IOTA USER GUIDE

Control ofAI Prime, Prime HD, Hydra 26HD & Hydra 52HD lighting with APEX

CONTENTS

INTRODUCTION

This Guide will assist you in setting up Aquaillumination Prime™(marine variant), Prime HD™, Hydra 26HD™, and Hydra 52HD™ LED lighting fixtures to be controlled by an Apex controller system. The AI Prime Freshwater and Prime Fuge models are not 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 Aquaillumination (AI) Prime™ and Hydra HD™ LED lights.

The HyperDrive (HD) capability of Prime HD™ and Hydra HD™ LED lights is fully supported by the Apex.

REQUIREMENTS

- An Apex or ApexEL is required; this capability is not available in Apex Classic models, which include the Apex Classic, Apex Gold, Apex Lite, and Apex Jr
- The Apex must have AOS version 5.04_7A18 (or later) installed
- The Apex must be connected to the local network via Wi-Fi or Ethernet
- The AI Prime or Hydra LED lights must be connected over Wi-Fi to the same network as the Apex
- The AI LED fixtures must have v2.20 or later firmware installed

PREPARING YOUR AI PRIME OR HYDRA HD TO BE CONTROLLED BY THE APEX

If you have not yet connected your Aquaillumination light(s) to your wireless network, you must do so before proceeding. Refer to these links to instructions on the **Aquaillumination web site** to connect your AI lighting fixture to your wireless network:

Setup using a computer
Setup using the MyAI app for Apple iOS
Setup using the MyAI app for Android
Resetting the network settings in your AI light or doing a full reset

IMPORTANT: AI LED fixtures having Hyperdrive (HD) must have v2.20 or later firmware installed. Hyperdrive will not work properly with earlier AI firmware versions. Use the MyAI app or the MyAI website to check the firmware version and update firmware if needed.

If you have already linked your AI light(s) to MyAI, you do not need to remove them from MyAI, but you should not at any time attempt to control them with MyAI after you have attached the lights to your Apex.

Prime, Prime HD™ and Hydra HD™ LED lighting fixtures may be configured with a password.

- If your Apex and AI light(s) are in your home, assigning a password to your AI light(s) is entirely optional.
- If your Apex and AI light(s) are in an educational, small business, or other commercial environment, it is _highly recommended that you do assign a password_ to your AI light(s).

The power supplies for AI Prime™ and Hydra HD™ 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 Prime™ and Hydra HD™ 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.

USING YOUR AI LIGHTS IN PARENT/CHILD MODE

AI lights may optionally be configured using the MyAI app or website to be in a Parent/Child mode; a light designated as the Parent will control one or more other lights configured as Children; each Child will do exactly what the Parent is doing.

Parent/Child assignments cannot be configured through the Apex ecosystem; if you wish to use your AI lights in Parent/Child mode, you must configure that using the MyAI app or website. You would then only control the Parent fixture using your Apex, and the

Parent will in turn control the Child light(s).   Consider these points when deciding whether to use Parent/Child mode:

- If you use Parent/Child mode, one Apex output will directly control the Parent, and the Parent will then in turn control all of the AI lights in Child mode, so you would only need to attach the Parent light to your Apex and program one Apex output.
- If you use Parent/Child mode, you cannot independently program and control each individual AI light fixture
- If you leave all lights in their default state of Parent, then each light must be attached to the Apex, and you will have an Apex output corresponding to each light.
- If you leave all lights in their default state of Parent, then you can program and control each AI light individually.

A good way of looking at this is that Parent/Child mode offers simplicity, but at the expense of flexibility.

APEX NETWORK CONFIGURATION

If your Apex is using a Wi-Fi connection to your network, you need not do anything special.

If your Apex is connected to your network using an Ethernet (hard-wired) connection, you **must** disable Wi-Fi in the Apex before attempting to use the Apex to control AI lights. To do this:

