

Hyperion Poi

This document is a work in progress. The instructions here apply both to the Hyperion Poi and the 3rd generation WiFi-capable Hyperion Hoop. For now your poi also come with a copy of the Hyperion Hoop manual, which covers topics like pattern creation that are common to both hoops and poi.

Safety

Always check the poi leashes before using and make sure they're in good condition and securely attached to the caps, and that the caps are locked to the poi bodies. Your Hyperion Poi are not toys and are intended for use by experienced practitioners. Fast-moving poi can cause property damage and injuries. Always be aware of your surroundings and make sure bystanders keep a safe distance.

Getting Started

Please take a few minutes to review the important notes below. We know you're probably impatient to get started, though, so here's what you need to know first:

Your poi take 14500 size lithium-ion batteries. Four are included with the set. The batteries come partly charged, so you can start right away. Unscrew the tail cap and insert a battery positive end first. If you put the battery in backwards it won't harm the poi, but it'll drain the battery quickly. Don't leave it like that.

Screw the tail cap back on and turn the poi on by clicking the tail cap switch. The switches have a protector installed to prevent them from switching off when bumped, so you'll need to press straight down on the center of the switch.

Two pairs of silicone protective caps are provided with each pair of poi. These will help protect the poi from impacts, and protect you from the poi. They also help keep dust and water out. They can be trimmed with scissors if you prefer to keep them from obscuring the LEDs; we ship them full length so you can cut them to your preferred length.

At the top end of the poi you'll find a metal cap that attaches to the leash. Press the button to remove the cap if you need to change the leash, access the USB port, or attach the poi to a staff adapter.

Important Notes

More than a year and a half ago the Hyperion poi reached the point where they could do virtually anything any competing pixel poi could do, but manufacturing difficulties delayed

production and problems with the WiFi modules set back the software development process by several months. Now that the critical problems have been resolved, development has been continuing night and day to finish the planned feature set.

That work is far from over, and in fact some of the coolest stuff is just getting started. The software developed for the poi will also become the third-generation Hyperion hoop software and will be the foundation of all of our new LED products and will likely still be getting new features for years to come.

The initial planned feature set will probably not be finished until February or March of 2018, but you've waited long enough for your poi and there's no reason for us to keep them sitting in our warehouse any longer. The software is easily updated over USB or WiFi, and by the time you receive your poi in the mail there will likely already be new updates available. But for now, keep these known limitations in mind:

- The browser-based interface is only partly completed. All of the configuration pages are complete, and you can perform some basic remote control functions. There's no proper pattern browser yet. The visualizer doesn't render all types of patterns, particularly motion-reactive ones, and the pattern editor isn't done.
- The poi make no real attempt at conserving battery power yet. Battery life in the next major release should be improved by at least 20%.
- The software is not using full optimization. More testing is needed to guarantee stability, and the poi are also producing extra diagnostic information to help identify bugs. You may see a brief (1/10 second or less) hesitation when the poi change patterns, and the poi may not keep up their full frame rate with a few patterns.
- In Access Point mode (when the poi are not used with an existing WiFi network), the poi may not change patterns at exactly the same time. A lag of up to half a second is possible.

About Syncing

Depending on their mode, the poi can take up to 30 seconds to establish a WiFi connection with each other. Until they're linked, the remote controls will work on each poi individually. If the poi were linked last time they were shut off, they'll remember what patterns they were going to play next, so if you turn both on at the same time, they should start on the same pattern and change patterns at the same time without having to wait for a WiFi connection.

If you turn the poi on and off again without letting them establish a connection, they'll

resume operating independently.

Presently the poi assume that every partner they're synced with has the same set of patterns. Future software updates will add the ability for the poi to determine which patterns they have in common, and optionally to allow them to share pattern files wirelessly. For now, if one starts playing a pattern that the other doesn't have, they'll get out of sync.

