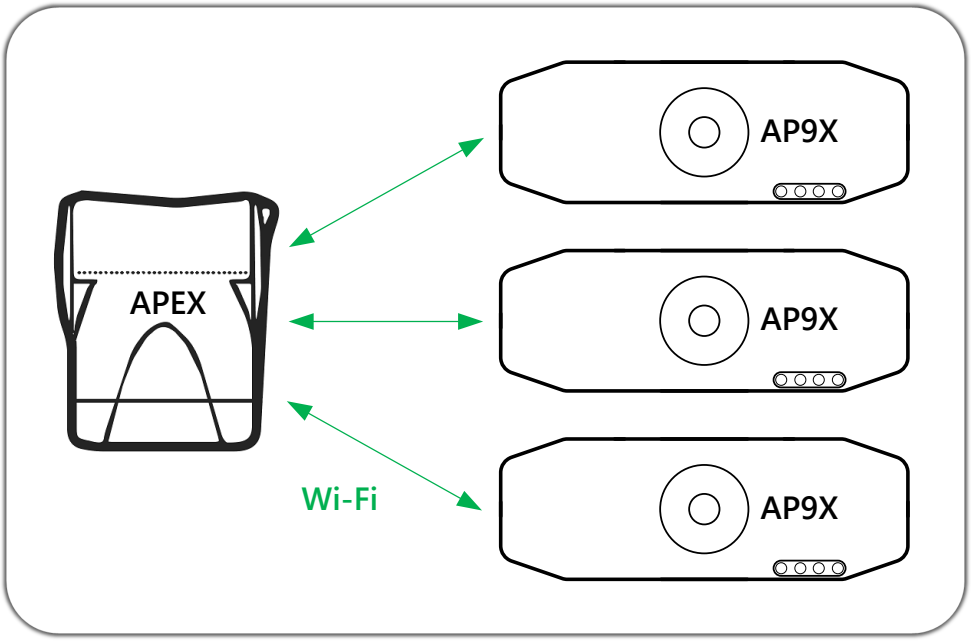
      Refer to this matrix for detailed compatibility when using K-Link and Apex-connected lights:

		Models Supported on K-Link							
		AP9X	AP9XE	A360X Tuna Blue	A360XE Tuna Blue	A360X Tuna Sun	A360XE Tuna Sun	A500X Tuna Blue	A360XE Refugium
Apex-Connected Model	AP9X	✓	✗	✓	✗	✗	✗	✓	✗
	AP9XE	✓	✓	✓	✓	✗	✗	✓	✗
	A360X Tuna Blue	✓	✗	✓	✗	✗	✗	✓	✗
	A360XE Tuna Blue	✓	✓	✓	✓	✗	✗	✓	✗
	A360X Tuna Sun	✗	✗	✗	✗	✓	✗	✗	✗
	A360XE Tuna Sun	✗	✗	✗	✗	✓	✓	✗	✗
	A500X Tuna Blue	✓	✗	✓	✗	✗	✗	✓	✗
	A360XE Refugium	✗	✗	✗	✗	✗	✗	✗	✓

If you have multiple lights having the same spectrum, i.e., all Tuna Blue), and you wish to control all lights together with the same lighting schedule, then only one AP9X/XE or one Wi-Fi Dongle-equipped A360X/XE should be in Apex-controlled mode, and other lights be daisy-chained from that light. This configuration offers simplicity; only the Apex-controlled light needs to have a lighting schedule assigned in the Apex; the other lights will automatically follow that same schedule.

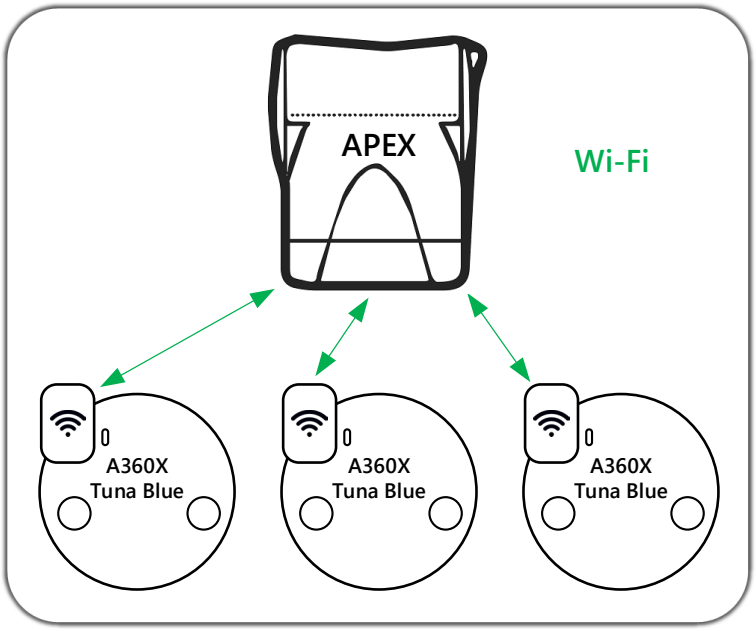


Apex controlling a K-Link chain of A360X

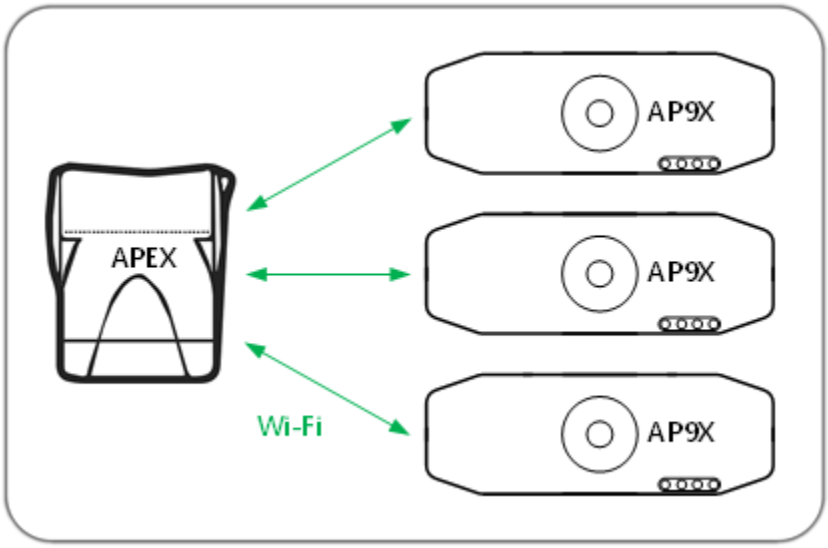


Apex controlling a K-Link chain of AP9X

If you have multiple A360-family lights of the same model and type (A360X Tuna Sun or A360X Tuna Blue), and you wish to control each light independently, each light must have a Wi-Fi dongle. and each should be configured in Apex-controlled mode. This offers the most flexibility, but the lighting schedule for each light must be set separately.

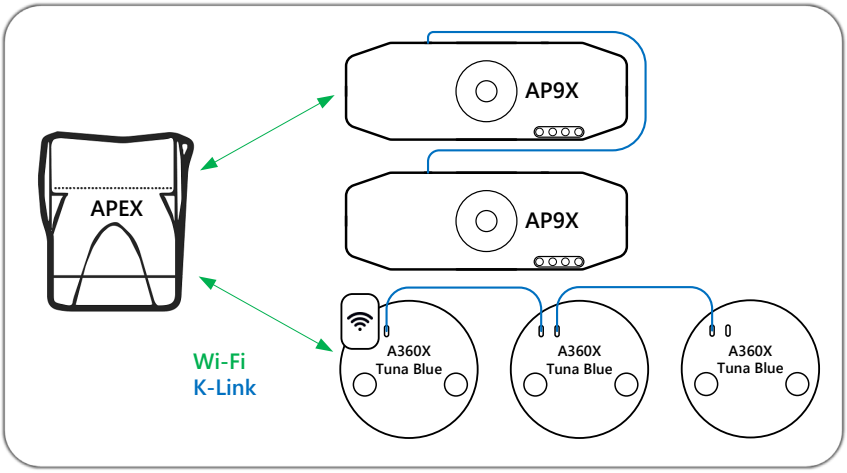


Apex independently controlling three A360X



Apex independently controlling three AP9X

If you have both AP9X/XE lights and A360X/XE lights, you may control each light individually, or you may form two chains of K-Linked lights of the same model.



Apex controlling chains of both AP9X and A360X

The Apex supports a maximum of 12 IoTa devices of any type, which includes:

- Kessil A360X or A360XE equipped with a WiFi Dongle and configured in Apex control mode

Kessil AP9X or AP9XE configured in Apex control mode

- Aquaillumination Prime, Prime HD, Hydra 26HD, and Hydra 52HD under Apex control
- Sicce Syncra SDC™ pumps and XStream SDC™ pumps which have been upgraded for IoTa and Apex control

This limit applies to all IoTa devices on the local wireless network; there can be no more than 12 present.