1. Sign into APEX Local or APEX Fusion
2. On the Dashboard, click or tap the **Expand** ⚙ button
3. Click or tap the **Network** 🛜 button
4. Click of tap the **Configuration** tab
5. In the **Type** dropdown menu, select **Wi-Fi**
6. Look at the **Wi-Fi Enable** checkbox; if it is checked, click or tap in the box to uncheck it.
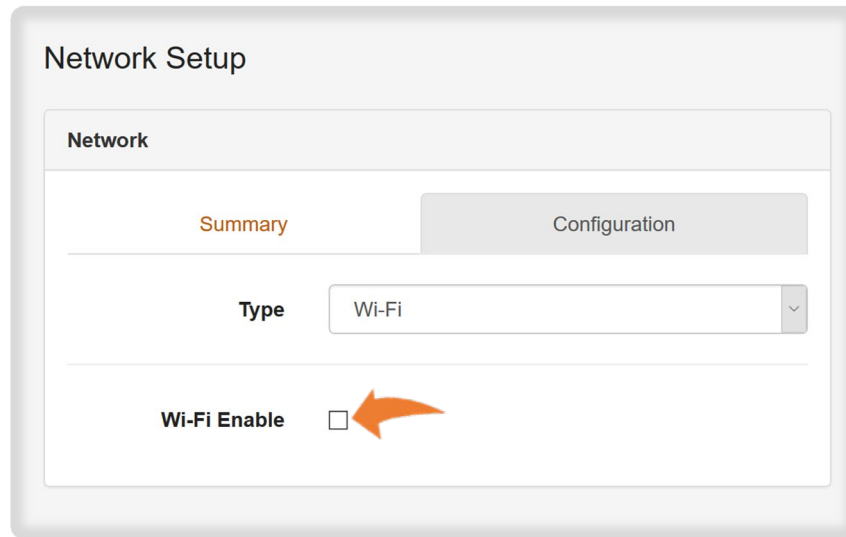
7. Click or tap the **Update APEX** ☁ button.
8. If the **Wi-Fi Enable** checkbox is already unchecked, you need not do anything more.   If you unchecked the checkbox, then you <u>must</u> restart the Apex for that change to take effect.
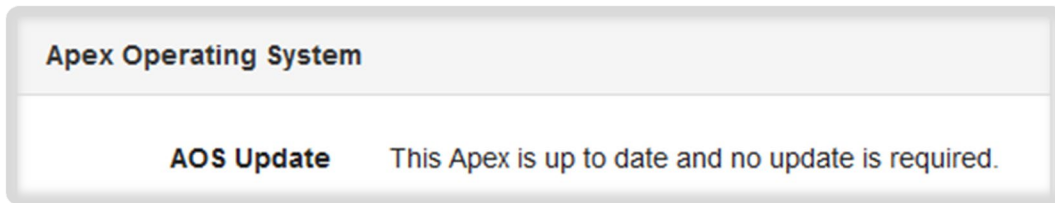
To restart the Apex:

1. Go to the Dashboard by clicking or tapping on the **Dashboard** 🎛 button.
2. Click or tap the **Expand** ⚙ button
3. Click or tap the **Miscellaneous Settings** 🔧 button
4. Click or tap the **Restart Apex** checkbox to put a checkmark in that box.
5. Click or tap the **Update APEX** ☁ button; the Apex will restart in a few seconds.
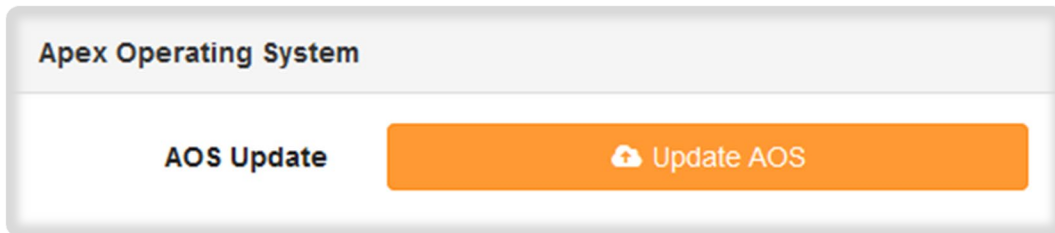
UPDATING YOUR APEX AOS

Your Apex must have AOS version 5.04_7A18 or later installed. 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 show one of these:

Apex Operating System

AOS Update   This Apex is up to date and no update is required.

- or -

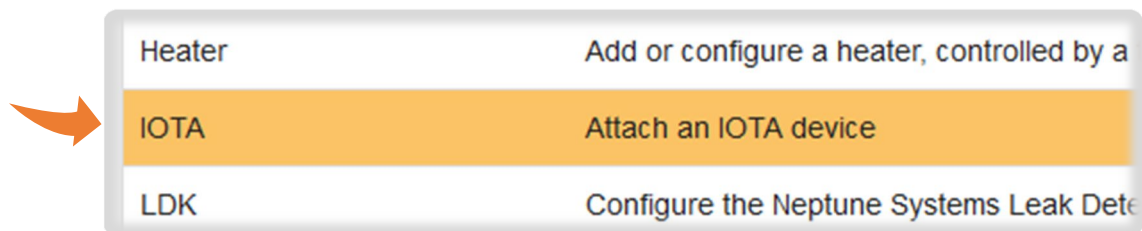**Apex Operating System**

AOS Update   ☁ Update AOS

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

ATTACHING AN AI LIGHT TO THE APEX USING THE APEX FUSION IOTA TASK

The process of configuring an Apex to control an AI Prime™ or Hydra™ is called "attaching". The simplest and preferred method of attaching a Prime™ or Hydra™ 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:

