Learning DigiShow

5

Artistic Lighting Applications

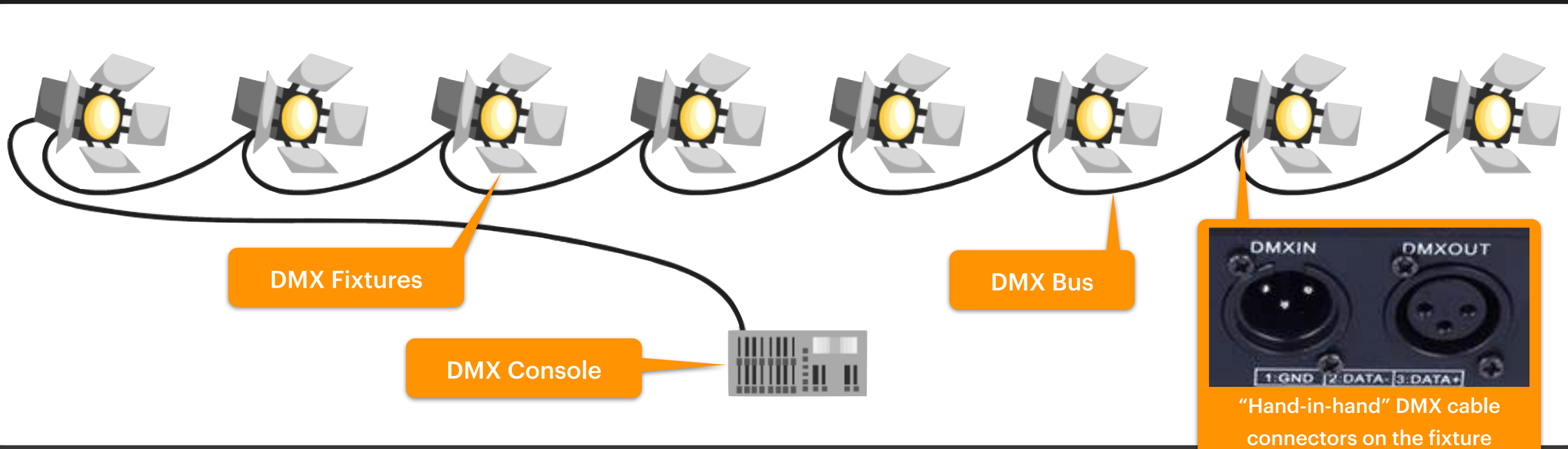
Robin Zhang and Labs 2025


Performance lighting usually uses a technology called DMX to control them.

DMX Interface

What is DMX ?

DMX (Digital Multiplex) is a protocol for remote control of stage lighting, created by the United States Institute of Theatre Technology (USITT) Engineering Committee in 1986.
The console can connect multiple lighting fixtures in a "hand-in-hand" chain through the DMX bus network, and centrally control all to achieve dimming, color adjustment, movement and other operations.



DMX Console

grandMA2

Linux system inside

Tiger Touch

Windows system inside

DigiShow app

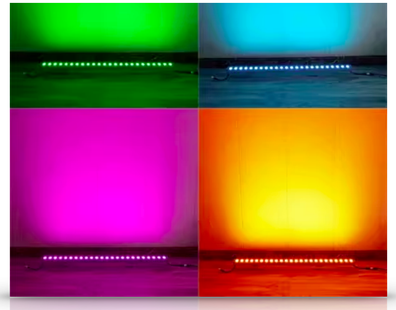
Mac / Windows PC

USB

DMX USB adapter

DMX

DMX Fixtures



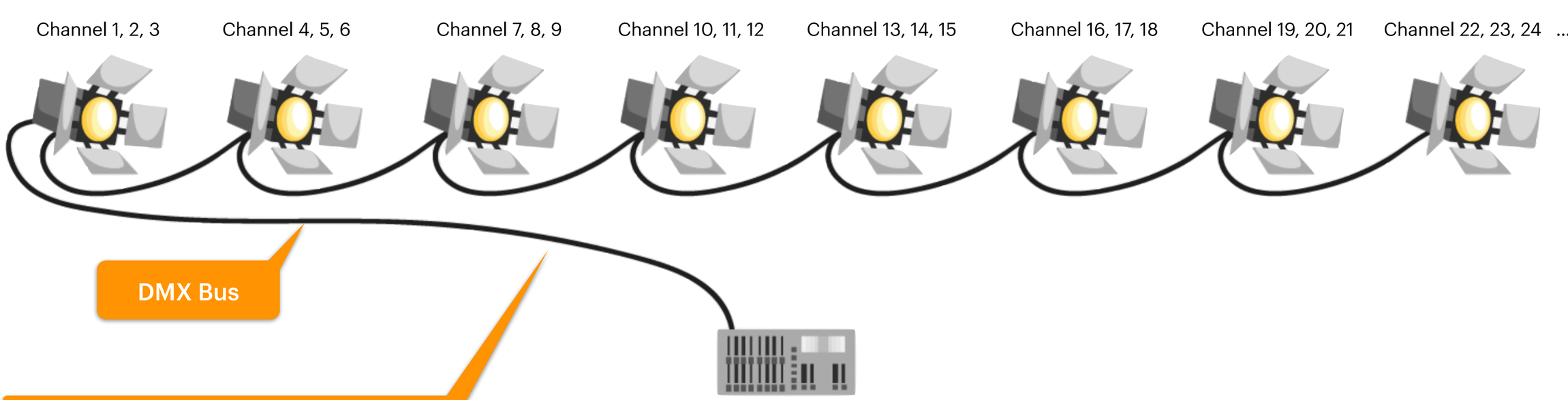
RGB Washer

Fogger

Par Light

Moving Head Beam Light

Different types of consoles are essentially computers for lighting control. DigiShow only needs to run on a regular computer and connect to the DMX bus via a USB DMX USB adapter.