Examples:

1. You have (6) A360X equipped with WiFi Dongles, (2) Sicce Syncra SDC pumps, and (4) Sicce XStream SDC power heads. This is a total of 12 IoTa devices, and all of these devices may be controlled by a single Apex, or some may be controlled by one Apex, and other controlled by another Apex.

2. You have (6) A360X equipped with WiFi Dongles, (2) AP9X, (2) Sicce Syncra SDC pumps, and (4) Sicce XStream SDC power heads. This is a total of 14 devices, which exceeds the limit of 12. To reduce the number of devices present on the network, use K-Link cables to daisy-chain the AP9X lights, some or all of the A360X, or some combination thereof as needed to reduce the totally quantity of IoTa devices to 12 or less.

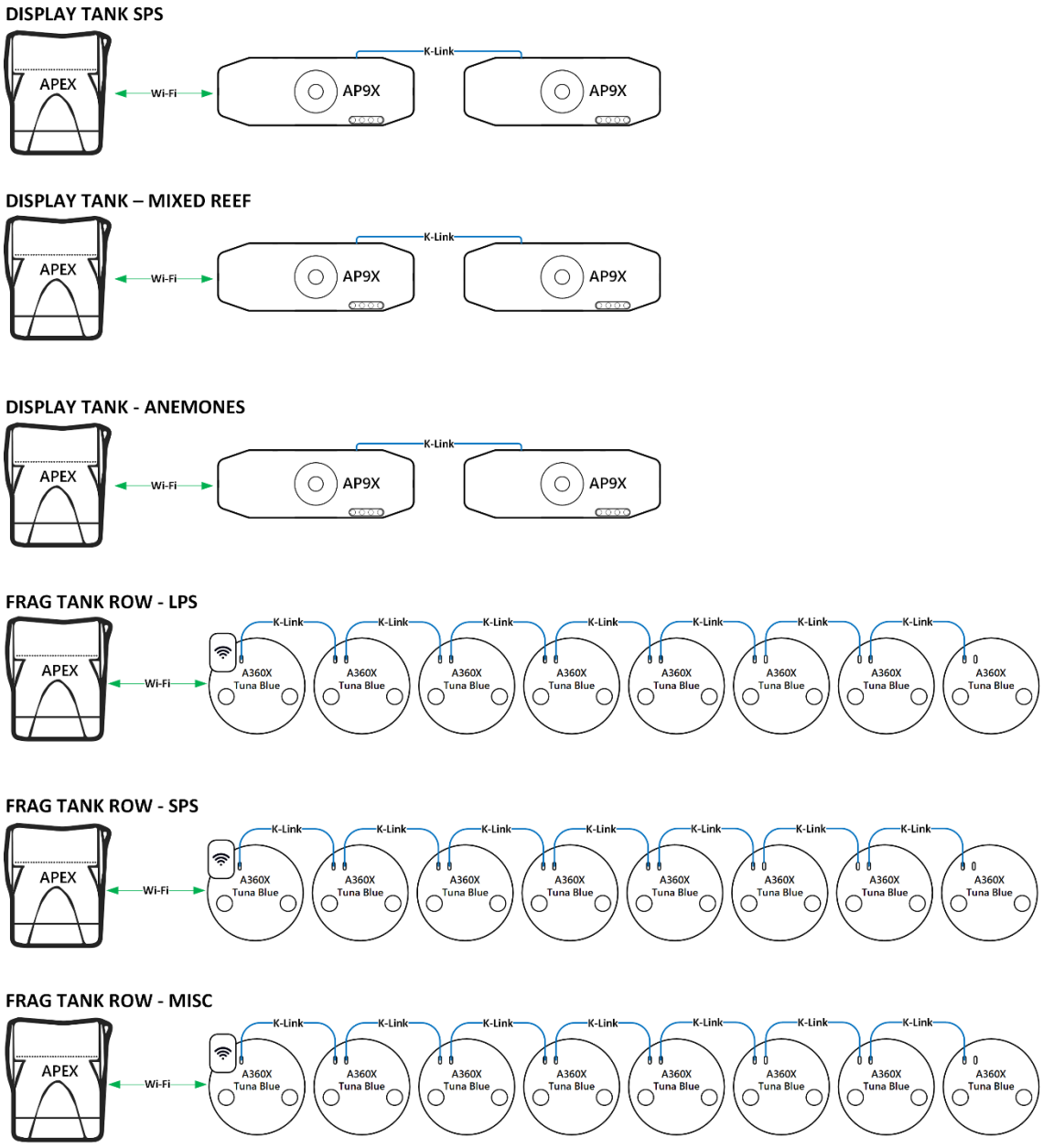
For larger installations involving more than 12 Kessil lights, special consideration must be given to ensure the 12-item limit is observed. For stores, coral farms, etc., it will generally be optimal to handle raceways or rows of frag tanks with one light being directly Apex-controlled, and the remaining lights in each row or each raceway be daisy-chained using K-Link.

Let's take a store as an example.

- It has 3 saltwater display tanks in the showroom, each with (2) AP9X
- Each display tank's pair of lights must be controlled separately
- The store also has 3 long rows of frag tanks, each with 8 A360X
- All frag tanks in any given row can have the same lighting schedule, but each row must be able to have a different schedule
- Each display tank has a dedicated Apex system
- Each row of frag tanks has a dedicated Apex system

To meet these goals and to stay within the limit of 12 active IoTa devices, the lighting could be configured using a mixture of some lights with direct Apex control and the remaining lights daisy-chained from those lights, as seen in this image:

MORGAN HILL AQUATICS



The depicted layout offers simplicity and ease of use, has the flexibility to meet the different requirements of the various types of livestock, yet still allows ample room for growth.

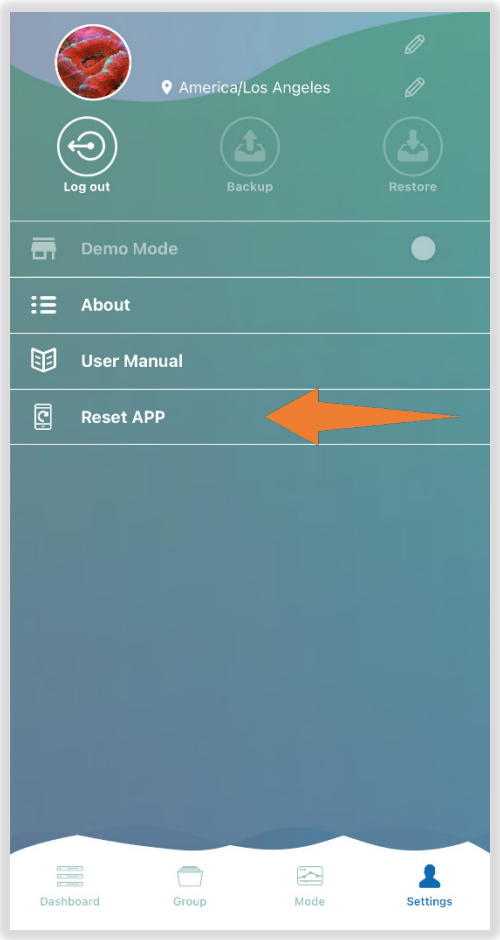
PREPARING X-SERIES LIGHTS FOR CONTROL BY APEX

NOTE: This section is for use with X-Series lights only. If you are setting up XE-Series lights, skip ahead to the next section.

If you are changing existing Kessil lighting from control via the Kessil WiFi app to Apex control, take screenshots or make notes about your current lighting schedule now so you can recreate your current lighting schedule in the Apex after the lights are under Apex control.

After installing the latest version of the Kessil WiFi app:

1. Reset all lights (AP9X and WiFi Dongle-equipped A360X).
2. Reset the app; tap Settings at the bottom, then tap Reset App.



3. Follow the setup instructions in the Kessil WiFi app manual. Use the "Through Wireless Router" method ***after*** enabling the ***Apex Fusion control ONLY*** option. When performing this step, the AP9X or the WiFi Dongle must be configured to connect to the same network as the Apex which will be used to control it.



If a firmware update is available for the AP9X or the WiFi Dongle, it will be installed during the process of configuring the Kessil light for your wireless network.