Heater	Add or configure a heater, controlled by a
IOTA	Attach an IOTA device
LDK	Configure the Neptune Systems Leak Dete

Follow the Task steps. Step1 is a summary of what the task does and the basic requirements to be able to attach the AI light to the Apex:

IOTA

Step 1 of 4

This task attaches an IOTA-compliant device to this Apex. Before proceeding, please ensure that:

- The device to be attached is IOTA-compliant.
- The device is powered on.
- The device is connected to the local network.
- The device is ready for attachment, i.e., it's either new or has been unattached from any other Apex it may have previously been attached to.

Cancel   Next

In Step 2, you will be presented a list of all compatible AI lights 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 Prime HD and one Hydra 26HD were found. Click on the AI light you wish to attach, then click the **Next** button.

IMPORTANT: If you have configured your lights using MyAI in a Parent/Child relationship, attach only the AI light(s) which are configured as a Parent; do not attach any lights configured as a Child.
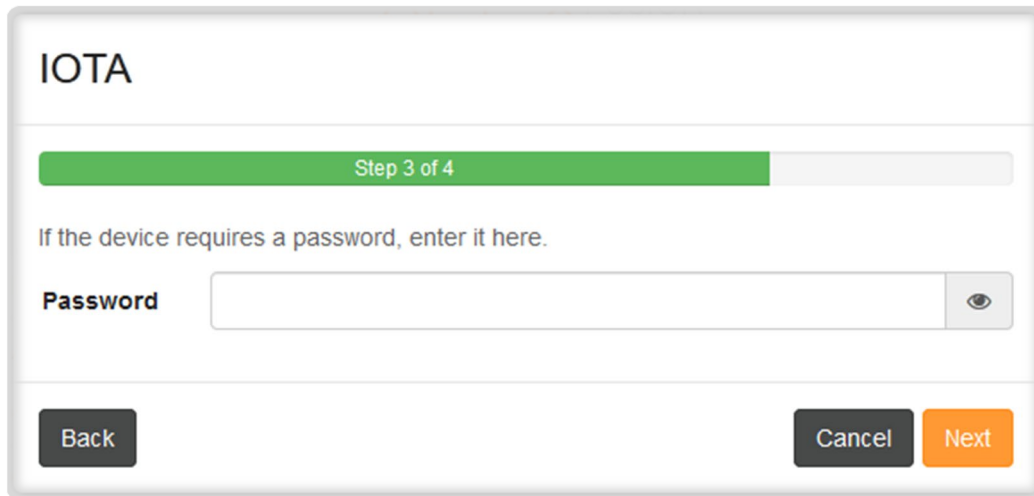
IOTA

Step 2 of 4

Select the IOTA device to attach:

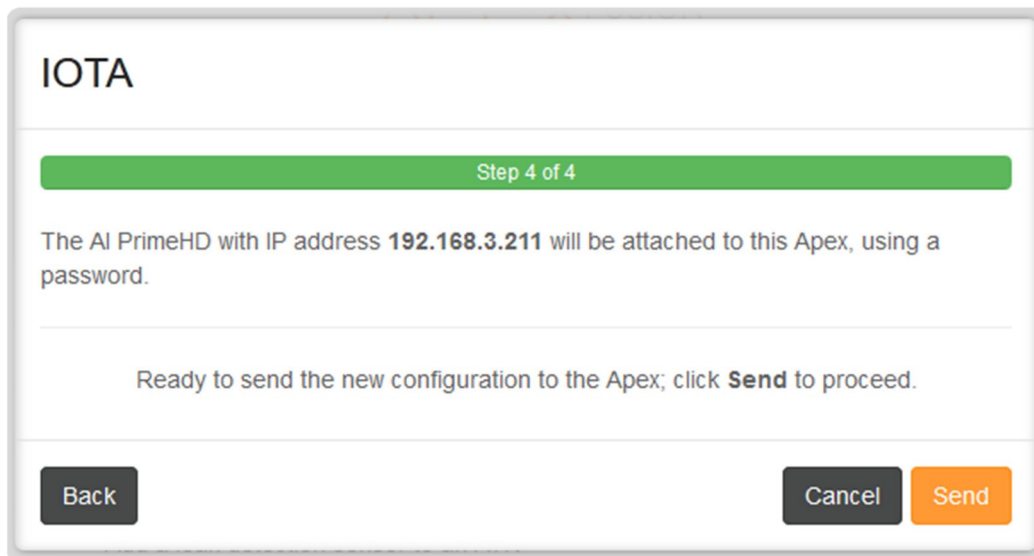| ID ▾	IP	Vendor	Model
0	192.168.3.211	AI	PrimeHD
1	192.168.3.212	AI	Hydra26