DMX message

Light 1	Channel 1	0%
	Channel 2	50%
	Channel 3	30%
Light 2	Channel 4	100%
	Channel 5	100%
	Channel 6	88%
	.....	
	Channel 512	0%

All lights connected to a DMX bus share a maximum of **512** light control channels. Usually each light will occupy several of these channels, such as the three channels for each light in this example.

The light control message for all lights is sent by the console and sent to each light on the line one by one through the DMX bus. Lights receive and claim their own part of the light control message through their own set channel addresses.

DMX Fixture Address Settings

1 **The default fixture address is 1**

Each fixture has an address that can be modified by the user, which can be used to set the starting channel number of the channels occupied by the fixture on the DMX bus.

Generally, DMX fixture have several light control channels with adjustable status values. Take a moving head light as an example:

Channel 1 Pan Angle
Channel 2 Tilt Angle
Channel 3 Master
Channel 4 Red
Channel 5 Green
Channel 6 Blue
.....

2 **Set the fixture address to 7**

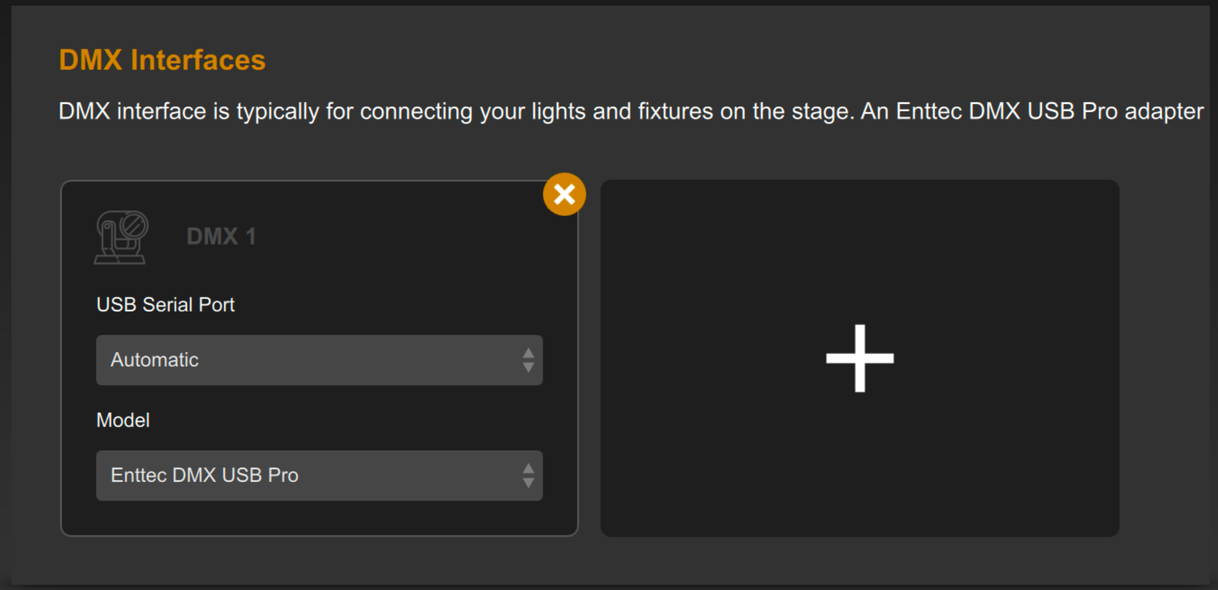
Usually, the fixtures on the DMX bus are set to different addresses, and the channel numbers occupied by each fixture do not overlap. When multiple fixtures are set to the same address, they will exhibit completely consistent behavior when controlled.

After modifying the address of the lighting fixture, the channel number it occupies on the DMX bus will also change accordingly. Take this moving head light as an example, when the address is changed to 7:

Channel 7 Pan Angle
Channel 8 Tilt Angle
Channel 9 Master
Channel 10 Red
Channel 11 Green
Channel 12 Blue
.....

DMX Interface Configuration

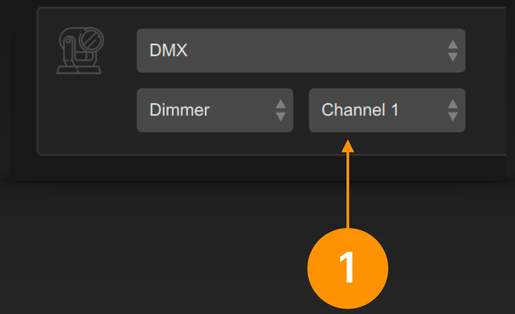
After plugging the DMX USB adapter into the USB port of the computer, DigiShow can use it to send lighting control messages to the lighting fixtures on the DMX bus. Users can add DMX interfaces to the current project in the DMX section of the Interface Manager.



DigiShow currently only supports the ENTTEC DMX USB Pro adapter or its compatible models. Normally, keep the USB Serial Port as Automatic. When there are multiple adapters plugged into the computer, you need to distinguish them by selecting a specific port.