4. When the configuration process through the app has completed, it will be ready to attach to your Apex.



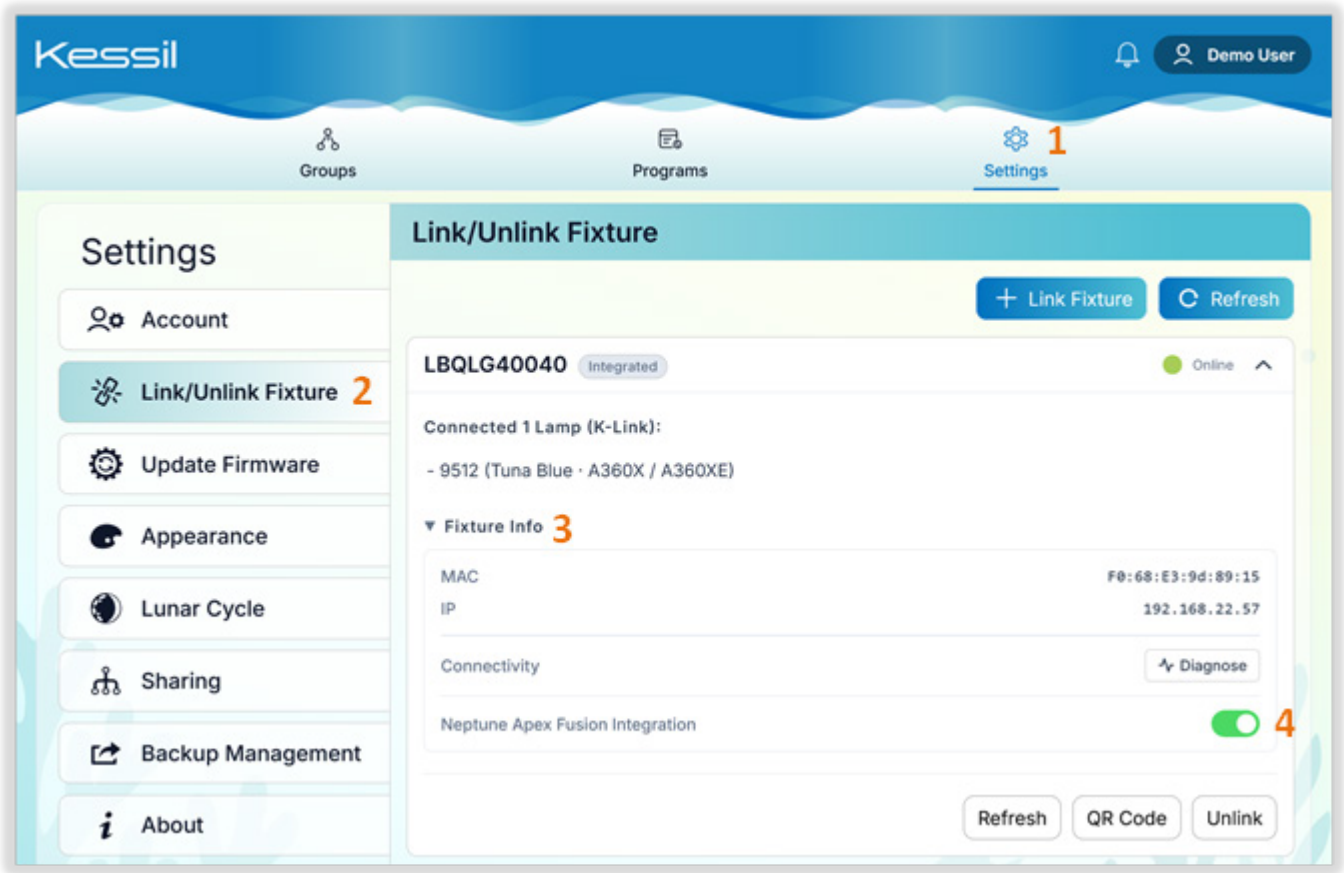
After you complete the setup of each AP9X or WiFi Dongle-equipped A360X with *Apex Fusion control ONLY* enabled, it will no longer be visible in the app.

PREPARING XE-SERIES LIGHTS FOR CONTROL BY APEX

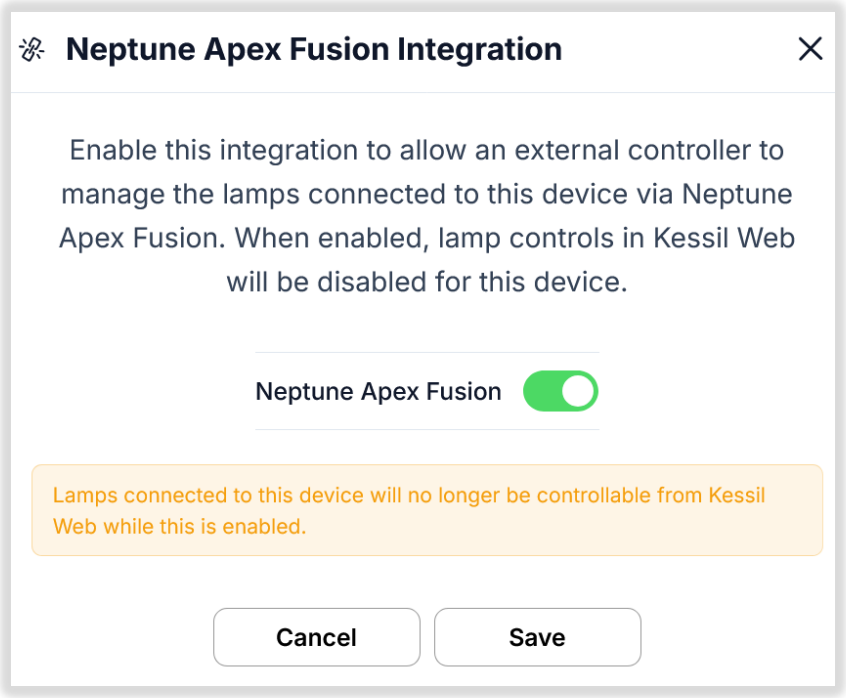
NOTE: This section is for use with XE-Series lights only. If you are setting up X-Series lights, go back to the previous section.

Kessil XE lights do not require the use of the Kessil mobile app; they use a newer method to configure them for Wi-Fi, update firmware, etc. Refer to the Kessil Support Downloads page for AP9XE and Dongle XE setup instructions. When the fixture is linked to the Kessil IoT cloud and you have updated the fixture or fixtures with the latest firmware, return here to continue.

In the Kessil IOT portal, enable Neptune Apex Fusion Integration by clicking in the sequence indicated. Repeat for any additional fixture which will be placed under Apex Control.



Another dialog to confirm your choice will appear; when prompted, enable Neptune Apex Fusion, then click Save.



PROVIDING POWER TO YOUR KESSIL LIGHT

The power supplies for A360X/XE and AP9X/XE lights do not need to be plugged into an EnergyBar outlet; instead, they should be plugged into a regular wall outlet or power strip. Neptune Systems recommends that the power supplies for A360X and AP9X lights not be plugged into an EnergyBar outlet. However, if you do, the EnergyBar outlet should be programmed to be always ON. You can use the APEX Fusion "Always" Task to configure the EnergyBar outlet to be always On, or if you prefer to program it yourself, use this simple program:

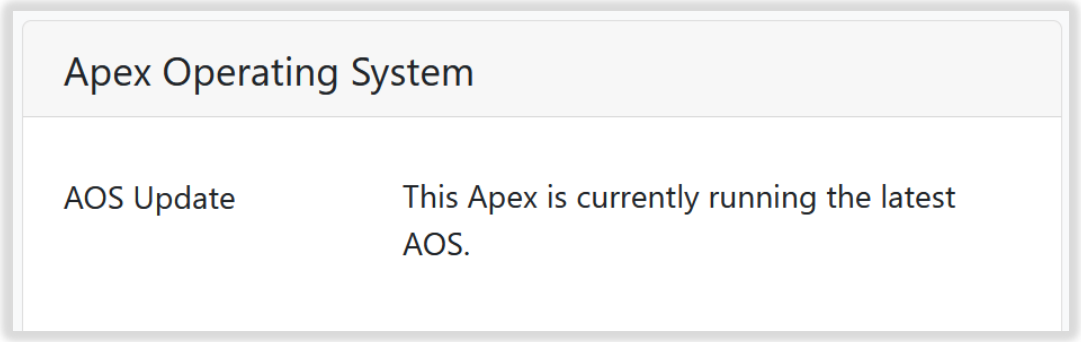
```
Fallback ON
Set ON
```

In APEX Fusion, the "Always" Task may be found by clicking on the **Tasks** button.

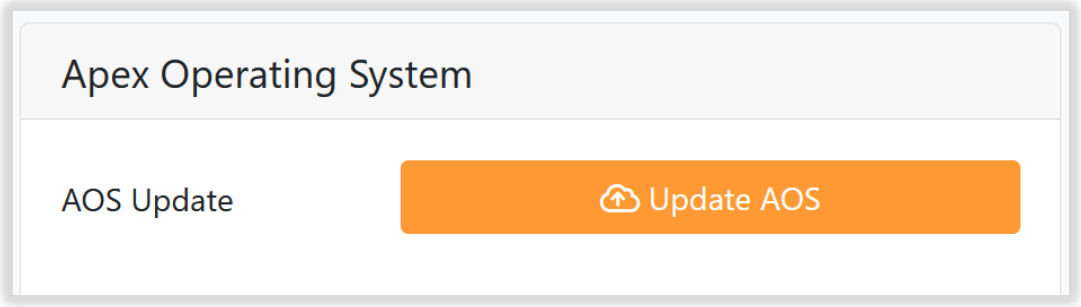
UPDATING YOUR APEX AOS

Your Apex should have the latest AOS version installed for best results. You can check for the availability of a newer AOS than installed and install an AOS update if one is available using either APEX Local or APEX Fusion. On the **Dashboard**, click the **Expand** button, then click the **Network** button.