Accessing the Web Interface

Each poi has its own web server. Out of the box, they're configured to create their own WiFi network, with the network name 'hyperion' and password 'hyperion'. You can connect to this network using a PC or mobile device. The poi hosting the network can be reached at <http://192.168.1.101>. Other poi and hoops on the network can be found in the 'Group' menu.

If the poi are connected to an Internet-connected network, you can find them by going to <http://my.hyperionhoop.com>. The site will display any Hyperion devices that have registered themselves on your network.

Detailed web interface instructions will be added later

WiFi Networking

One of the most unique features of your Hyperion poi is their use of WiFi networking. The poi can use WiFi to communicate with each other and with WiFi-capable Hyperion hoops to synchronize their patterns, they can be controlled from an Art-Net capable lighting control console, their browser-based interface can be used for setup, programming, and live control, and they can receive software and pattern updates over the Internet. They have three network modes: WiFi Direct, Access Point (AP), and Client.

In Client mode, the poi can connect to a 2.4 GHz (802.11b/g/n) WiFi network. In AP and Direct modes, they create their own network, which you can join with a PC or mobile device for setup and control.

WiFi Direct Mode

As of 1/16/2018, poi and WiFi hoops are shipping in Access Point mode rather than WiFi Direct mode, due to a flaw in the WiFi modules. We recommend not trying to use WiFi Direct mode at all until a firmware update is available. As soon as Silicon Labs fixes the problem, we'll put out an update.

~~Out of the box, your poi are set up to use WiFi Direct, also known as WiFi Peer-to-Peer.~~ WiFi Direct is a special WiFi mode that doesn't require a router. One poi creates a WiFi Direct group and the other joins the group. The WiFi channel is selected automatically and you don't need to do any special setup for your poi to connect to each other in this mode; just turn them on and within about 10 seconds they should find each other and sync up.

Some devices, particularly newer Android devices, are able to connect to a WiFi Direct network without disconnecting from their regular WiFi network – for example, your phone can be connected to your home WiFi and to the poi at the same time. See below for instructions on connecting an Android device in WiFi Direct mode.

Apple iOS devices don't support WiFi Direct. However, the WiFi Direct group will still show up like a legacy WiFi network that almost any WiFi device can connect to; you just won't be able to connect to more than one network at a time.

Access Point Mode

The poi can also be set up as a conventional WiFi access point. There's not much difference between access point (AP) mode and WiFi Direct mode if you don't need to connect to two networks at once; AP mode is included mostly because WiFi Direct is a relatively new standard and some devices have odd quirks in Direct mode.

Client Mode

In client mode, the poi connect to an existing WiFi network. To connect, you'll need to let the poi know which network to join and what the password is, if the network is secure.

If you have the poi scan for open (unsecured) networks, they'll connect to the open network with the strongest signal. Once they've connected, they'll remember the network name and try to connect automatically when they see that network again.

If your network is secured, you have a few options for setting up the poi. The simplest is to use WiFi Protected Setup (WPS) push button mode, sometimes called "WiFi Simple Config", "Push 'n Connect", "PBC", or "Quick Secure Setup".

To use WPS, select the WPS scan option from the poi's link menu, described in the remote control section below. The scan will run for two minutes. While it's scanning, press the WPS button on your router. On some routers, this button might be a soft button in the router's web interface rather than a physical button. If all goes well, the poi should find the router, obtain the password, and connect automatically.

WPS doesn't always work, and not all routers support WPS. If WPS is not an option, you can either use a WiFi-capable device to connect to the poi's WiFi Direct network and change the networking settings through the web interface, or you can connect the poi to a computer via USB and change the settings in the config.ini file.

Setting up Multiple Devices

You presumably have at least a pair of poi, and you may have several devices to configure at the same time. To save the trouble of configuring them all individually, they can share login information using their short-range infrared (IR) link.

The IR link is *very* short-range – the poi need to be held together, not more than a few inches apart, to exchange data. A poi that is already connected to a network will share its login information with one waiting to connect. The poi receiving the login information will flash briefly and then attempt to connect to the network.