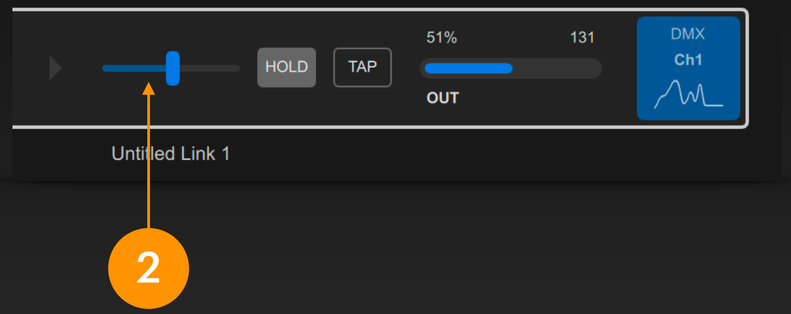
DMX Signal Output

In the signal link table, set the output end of the signal bar to DMX, and we can change the light control signal output in a specific channel on the DMX bus.



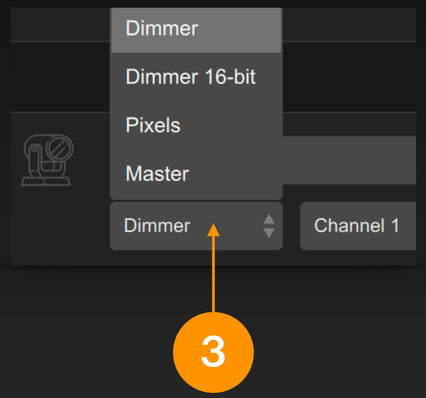
For the output end of the signal bar, select DMX interface, Dimmer control, and set the channel number.

Each channel number corresponds to a property of a specific fixture on the DMX bus.



By moving the fader in the signal bar, you can change the signal output of the DMX channel. It is an analog signal with a value range of 0 ~ 255.

At this point, you can also select an input for this signal bar to achieve the corresponding signal mapping.



Also, you can select more control types in the DMX output:

Dimmer 16-bit is high-precision lighting adjustment (occupies 2 DMX channels), its value range is 0 ~ 65535

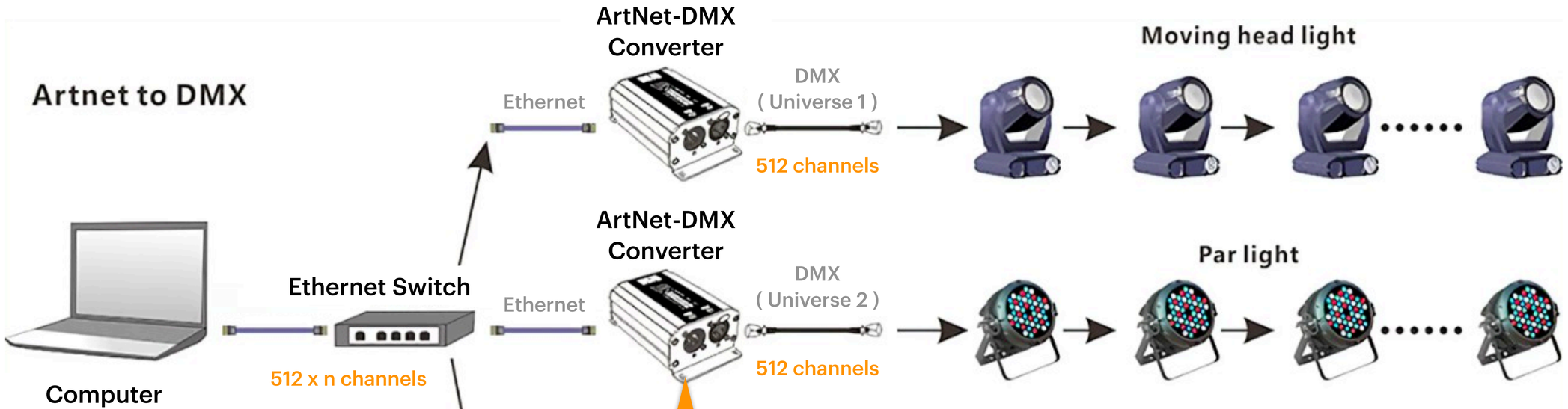
Pixels is used for pixel mapping, that is, the pixel content of pictures and videos is displayed on light fixtures through the DMX bus (see the following section for details)

Master is used to adjust the main dimming on the DMX bus.

ART-NET Interface

What is ART-NET ?