The page will either show that no update is needed, or that an AOS is available to install.



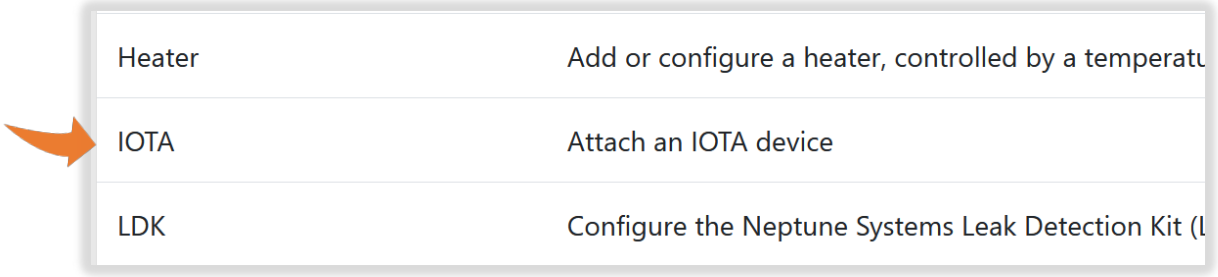
- or -



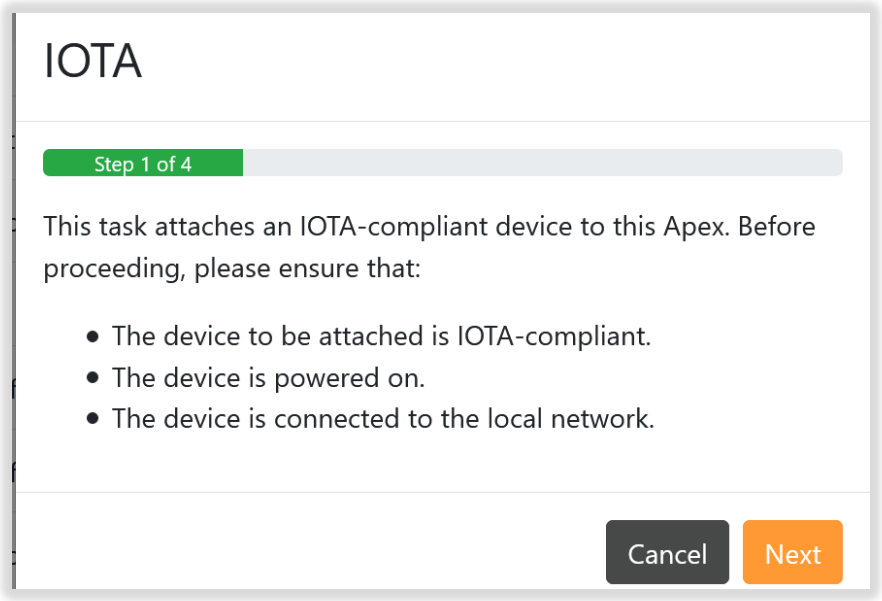
If an update is available, click the **Update AOS** button, then follow the prompts. Wait at least 10 minutes after the AOS update process completes before proceeding.

ATTACHING LIGHTS USING THE APEX FUSION IOTA TASK

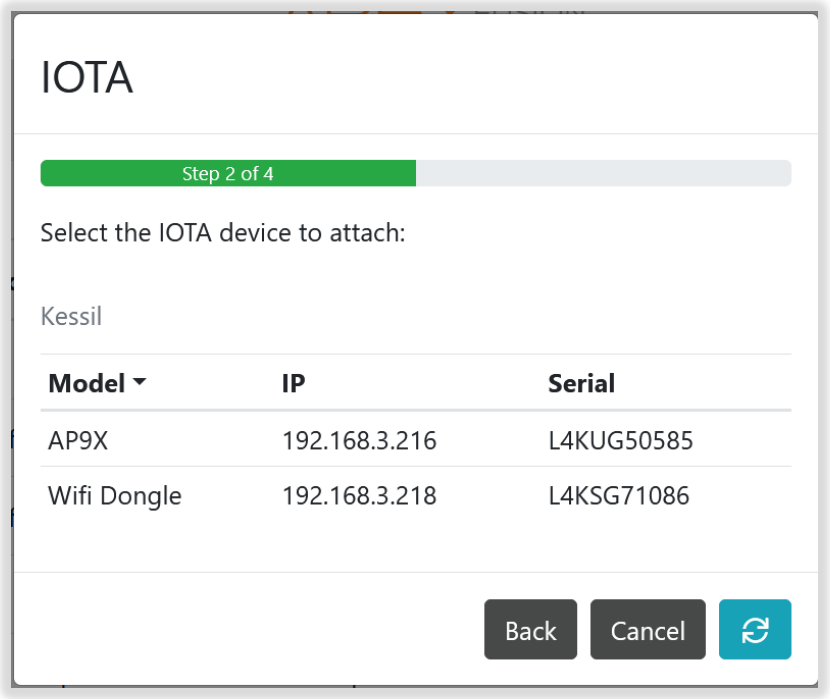
The process of configuring an Apex to control an A360X, A360XE, AP9X, or AP9XE is called "attaching". The simplest and preferred method of attaching an A360X/XE or AP9X/SE is by use of the IOTA Task in APEX Fusion (not APEX Local). While viewing your Apex dashboard, click on the **Tasks** button; then click on the IOTA Task:



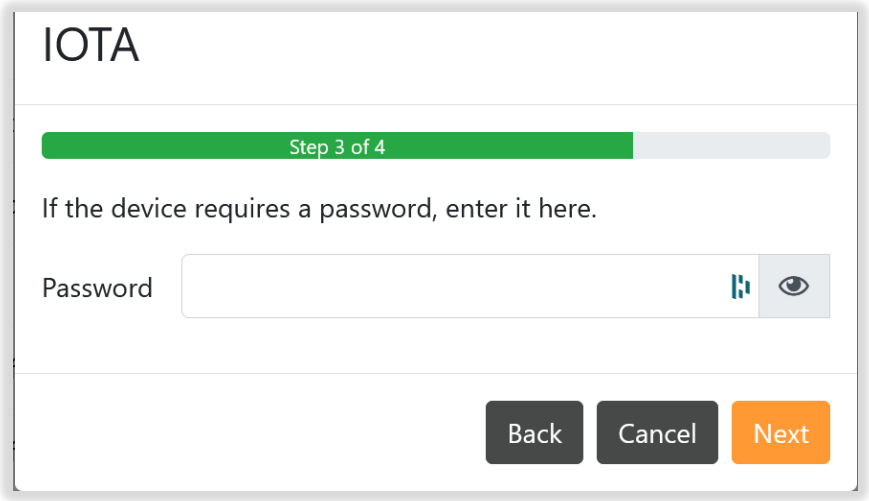
Follow the IOTA Task steps. Step 1 is a summary of what the task does and the basic requirements to be able to attach the Kessil light to the Apex:



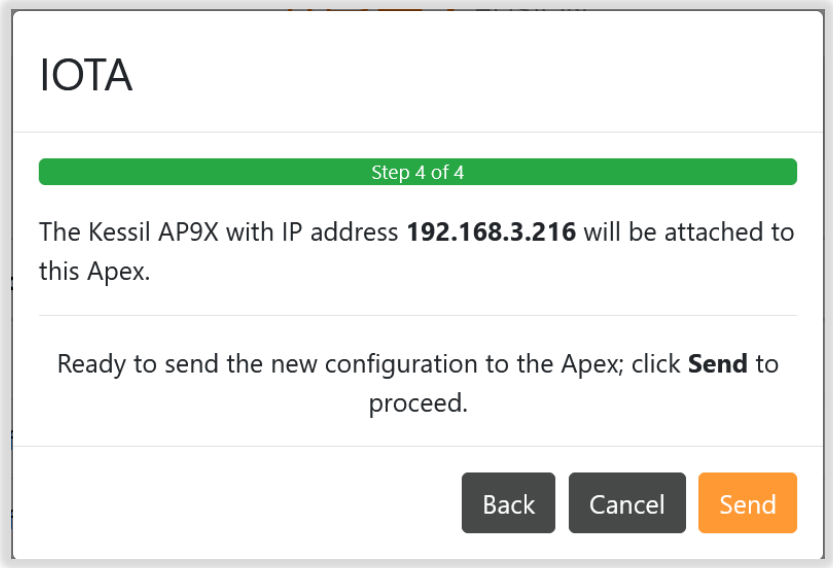
In Step 2, you will be presented a list of all compatible lights and pumps that the Apex has discovered on your network and which are not already attached to this Apex. In the image below, you can see that one AP9X and one Wifi Dongle (A360X) were found. The Serial displayed here is the same as the one printed on the QR-Code stickers which came with your lights. Click on the light you wish to attach, then click the **Next** button.



Some IoTa devices may optionally be configured with a password, or may require the use of a password when setting this up for control by an Apex. Kessil lights do not use a password. In Step 3, just skip the password entry and click the **Next** button.