The poi don't send IR signals while they're in motion, so make sure you hold them still until you see the flash.

Choosing a Mode

WiFi Direct and AP modes are useful for connecting a few poi or hoops at the same time and

will work even if you're not in range of an existing WiFi network. Both modes require one device to act as a central hub and don't automatically pick a new group owner if that hub device isn't present. This means that if the group owner is off or its battery fails, the whole group will lose the ability to communicate until they're reconfigured. The hub device can also handle only a limited number of connections.

Client mode allows a very large number of devices to be connected at the same time and typically has better reliability at long range, and also makes access to your poi easy for other devices on the network. If you're using your poi at home or on stage, this is the mode you'll usually want them in.

Your poi remember the last few WiFi networks they connected to, including networks hosted by other Hyperion devices. If the poi configured to be group owner finds a network it knows when it starts up, it'll connect to that network as a client. If no known networks are in range, it will start its own network. For example, if you normally use the poi on your home network but sometimes use them at the beach, they'll still create their own network and sync up when they don't find your home network.

A Note about Privacy

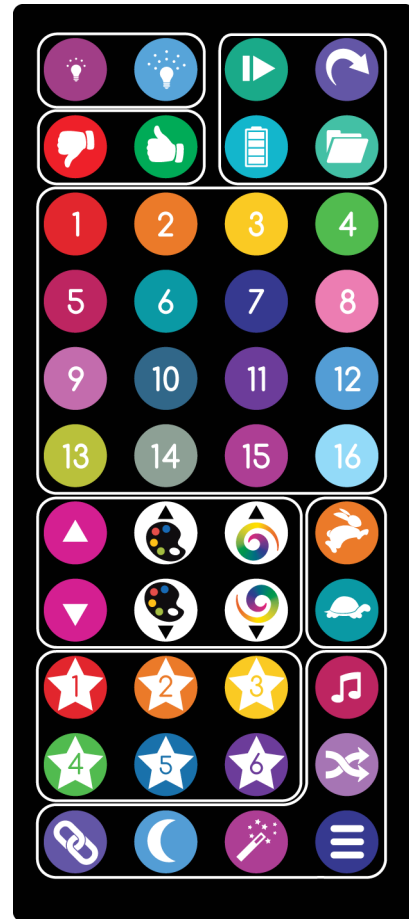
To make themselves easy to find, when the poi connect to an Internet-connected WiFi network they'll normally 'phone home' and contact a server to register their presence. The information sent to the server includes the poi's serial number and IP address. If for any reason you don't want the poi to contact the server, you can set the 'wifi_privacy' option described in the 'advanced configuration' section of this manual.

Note that if you're using a web browser to access the poi's configuration interface, your browser may still attempt to contact a server (without providing identifying information) to check for available updates.

Remote Controls

Your poi include two IR remote controls, a 44-key remote and a 7-key keychain remote.

- Light bulbs – Brightness up/down
- Thumbs up/down – Playlist/favorites editing
- Play/pause – Hold pattern
- Arrow – Next pattern
- Battery – Check battery level
- Folder – Next pattern folder
- Numbers 1-16 - Jump to pattern folder 1-16
- Violet up/down – Next/previous pattern
- Palette up/down – Next/previous color palette
- Swirl up/down – Next/previous motion mode
- Rabbit/turtle – Faster or slower pattern change time
- Star numbers – Favorite pattern presets
- Music note – Sync to music (unfinished)
- Twisted arrows – Shuffle mode
- Links – Link mode settings
- Moon – Hold to sleep or wake
- Wand – Special functions
- Menu - (unfinished)



Link Menu

To check the poi's link status, press the link button on the 44-key remote (lower left corner). The middle three lights indicate the link status:

- ○○○ ●●● (White) Not connected / WiFi disabled
- ●●● ●●● (Green) Connected to network as client
- ●●● ●●● (Yellow) Couldn't find network
- ●●● ●●● (Violet) Hosting network in access point mode
- ●●● ●●● (Red) Hosting network in WiFi Direct mode