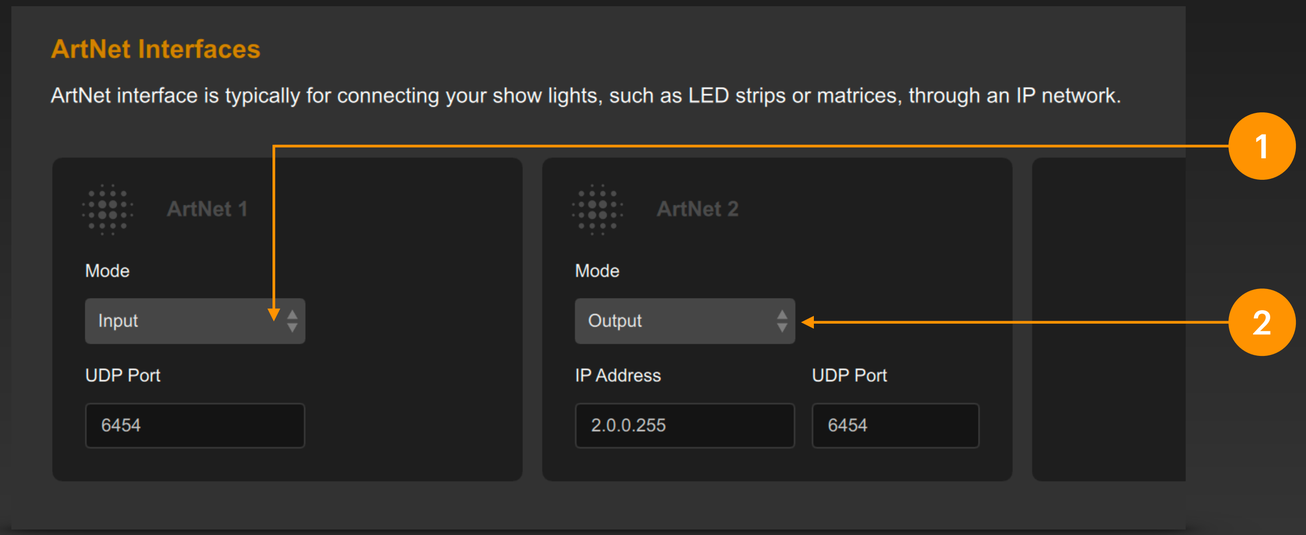
ArtNet can be considered as a protocol that uses ethernet to transmit multiple DMX signals. When the total number of channels of the fixtures to be controlled exceeds 512, we will think of using ArtNet. In addition, ArtNet is also commonly used to transmit lighting control messages between multiple computer software.



ArtNet-DMX converter is connected to your computer network at one end and to a DMX line at the other end. Usually a DMX line here is also called a DMX universe.

ART-NET Interface Configuration

Based on the ArtNet protocol, DigiShow can send lighting control messages to fixtures (or other computer software) through the ethernet, and can also receive lighting control messages from other consoles (or other computer software). Users can add an ArtNet interface to the current project in the ArtNet section of the Interface Manager.



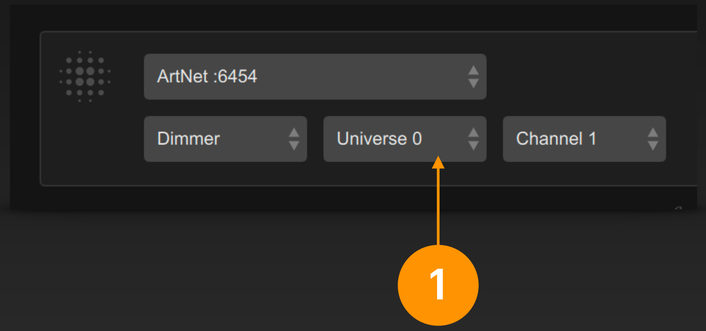
By default, ArtNet protocol uses UDP port 6454 on the IP network to transmit lighting control messages to each other.

When need DigiShow to receive lighting control messages, please select Input mode.

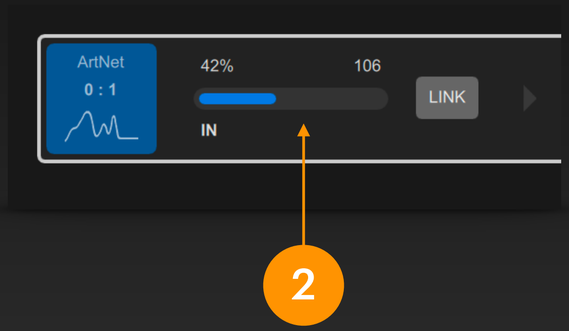
When need DigiShow to send lighting control messages, please select Output mode. And set IP Address to the IP address of the ArtNet-DMX converter (or other device that can receive ArtNet messages) in the network. You can also fill in a broadcast address ending with .255 here, so that all devices in the entire network can receive the ArtNet messages sent by DigiShow.

ART-NET Signal Input

In the signal link table, set the input end of the signal bar to ArtNet, and we can monitor the lighting control instructions for the specified channel in the specified universe issued by the control console (or other computer software) in the ArtNet network.



In the input end of the signal bar, select the ArtNet interface, Dimmer control, and set the universe number and channel number.

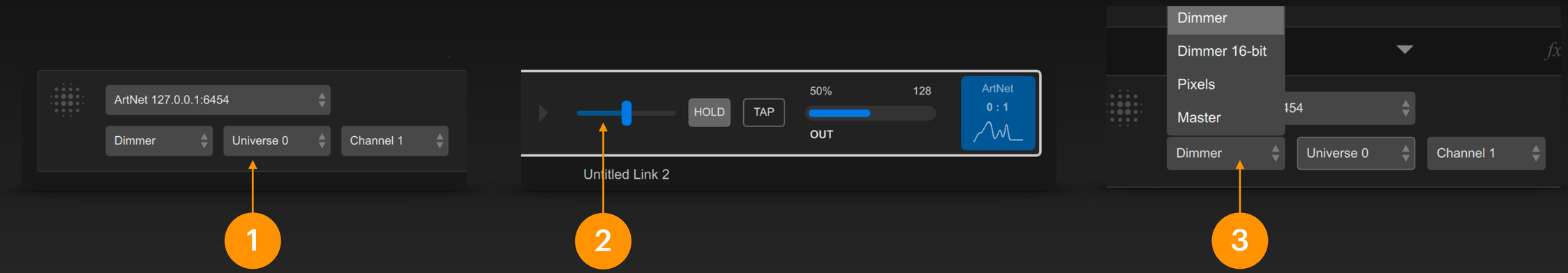


Once the DigiShow project is started, the signal bar input will display the input signal value of the channel. It is an analog signal with a value range of 0 ~ 255.