Back   Cancel   ⟳

In Step 3, type the password for your AI light, then click the **Next** button. If you did not set a password when initially setting up this AI light, leave the Password field blank, then click the **Next** button.

IOTA

Step 3 of 4

If the device requires a password, enter it here.

Password

Back   Cancel   Next

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

IOTA

Step 4 of 4

The AI PrimeHD with IP address **192.168.3.211** will be attached to this Apex, using a password.

Ready to send the new configuration to the Apex; click **Send** to proceed.

Back   Cancel   Send

ATTACHING AN AI LIGHT TO THE APEX USING APEX LOCAL OR APEX FUSION

As an alternative to using the APEX Fusion IOTA Task, AI Prime™ or Hydra HD™ 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:

Modules					□
Addr ▾	**Name**	**Type**	**SW Rev**		**Status**
2	EB832_2	EB832	8	OK	✔
3	AFS_3	AFS	2	OK	✔

Click on the **Add IOTA Module ➕** button in the upper right. You will be presented with a list of all compatible AI lights 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 Prime HD and one Hydra 26 HD were found. Click on the line for AI light you wish to attach, then click the **OK** button.

Add IOTA Module ✕

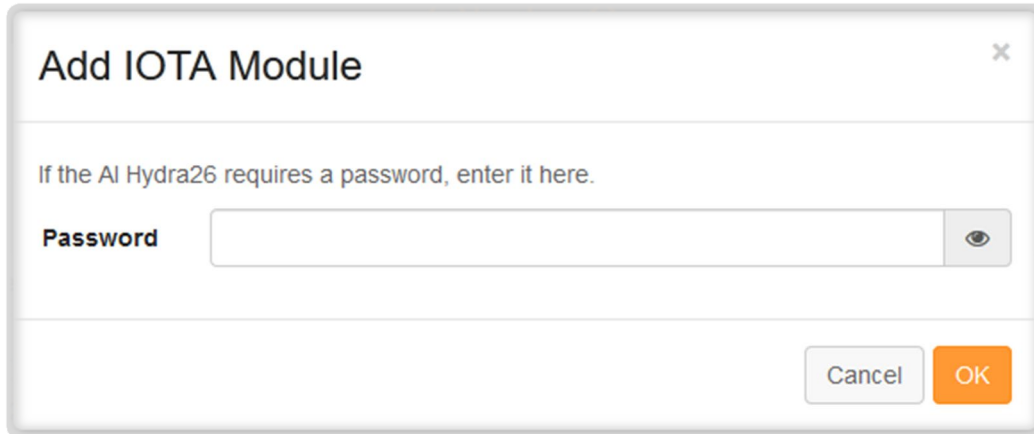Select a module from the list to attach it to this Apex.

ID ▾	IP	Vendor	Model
0	192.168.3.212	AI	Hydra26
1	192.168.3.211	AI	PrimeHD

Cancel   OK

IMPORTANT: If you have configured your lights using MyAI in a Parent/Child relationship, attach only the AI light(s) which are configured as a Parent; do not attach any lights configured as a Child.