Step 4 summarizes the action to be taken. Click the **Send** button to finish the IOTA Task.

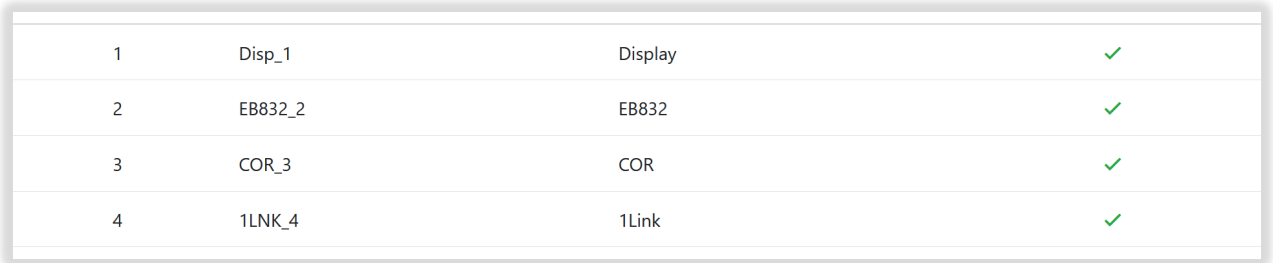


Run the IOTA Task again for each additional Kessil light to be attached.

ATTACHING LIGHTS USING THE MODULES LIST

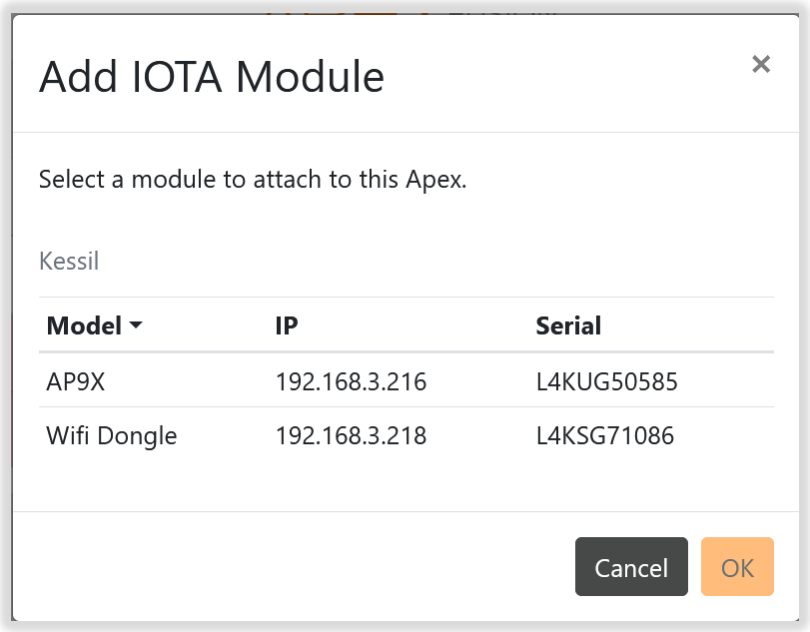
As an alternative to using the APEX Fusion IOTA Task, A360X/XE or AP9X/XE lights may be attached using the Modules view in either APEX Fusion or APEX Local.

While viewing your Apex dashboard, click on the **Expand** button, then click the **Modules** button. A listing of all connected modules will be shown:

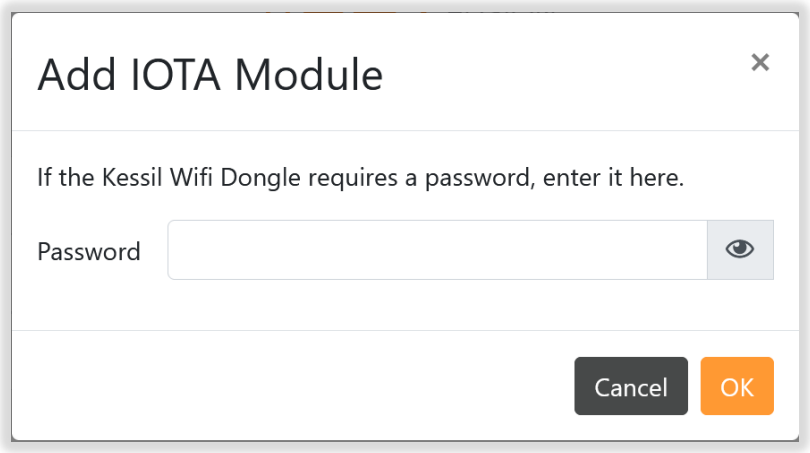


Click on the **Add IOTA Module** button in the upper right. You will be presented with a list of all compatible IoTa devices that the Apex has discovered on your network and which are not already attached to this Apex. In the image below, you can see that one AP9X and one WiFi Dongle (A360X) were found. The Serial displayed here is the same

as the one printed on the QR-Code stickers which came with your lights. Click on the line for Kessil light you wish to attach, then click the **OK** button.

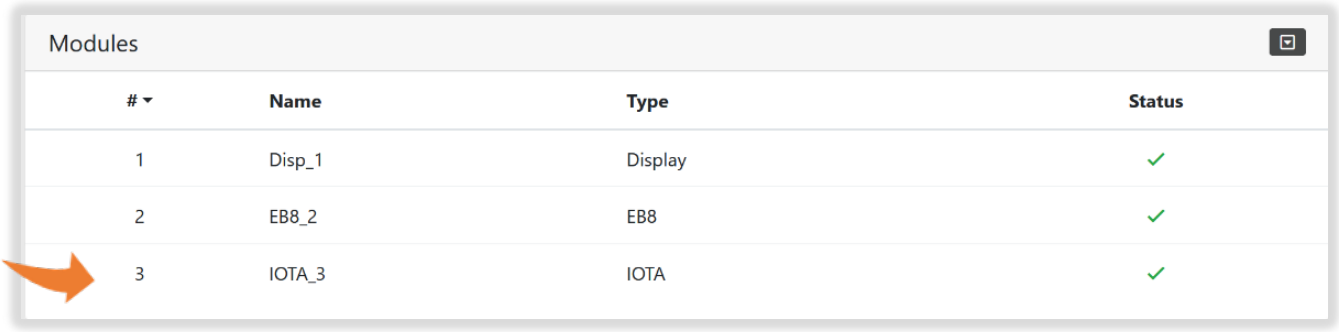


Some IoTa devices may optionally be configured with a password, or may require the use of a password when setting this up for control by an Apex. Kessil lights currently do not use a password. Skip the password entry and click the **OK** button.

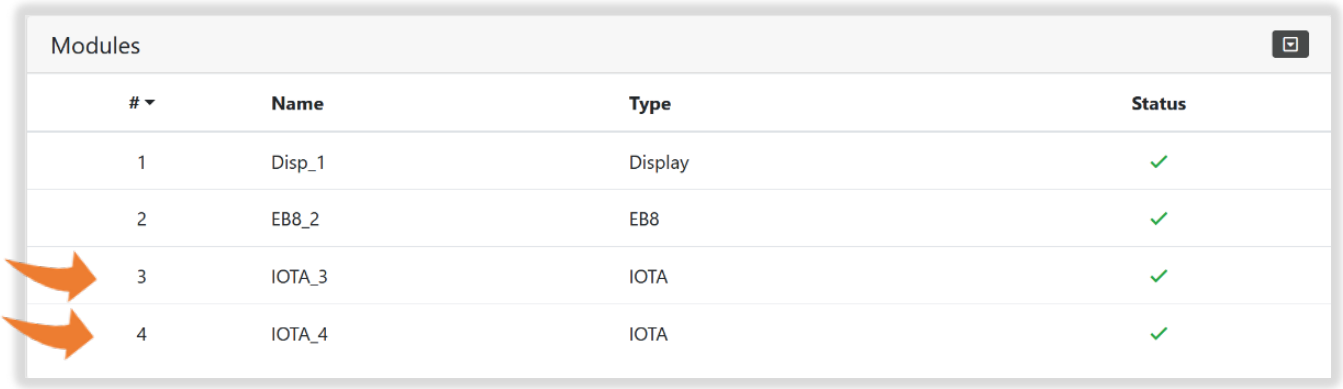


You will be returned to the Modules view. If you are using APEX Local, wait 5-10 seconds, then click the Refresh button. You should now see a new module named IOTA_# where # is the Aquabus address which the Apex assigned for newly-attached

Kessil light. It may take a minute or so if you are using APEX Fusion before the newly-added light appears as a module.