At this point, you can also select an output for this signal bar to achieve the corresponding signal mapping.

ART-NET Signal Output

In the signal link table, set the output end of the signal bar to ArtNet, and we can change the light control signal output in a specific channel of a specific universe on the ArtNet network.



In the output end of the signal bar, select the ArtNet interface, Dimmer control, and set the universe number and channel number.

Moving the fader in the signal bar can change the signal output of the light control channel. It is an analog signal with a value range of 0 ~ 255.

At this time, you can also select an input for this signal bar to achieve the corresponding signal mapping.

Also, you can select more control types in the ArtNet output:

Dimmer 16-bit is high-precision lighting adjustment (occupies 2 DMX channels), its value range is 0 ~ 65535

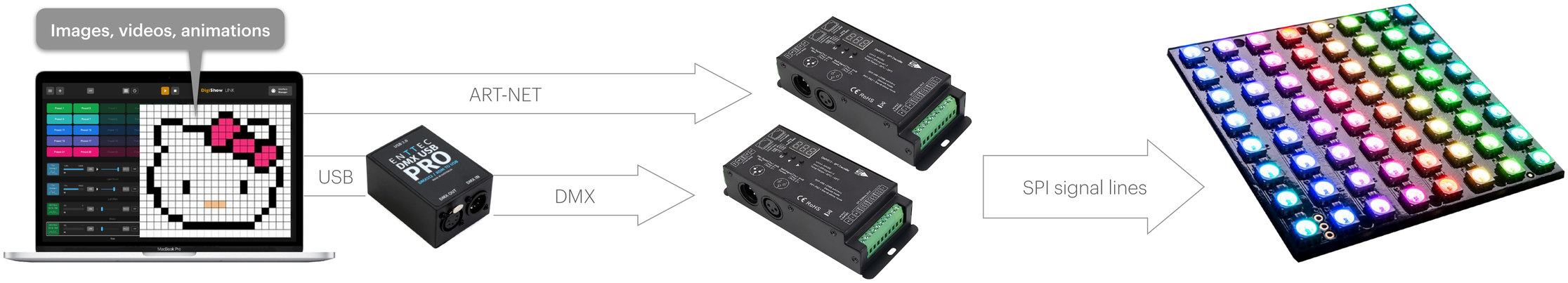
Pixels is used for pixel mapping, that is, the pixel content of pictures and videos is displayed on light fixtures through the ArtNet network (see the following section for details)

Master is used to adjust the main dimming on the specified universe.

Pixel Mapping

Pixel Mapping

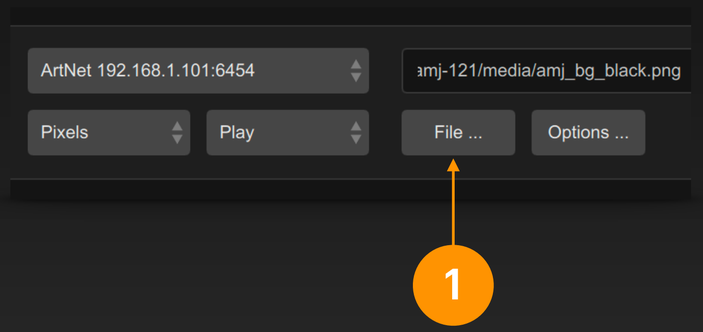
Pixel mapping is a useful function provided by DigiShow DMX and ArtNet interfaces, which can directly output each pixel in an image or video file to the DMX or ArtNet channel data.



Pixel mapping is often used in pixel display of SPI (such as WS2812) colorful light strips. Each RGB pixel on the light strip occupies three DMX channels. DigiShow encodes the image in the computer into DMX channel data and sends it to the SPI LED decoder to drive the dynamic display of each RGB LED light on the light strip.

Pixel Mapping

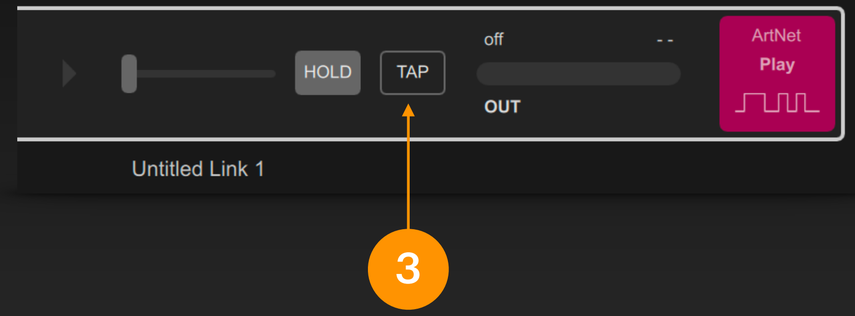
When the output of the signal bar is a DMX or ArtNet interface, we can select Pixels mode to output an image or video mapping to a specific group of lights (such as a light strip).



After setting DMX or ArtNet output in the signal bar to Pixels mode, you can click the File... button to select a media file on your computer disk for pixel mapping.

In addition to still images such as jpg and png, and videos such as mp4 and mov, media files can also be animation sequence frames (see the following section for details).

Then you can select a control channel such as Play or Stop to connect to a binary type signal output.