Type the password for your AI light, then click the **OK** button. If you did not set a password when initially setting up this AI light, leave the Password field blank, then click the **OK** button.
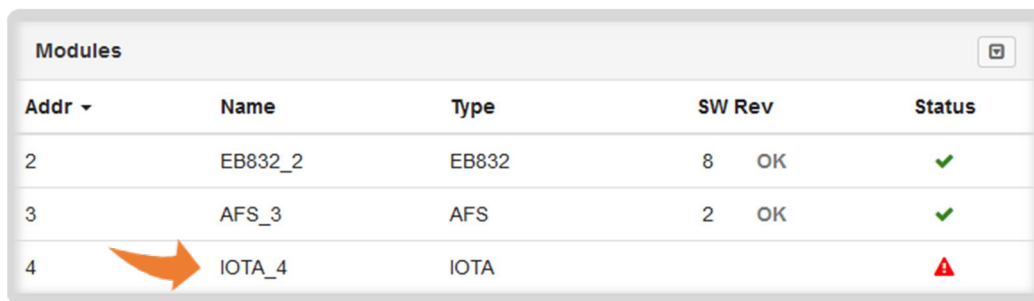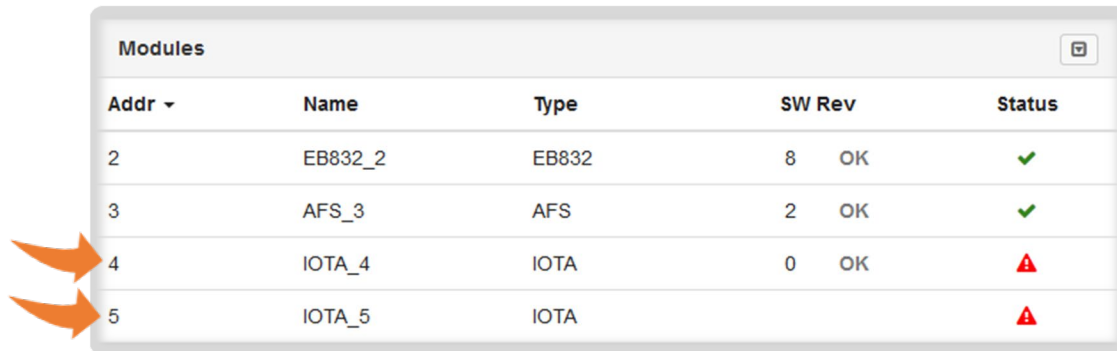

You will be returned to the Modules view. If you are using APEX Local, wait 5-10 seconds, then click the Refresh ↻ button. You should now see a new module named IOTA_# where # is the Aquabus address which the Apex assigned for newly-attached AI light. It may take longer than 5-10 seconds if you are using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

Disregard the lack of data in the **SW Rev** column and the ⚠ in the Status column; this will clear up automatically within a few minutes.

Repeat this process for any additional AI lights you wish to connect. In the image below, you can see that two IOTA devices have been attached and have been assigned Aquabus addresses 4 & 5.
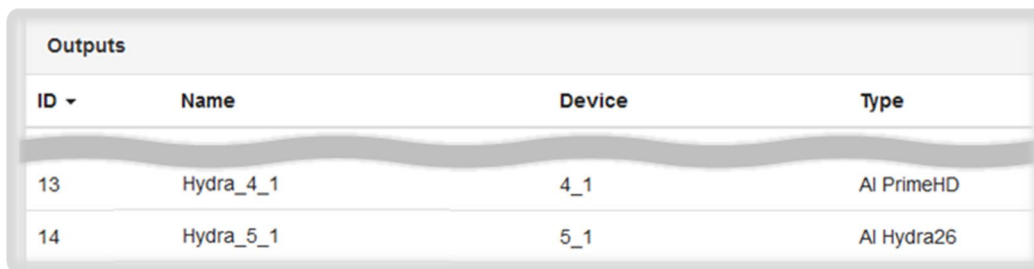
Modules					
Addr ▾	Name	Type	SW Rev		Status
2	EB832_2	EB832	8	OK	✔
3	AFS_3	AFS	2	OK	✔
4	IOTA_4	IOTA	0	OK	⚠
5	IOTA_5	IOTA			⚠

As before, disregard the lack of data in the SW Rev column and the ⚠ in the Status column.

If you wait 2-3 minutes then refresh the Module view by clicking the Refresh ⟳ button, the IOTA module(s) should now show **0 OK** in the SW Rev column and with ✔ under Status.

OUTPUTS AND DASHBOARD TILES FOR IOTA-ATTACHED DEVICES

When an IoTa device such as a Prime™ or Hydra HD™ is 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 Prime and Hydra which were attached earlier can be seen in this image:

Outputs			
ID ▾	Name	Device	Type
13	Hydra_4_1	4_1	AI PrimeHD
14	Hydra_5_1	5_1	AI Hydra26

The default output name for any AI IoTa device is model_#_1, where *model* may be Prime, PrimeHD, Hydra26, or Hydra52, and *#* is the Aquabus address of the IoTa module; the AI light model can also be seen in the Type column.