To change link modes, hold down the link button until the display begins to flash. Press the link button to cycle through the available options. After a few seconds of inactivity, the device will exit the menu and change modes. The link options are:

- ○○○ ●●● (White) Turn WiFi off
- ●●● ●●● (Green) Connect to network
- ●●● ●●● (Violet) Switch to access point mode
- ●●● ●●● (Red) Switch to WiFi Direct mode
- ●●● ●●● (Cyan) Start WPS push button scan
- ●●● ●●● (Orange) Scan for open (unsecured) networks
- ●●● ●●● (Red/Yellow/Green) Check for software updates

While the link menu is active, you can hold down the link button for two seconds to forget the current network connection. The saved password will be deleted and the device will not automatically reconnect to that network again.

The software update option only works if the device is connected to a network with an Internet connection. If a software update is found, it'll be downloaded and installed immediately. The update process typically takes less than a minute. If no updates are available, the poi will go back to playing patterns.

You can also hold the magic wand button while the link menu is active to wipe out and reload all of the pattern files. This process takes about 10-20 minutes. Be sure you have a fresh battery installed before using this option. Stopping the transfer may result in corrupted files, but this can be fixed by simply repeating the process and letting it finish.

Sleep Mode

Holding down the 'sleep' button (crescent moon, on the bottom row) will put the poi into a low-power sleep mode. Holding the button again will wake the poi. Presently this is not a 'deep sleep' mode and the battery will still be drained over the span of several hours, so be sure not to leave your poi in this state for long periods. Sleep mode will shut down the WiFi module and the poi will reconnect to the network after being woken up.

Art-Net™ Support

Art-Net is a network protocol for carrying DMX512 lighting data. Art-Net support is enabled by default on your poi. With it, you can use any modern lighting control console or lighting design software to control them.

The DMX512 universe number and start address can be configured in the config.ini file or through the web interface. The defaults are universe 0 and slot 1. Presently only a single profile is defined, and the slots are assigned as follows:

- 1 Master brightness (0 = off, 255= max)
- 2 Pattern rotation rate (0 = ignore, 1 = max left, 128 = none, 255 = max right)
- 3 Overlay rotation rate (0 = ignore, 1 = max left, 128 = none, 255 = max right)
- 4 Pattern folder select (0 = ignore selection)
- 5 Pattern number selection within folder (0 = ignore selection)
- 6 Palette line number (0 = ignore)
- 7 Pattern line number (0 = ignore)
- 8 Mapped pattern selection (0 = ignore)
- 9-11 R/G/B values for palette substitution slot 1
- ...
- 54-56 R/G/B values for palette substitution slot 16

Settings in every slot except for master brightness are ignored if set to 0. The rotation rates for the pattern and overlay layers are both centered at 128 (50%) for easy control with a single knob or fader.

Patterns can be selected using the combination of slot 4 (folder select) and slot 5 (pattern select). This is a simple way to access all of the patterns loaded on the device. To directly access specific patterns, you can also use slot 8 to choose a pattern from a prepared list. To use this feature, create a file on the poi called 'dmx.ini' and add a line for each pattern in the form 'pattern<n>=<filename.bmp>'. For example:

```
pattern1=my_first_pattern.bmp  
pattern2=my_second_pattern.bmp
```

Slots 6 and 7 control the palette and pattern playback line number, respectively. In normal operation the poi will step through each line of the palette and pattern in sequence, but these slots allow direct control of which lines are displayed. See the section on advanced pattern customization for more information on how these can be used.

The rest of the slots represent the red, green, and blue intensity values for 16 color

substitution slots. These colors replace placeholder colors in the pattern.

Battery Tension Adjustment

If your poi reset while spinning hard or if the battery won't easily fit in the compartment, you can adjust the position of the top contact spring using a Philips screwdriver. Turning the screw counterclockwise will make the battery fit tighter and clockwise makes it looser.

Legal

The Hyperion software includes the following open source projects in whole or in part:

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