Click TAP in the signal bar to play the specified media clip in the connected DMX or ArtNet interface.

At this time, you can also select an input for this signal bar to achieve the corresponding signal mapping.

Pixel Mapping

When mapping pixels in the source file to pixels on the target fixture:

Pixel Mode Set the order of the RGB control channels for each pixel in fixtures (light strips)

Pixel Count Set the number of pixels to be mapped, including horizontal and vertical numbers

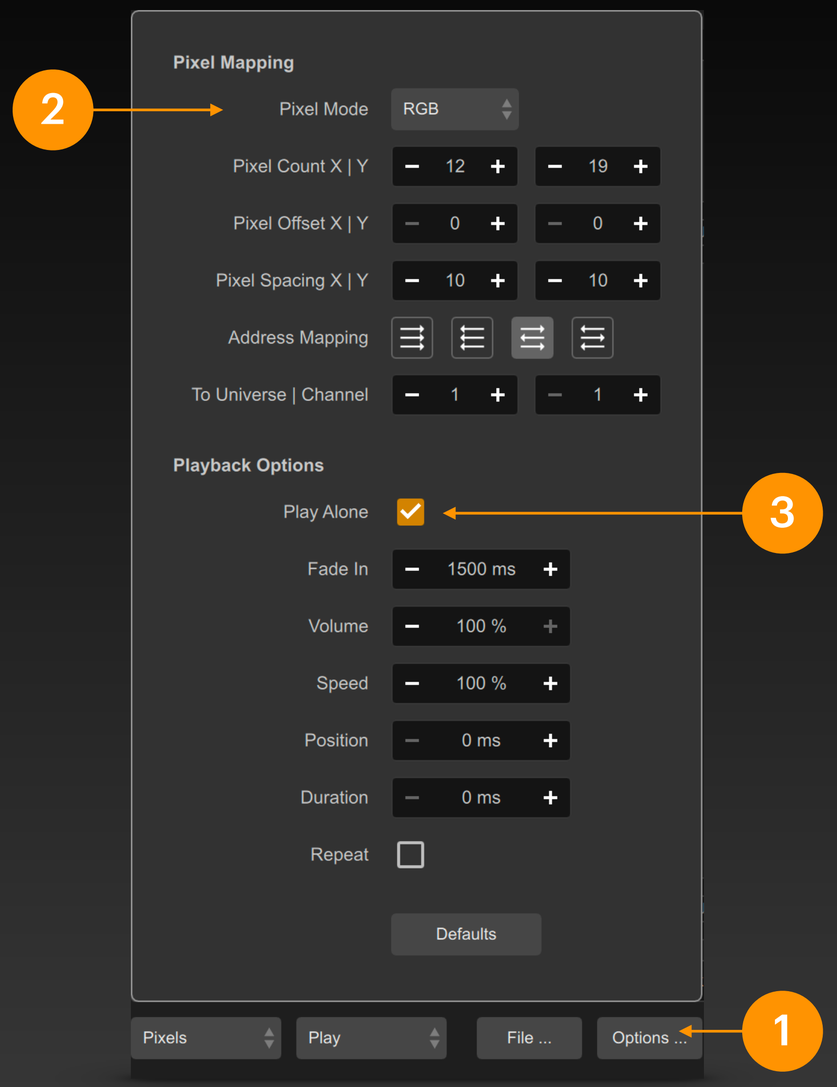
Pixel Offset Set the horizontal and vertical starting position of the pixel mapping in the source file pixels

Pixel Spacing Set the horizontal and vertical pixel mapping intervals in source file pixels

Address Mapping Set the pixel layout of the target fixtures (light strips) when arranged

To Universe | Channel Set the starting position of the pixel mapping in the target DMX or ArtNet channels

Pixel Mapping Options



Play Alone Only the specified media clip is played in the pixel mapping output, that is, once the clip is played, any other media clips that have appeared in the interface before will be stopped and hidden.

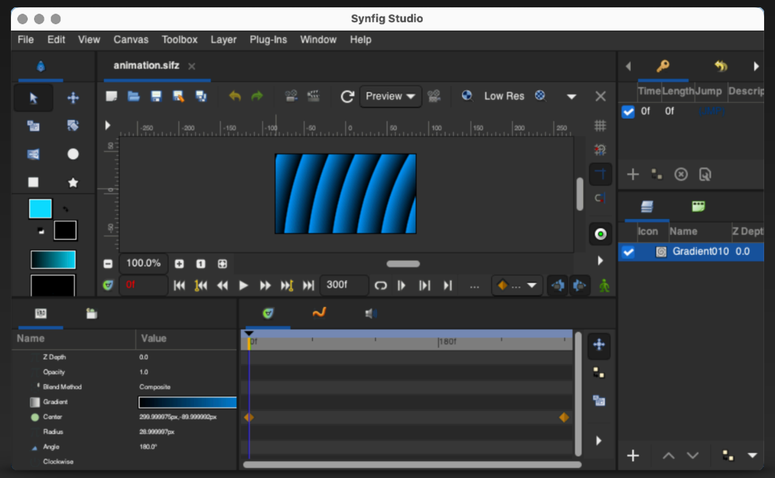
Fade In
Set the number of milliseconds it takes for a media clip to appear in the pixel mapping output, slowly fading in to full display.