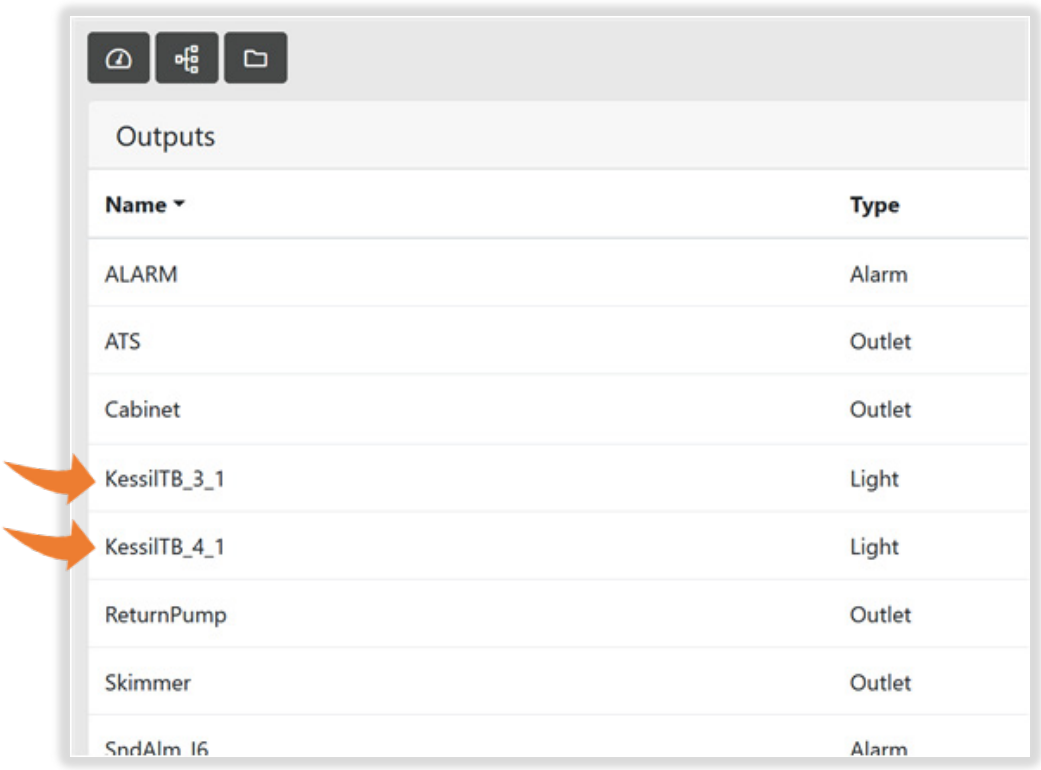


Repeat this process for any additional Kessil lights you wish to connect. In the image below, you can see that two Kessil IoTa devices have been attached and have been assigned Aquabus addresses 3 & 4.



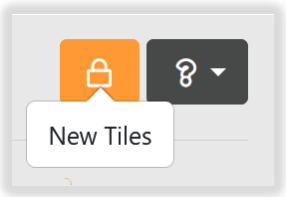
OUTPUTS AND DASHBOARD TILES FOR IOTA-ATTACHED DEVICES

When IoTa devices such as A360X or AP9X are attached to the Apex, new outputs and dashboard tiles will automatically be created. Outputs will appear in the **Outputs** view. The Apex outputs for the A360X and AP9X which were attached earlier can be seen in this image:



The default output name for any Kessil IoTa device is **Kessil***xx*_#_**1**; The *xx* will be **TB** (for Tuna Blue) or **TS** (for Tuna Sun), and # is the Aquabus address of the IoTa module.

Now go back to the **Dashboard** ; it will show the New Tiles indicator:



Click the **Unlock** button to show the hidden tiles area, then locate and drag the new tile(s) named KessilTB_#_1, and/or KessilTS_#_1 onto your dashboard and position each one where desired. When done, close the hidden tiles area by clicking on the **Lock** button again.

MIGRATING A X-SERIES LIGHTING SCHEDULE FROM KESSIL APP TO APEX

Skip to the next section if you have not previously used the Kessil app to control your lights.

Schedules created in the Kessil WiFi app cannot be directly converted or imported into APEX Local or APEX Fusion. If you are changing existing Kessil lighting from control via the Kessil WiFi app to Apex control, take screenshots or make notes about your current lighting schedule so you can refer to them when recreating your current lighting schedule in the Apex.

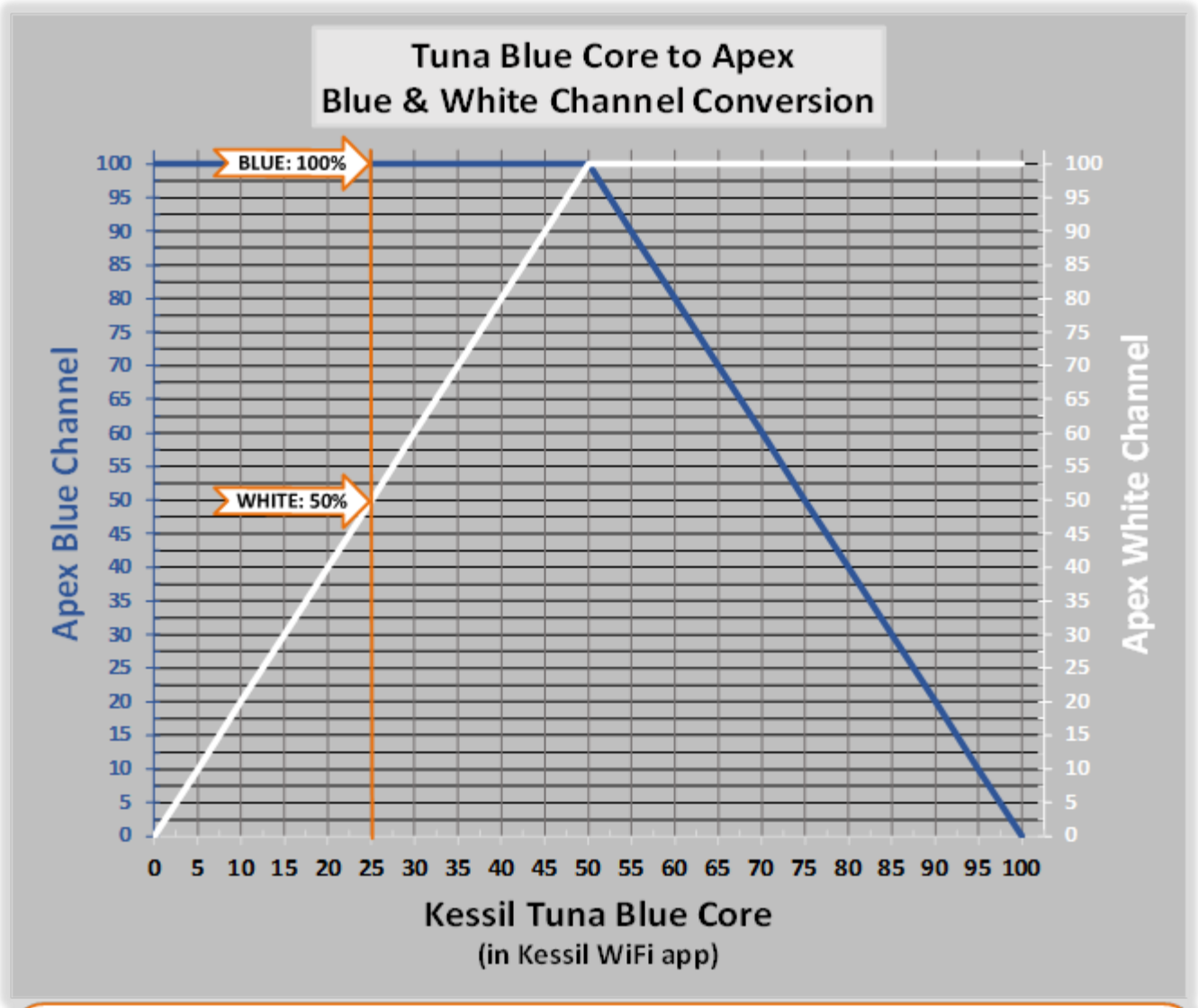
In the Kessil app, the Kessil Tuna Blue Core (blue and white) is controlled by a single setting which is continuously variable between all blue and all white. Similarly, for Tuna Sun lights, the Tuna Sun Core is continuously variable between 6000K and 9000K white. When under Apex control, blue and white for Tuna Blue lights are split into separate channels. When under Apex control, the Tuna Sun Core is split into separate 6000K and 9000K channels.

In order to facilitate an easy migration from Kessil app to Apex, use these conversion charts to convert from an Kessil app schedule to Apex schedule.