Note: Hydra 26HD and Hydra 52HD lights will not have "HD" in their default Name or Type.

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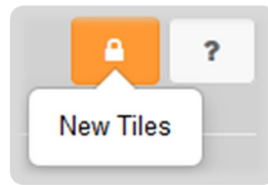
New Tiles

Click the Lock 🔒 button to show the hidden tiles area, then locate and drag the new tile(s) named Hydra26_#_1, Hydra52_#_1, Prime_#_1, and/or PrimeHD_#_1 onto your dashboard and position each one where desired. When done, close the hidden tiles area by clicking on the 🔓 button.

CREATING A SCHEDULE FOR YOUR AI LED LIGHT

To create a schedule for your newly-attached AI 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.
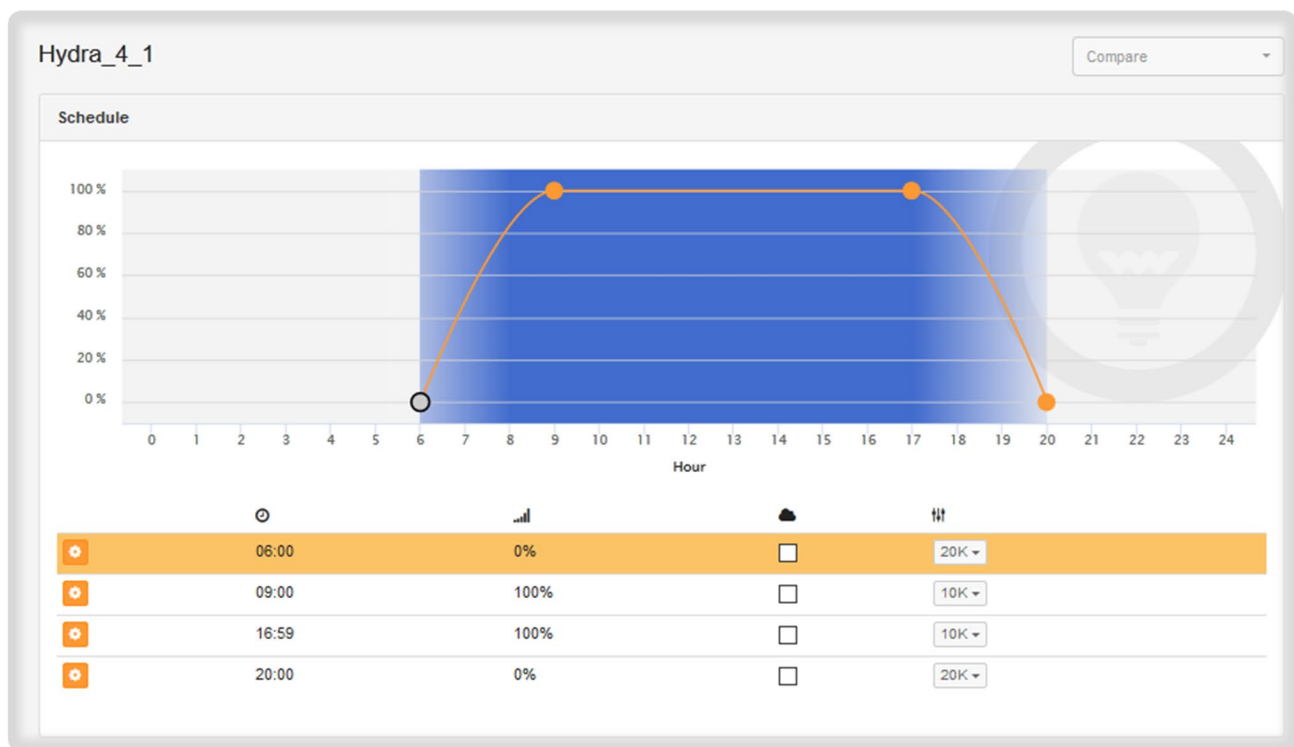

Modify the schedule as desired by dragging each schedule points to adjust the time and overall intensity. Add an additional schedule point by clicking on the ⚙ for a point then

clicking on Add Point. You can also adjust the time and intensity for a point, or remove a point.
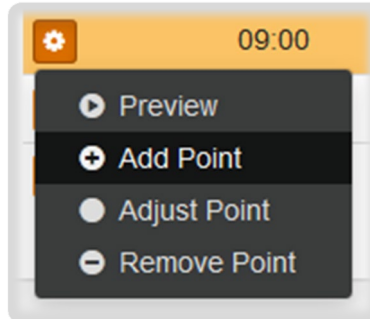