Volume (video playback volume)
Speed (video playback speed)
Position (video playback position)
Duration (video playback duration)
Repeat (play video in a loop)
These parameters are used to set various playback properties of video or animation type media clips when they appear in pixel mapping output

After selecting the Pixels mode and the Play control, you can click the Options... button to set optional parameters for the pixel mapping in the pop-up panel.

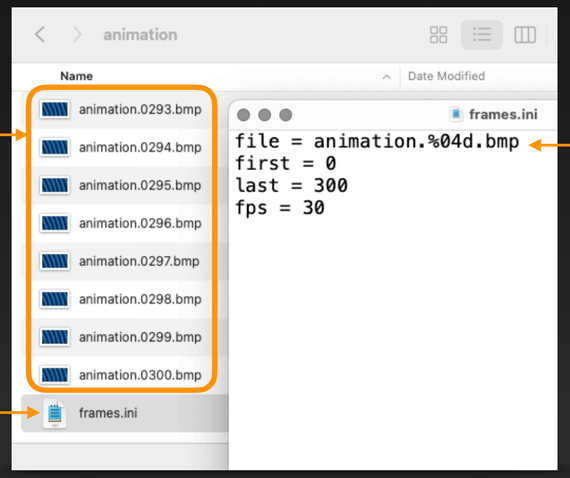
Animation Sequence Frames for Pixel Mapping

The media files used by DigiShow pixel mapping are not only still images and videos, but also animation sequence frames (a set of images). You can use software such as Blender, Adobe After Effects, SynfigStudio to create and export animation sequence frames.



Animation sequence frames are a set of image files

Animation property description file (.ini file)



Open the ini file with a text editor and configure the properties of the animation sequence frames:

file The name of image file, which contains the format characters of the sequence number, such as `%04d` represents the 4-digit number in the file name (i.e. `0001`, `0002`, `0003`, etc.).

first The number of the first frame
last The number of the last frame
fps The frame rate of the animation

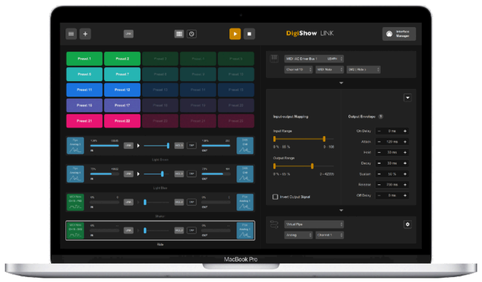
1. Design animation in animation software and export sequence frame files, which is a set of image files.

2. In the same directory where the sequence frame files are stored, you also need to manually create a text file with the extension .ini, which contains some property descriptions of the animation sequence frames. This file will be used when selecting animation sequence frames for pixel mapping in DigiShow.

Hue Interface

What is Hue ?

Philips Hue is a popular wireless smart lighting control system that is often used in smart homes. The Hue bridge is connected to both the computer network and the Zigbee wireless mesh. The mobile phone or computer uses the Hue Bridge to send the wireless lighting control signal to the Hue bulbs, light strip controllers and other lamps in the field to achieve dimming and color adjustment.



Ethernet

Zigbee wireless

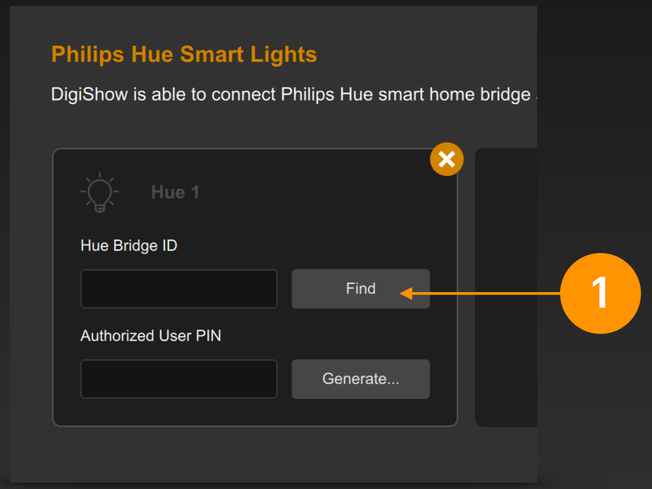
DigiShow app

Hue bridge

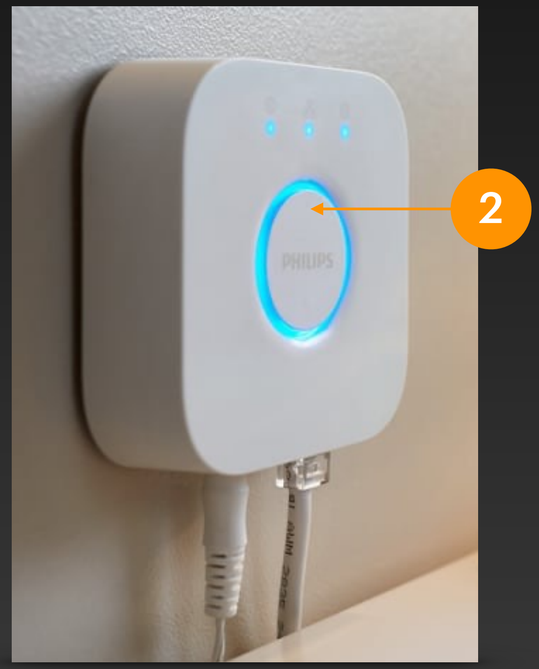
Hue lights

Hue Interface Configuration

First, connect the Hue Bridge to your computer network and configure the lights in the field through the Philips Hue app on your phone. Then you can configure the network connection with the Hue Bridge in DigiShow and achieve wireless lighting control through this device. Users can add a Hue interface to the current project in the Hue section of the Interface Manager.