Tuna Blue Core to Apex Conversion		
Kessil Tuna Blue %	Apex Blue Channel %	Apex White Channel %
0	100	0
5	100	10
10	100	20
15	100	30
20	100	40
25	100	50
30	100	60
35	100	70
40	100	80
45	100	90
50	100	100
55	90	100
60	80	100
65	70	100
70	60	100
75	50	100
80	40	100
85	30	100
90	20	100
95	10	100
100	0	100

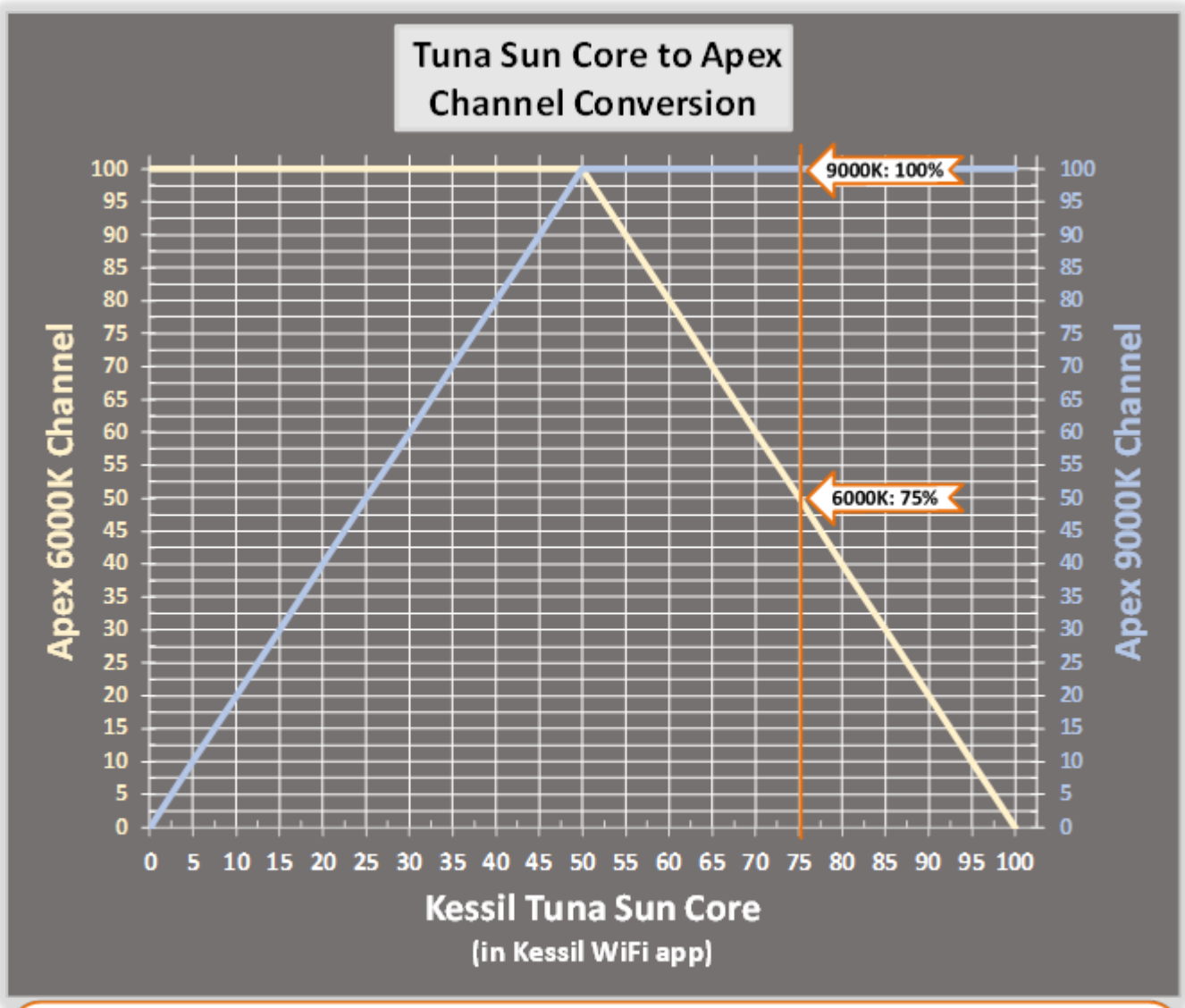
Tuna Sun Core to Apex Conversion		
Kessil Tuna Sun %	Apex 6000K Channel %	Apex 9000K Channel %
0	100	0
5	100	10
10	100	20
15	100	30
20	100	40
25	100	50
30	100	60
35	100	70
40	100	80
45	100	90
50	100	100
55	90	100
60	80	100
65	70	100
70	60	100
75	50	100
80	40	100
85	30	100
90	20	100
95	10	100
100	0	100

This same conversion is presented in graphical form below, along with an example for both Tuna Blue and Tuna Sun lights.



EXAMPLE

You have been using a value of 25% percent in the Kessil WiFi app. To convert that into Apex spectrum slider values for Blue and White, draw an imaginary line upward from 25% on the Tuna Blue axis; the points where that line intersect the blue and white lines are the values to use in the Apex schedule for that light.

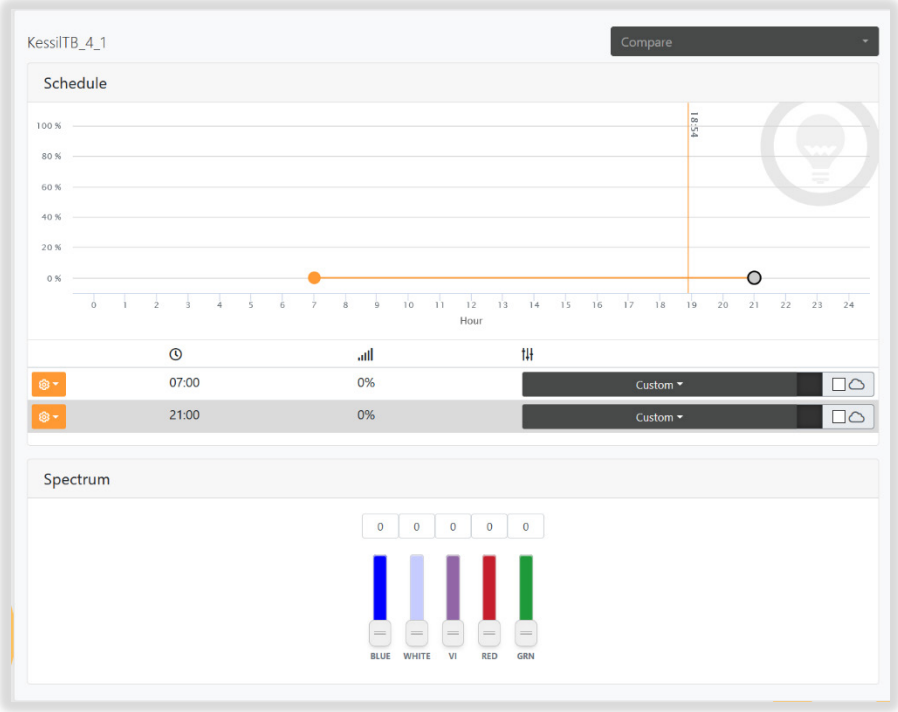


EXAMPLE

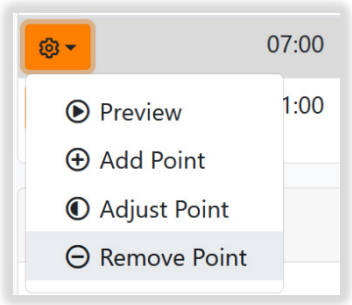
You have been using a value of 75% percent in the Kessil WiFi app. To convert that into Apex spectrum slider values for Blue and White, draw an imaginary line upward from 75% on the Tuna Sun axis; the points where that line intersect the bluish and whitish lines are the values to use in the Apex schedule for that light.

CREATING A SCHEDULE FOR YOUR KESSIL LIGHT

To create a schedule for your newly-attached Kessil light, locate its dashboard tile and click the ⚙ on the tile. The lighting wizard with a sample lighting schedule will be shown. Use this as starting point.

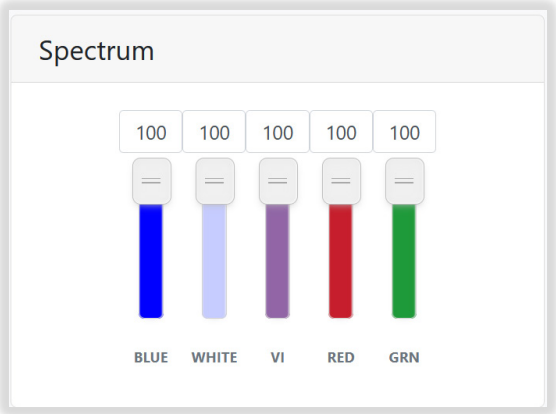


Modify the schedule as desired by dragging each schedule points to adjust the time and overall intensity. Add an additional schedule point by clicking on the ⚙ for a point then clicking on Add Point. You can also adjust the time and intensity for a point or remove a point.

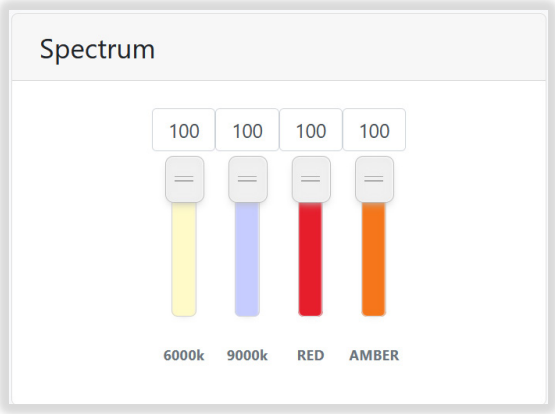


For each point, choose the color spectrum desired. Optionally, enable random cloudy effects for a point by clicking in the checkbox next to the ☁ symbol.