For each point, choose the color spectrum desired; you may use one of the spectrum presets, or define a customized spectrum.
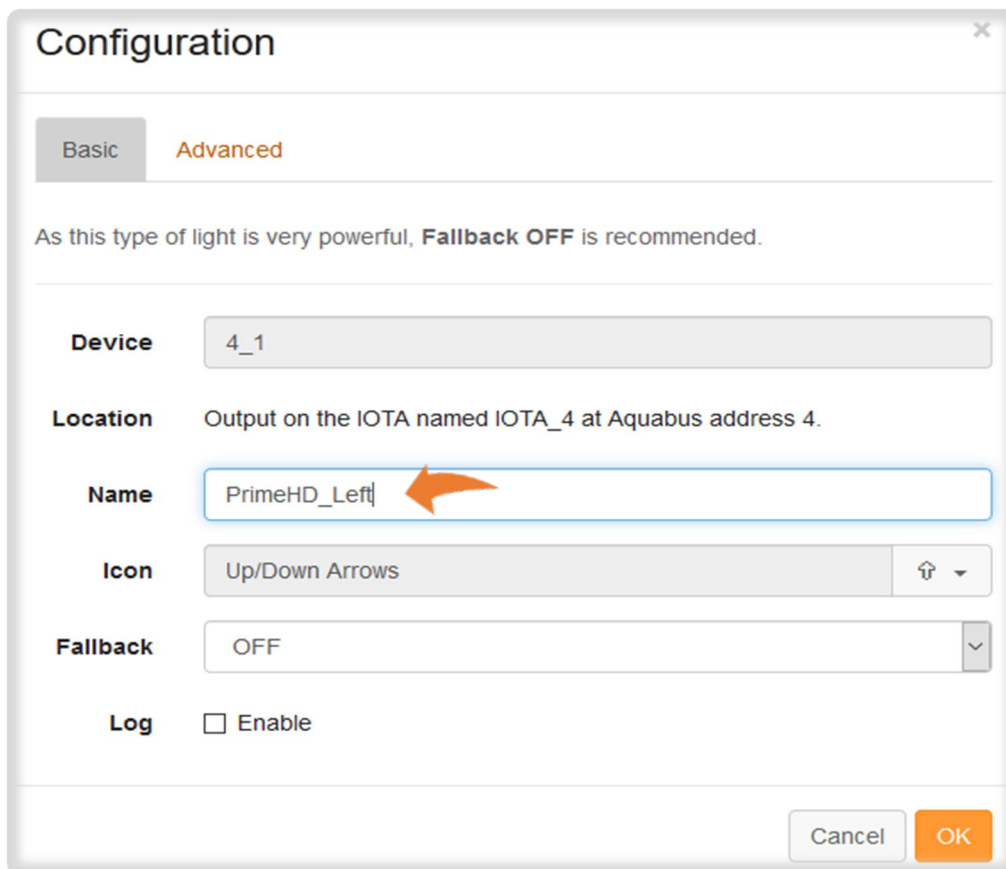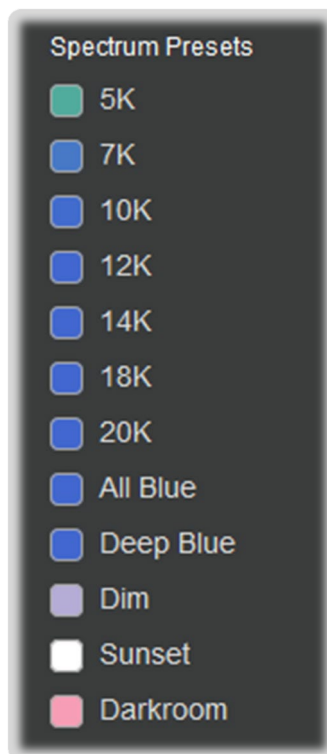

Enable random cloudy effects for a point by clicking in the box under the ☁ column.

To define a custom spectrum, use the vertical sliders in the Spectrum box to adjust the desired intensity for each color channel. For AI HD lights, it is possible to exceed 100% intensity for colors.