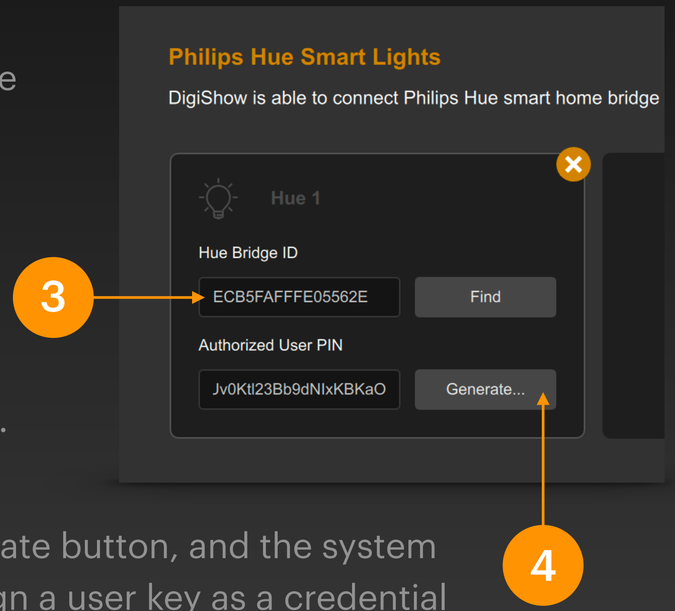


Click the Find button and DigiShow will search for your Hue Bridge device in the current network.



Once DigiShow prompts you to find the device, press the button on your Hue Bridge.

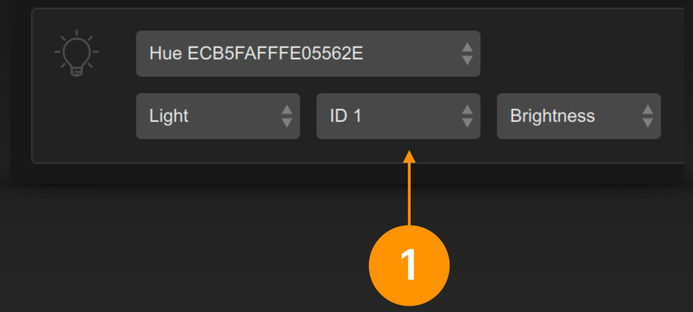
The device ID number of this bridge will appear in the software.



Finally, click the Generate button, and the system will automatically assign a user key as a credential when the software connects to the device.

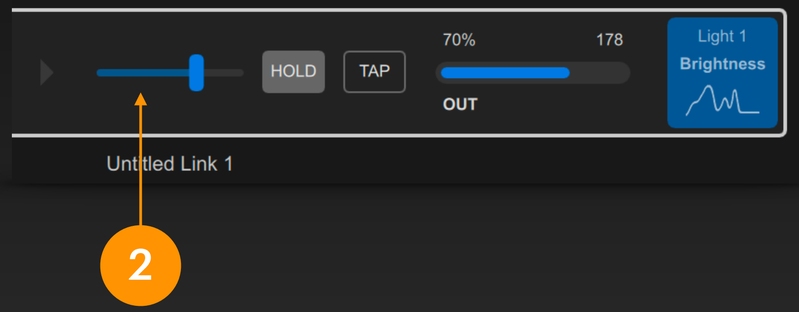
Hue Signal Output

In the signal link table, set the output end of the signal bar to Hue, and we can change the brightness, color, etc. of each light connected to the Hue Bridge.



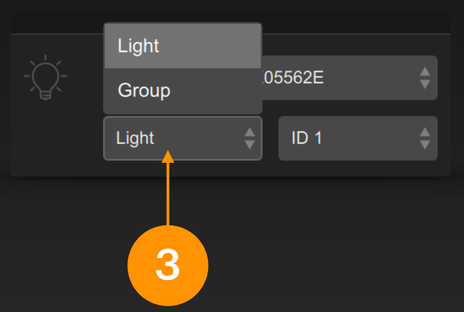
In the output end of the signal bar, select the Hue interface, control the object as Light (single light), set the light ID number and control channel to Brightness.

The configuration and numbering of lights need to be completed in the Philips Hue app in advance.



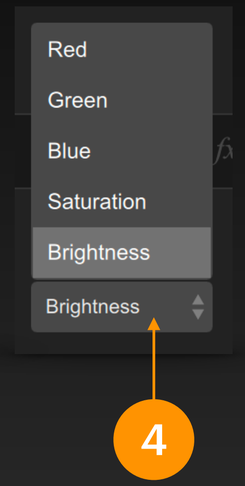
By moving the fader in the signal bar, you can change the signal output of the light control channel. It is an analog signal with a value range of 0 ~ 255.

At this time, you can also select another input for this signal bar to achieve the corresponding signal mapping.



Besides Light, can also select Group as the control object.

Grouping lights also needs to be done in the Philips Hue app in advance.



Also, you can select more control types on the Hue output:

Red Green Blue adjust the RGB level of colored lights

Saturation adjust the saturation of colored lights

Summary

- Understand the relevant knowledge of DMX, Art-Net and performing arts lighting
- Learn to use DMX and Art-Net interfaces in DigiShow to complete lighting control
- Understand the concept and usage of Pixel Mapping
- Understand the concept and usage of Hue smart home lighting