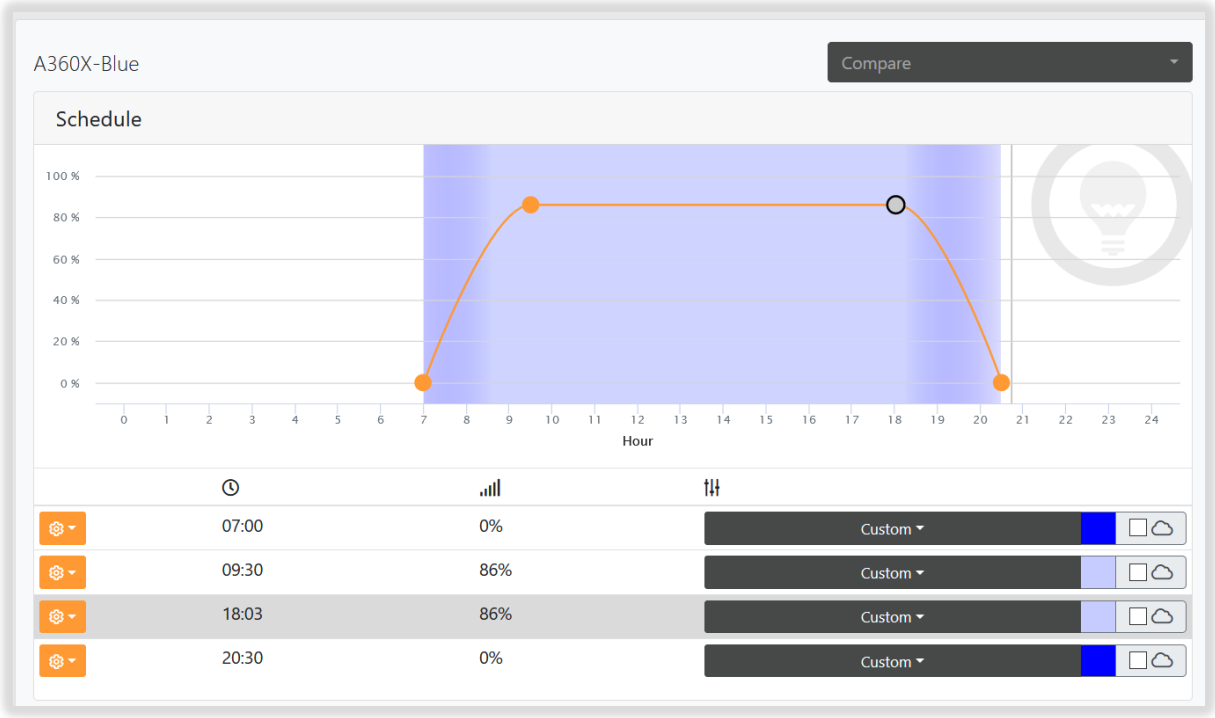
To define a custom spectrum, use the vertical sliders in the Spectrum box to adjust the desired intensity for each color channel.



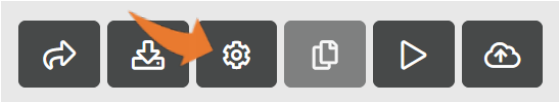
Spectrum sliders for AP9X & A360X Tuna Blue



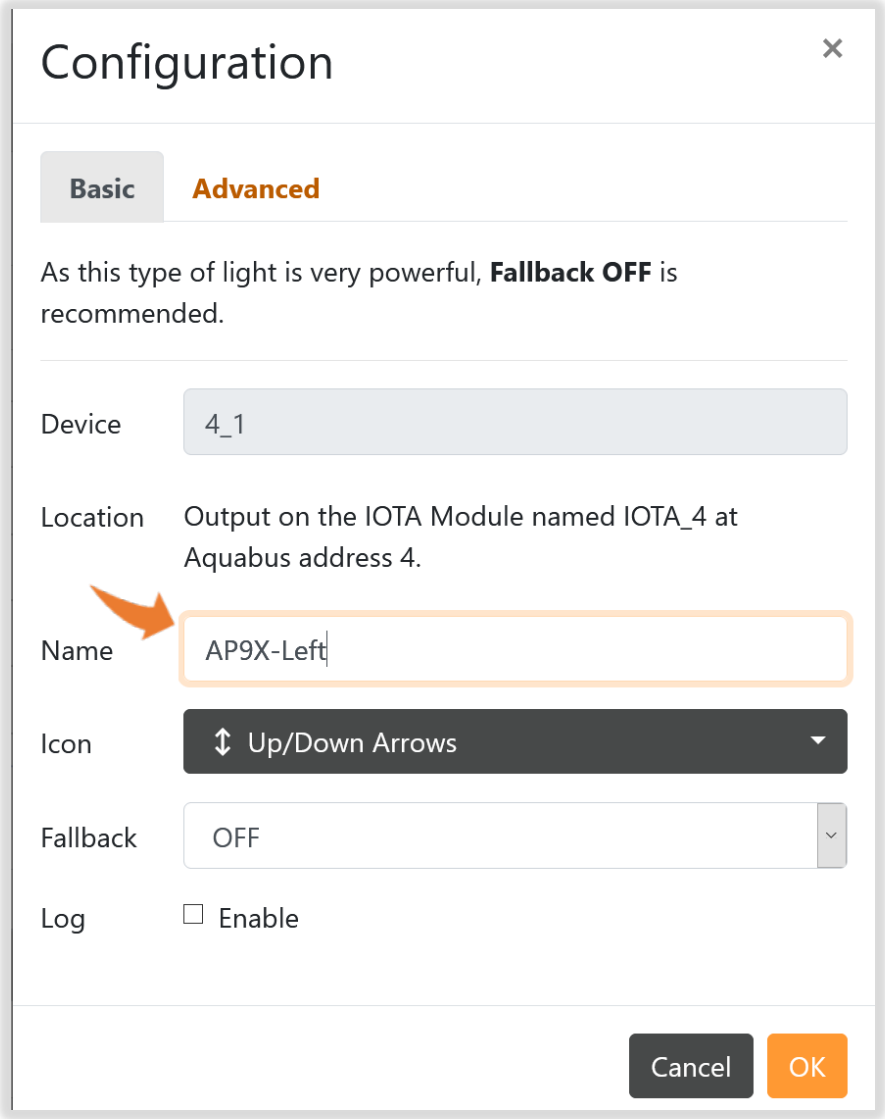
Spectrum sliders for A360X Tuna Sun



After creating your lighting schedule, assign a custom name to the output by clicking on the **Configuration** ⚙ in the upper right corner.



Edit the default output name to give it a descriptive and meaningful name; click the **OK** button when done.



When finished creating your lighting schedule, send it to the Apex by clicking the **Update APEX** button.

LIGHTING SCHEMES

The IoTA lighting wizard in APEX Fusion supports the use of Schemes, which are lighting schedules that can be saved for your own later use and can also be shared with other Apex owners.

- To save a lighting schedule as a Scheme, click the **Save Scheme** button.
- To search for Schemes shared by others, click the **Download Scheme** button. Schemes are available only in APEX Fusion; they are not available in APEX Local.
- You can save a Scheme, then load it onto another IoTa light of the same model.
- Schemes are vendor- and model-specific:
    - A Scheme created from a Aquaillumination brand light, for example, cannot be used with a Kessil output.
    - A Scheme created from a AP9X or AP9XE cannot be used with a A360X or A360XE.
    - A Scheme created from a Tuna Sun lighting schedule cannot be used with Tuna Blue schedule.

ADDITIONAL INFORMATION

- The use of Apex profiles is not supported with IoTa outputs.
- Schedules created in the Kessil WiFi app cannot be converted or imported into APEX Local or APEX Fusion.
- Fallback is not supported.

Additional details about an attached Kessil light are available on the Modules view. To see that information, start on the **Dashboard**. Click or tap on the **Expand** button, click or tap the **Modules** button, then select the desired IOTA Module. You will see the detailed status on the IOTA Module view.

Of primary interest here is the model and IP address of the Kessil light. Note that A360X lights will appear here as "Wifi Dongle".

The serial number shown here is the same as the identifier on the QR code sticker that came with each Kessil light.

Summary

IOTA Module named IOTA_3 at Aquabus address 3.

Type	IOTA
Name	IOTA_3
Address	3
Status	Connected
Vendor	Kessil
Model	Wifi Dongle
Serial	L4KSG71086
MAC	9e65f903d802
IP Address	192.168.3.218

Summary

IOTA Module named IOTA_4 at Aquabus address 4.

Type	IOTA
Name	IOTA_4
Address	4
Status	Connected
Vendor	Kessil
Model	AP9X
Serial	L4KUG50293
MAC	5ef3700e4662
IP Address	192.168.3.215

CHANGE LOG

1.0	8/17/2021	Initial release
2.0	10/20/2026	Updated for Kessil XE-Series products