The Power Meter widget shows you how much of the lighting fixture's available power budget is used by the current spectrum settings.
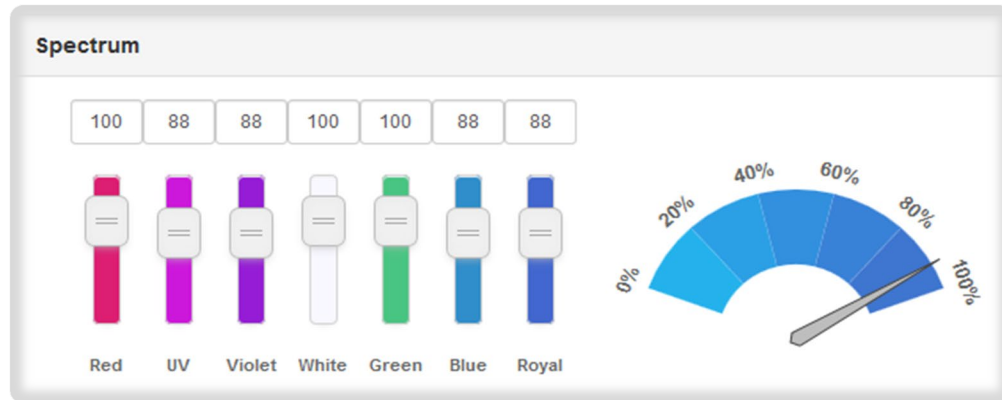
Assign a custom name to the output by clicking on the ⚙ in the upper right corner, then edit the default output name as desired; click the **OK** button when done.

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

- Details about an attached AI light is available on the Module view. To see that information, start on the **Dashboard** 🕐. Click or tap on the **Expand** ⚙️ button, then click or tap the **Modules** 🖥️ button, then select the desired IOTA Module. You will see the detailed status on the IOTA Module view:

IOTA Module	
Summary	
IOTA named IOTA_3 at Aquabus address 3.	
Type	IOTA
Name	IOTA_3
Address	3
Vendor	AI
Model	Hydra26
MAC	d8976003a020
IP Address	192.168.3.212
Hardware Version	1
Software Version	0 (OK)
Status	Connected

Of interest here is the model, MAC address, and IP address of the AI light. The MAC address is also the serial number of the AI light fixture.
- 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 AI light of the same model.
- Schemes are model-specific; you cannot load a Scheme created from a Prime HD, for example, onto a Hydra 52HD.
- The use of Apex profiles is not supported with IoTa/AI outputs.
- Schedules saved from MyAI (.aip files) cannot be converted or imported into APEX Local or APEX Fusion.
- Lightning simulation is not available for IoTa/AI outputs.
- Firmware for AI Prime, Prime HD, Hydra 26HD, and Hydra 52HD fixtures cannot be updated through the Apex ecosystem. You must use the MyAI app, the MyAI website or the light's web page to check for and update the AI fixture's firmware.

TROUBLESHOOTING

If no Prime or Hydra output is created after you attached the AI light, and you are using a hard-wired network connection, disable Wi-Fi in the Apex as detailed in the APEX NETWORK CONFIGURATION section of this guide.

If your Apex does not list any AI lights when you attempt to attach the lights to your Apex:

- Some routers and mesh Wi-Fi systems do not propagate the network traffic that the Apex uses to discover AI lights on the network due to a limitation in the router or wireless mesh system firmware. If this is the case, you will need to use MyAI to control your AI lights.

- Some routers by default do not propagate the network traffic that the Apex uses to discover AI lights on the network, however they can be configured to permit that necessary traffic to be transmitted.

  - One known example of this is that some routers with DD-WRT firmware installed have an option called Filter Multicast enabled by default. This is found on the Security->Firewall page, in the Block WAN Requests section. Disabling that option allows the Apex to discover the AI light(s).
  - In other routers and Wi-Fi systems, there may be an option (usually on the LAN setup page or equivalent) called IGMP Snooping. If there is an IGMP Snooping option, try enabling setting to if it is disabled.

- If you have a managed switch in your network which is configurable, look for Multicast and IGMP Snooping options.

- o If there is an Unknown Multicast option for "Flood" option, use that.
- o If there is an IGMP version option for the IGMP Snooping feature version, choose v2 or v3.
- o If IGMP Snooping is enabled, try disabling it if your switch permits that.
- o If IGMP Snooping is disabled, try enabling it.

An addendum to this guide may be found on the Neptune Systems website's [Documentation page](#); it contains information about compatibility of routers, mesh Wi-Fi systems, and other network equipment.

CHANGE LOG

1.0	7/27/2018	Initial public release
1.1	8/05/2018	Added network equipment addendum
1.2	1/08/2019	Updated to state that AI Prime Fuge is not supported