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ADVATEK LIGHTING PixLite 16 Plug Pixel Control Device User Manual

Contents

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ADVATEK LIGHTING PixLite 16 Plug Pixel Control Device

Introduction

This is the user manual for the PixLite 16 Plug And Play Mk2 pixel controller, hardware version 1.1. The PixLite 16 Plug And Play Mk2 controllers convert E1.31 (sACN) or Art-Net protocols from a lighting console, media server or computer lighting software into various pixel LED protocols.

The enclosure is constructed of high- impact polycarbonate material allowing for excellent durability and reliability, even in harsh outdoor weather conditions. It is a weatherproof box with high UV resistance and features splash-proof venting and waterproof connectors for data and lights.

The PixLite 16 Plug And Play Mk2 features an output capacity of up to 32 universes of multicast/unicast E1.31 or Art-Net data. This, combined with an advanced feature-set and easy-to-use configuration software, makes the PixLite 16 Plug And Play Mk2 an excellent choice for your pixel lighting application.

This manual covers physical aspects of the PixLite 16 Plug And Play Mk2 controller and its essential setup steps only. Detailed information about its configuration options can be found in the 'PixLite Configuration Guide'. Other manuals and the PixLite Configuration Guide may be downloaded from here:
www.advateklights.com/downloads

Safety Notes

AC Power & Opening Enclosure
Inside the fully assembled enclosure there are high voltage hazards. Extreme care must be taken if opening the enclosure as there are exposed high voltage terminals inside.
The enclosure lid can easily be opened by removing the 4 large screws located at each corner (ensure the appropriate sized driver is used or the screw head will get damaged). The lid may be completely removed allowing full access to the circuit board, wiring and power supply inside.

Air Vents & Temperature Monitoring
The enclosure has two large air vents located on each side which allow the enclosure to equalize to a low, stable running temperature. One vent is for the air intake and the other expels the hot air generated from the internal power supply. It is critical to ensure these vents are not blocked or obstructed by anything while the controller is in operation. Anything restricting the flow of air out of the enclosure may cause it to overheat and could damage to

internal components.

Due to the nature of the power supply, the internal temperature of the enclosure MUST be considered. As your load (number of pixels) increases, the power supply will generate more heat. There is a measured temperature that can be read from the Advatek Assistant for your convenience, as a rough guide for the power supply's temperature. The operating temperature of the controller depends, therefore, on the temperature of the power supply, which is largely dependent on how much power you are drawing from it, and less dependent on the temperature outside the enclosure.
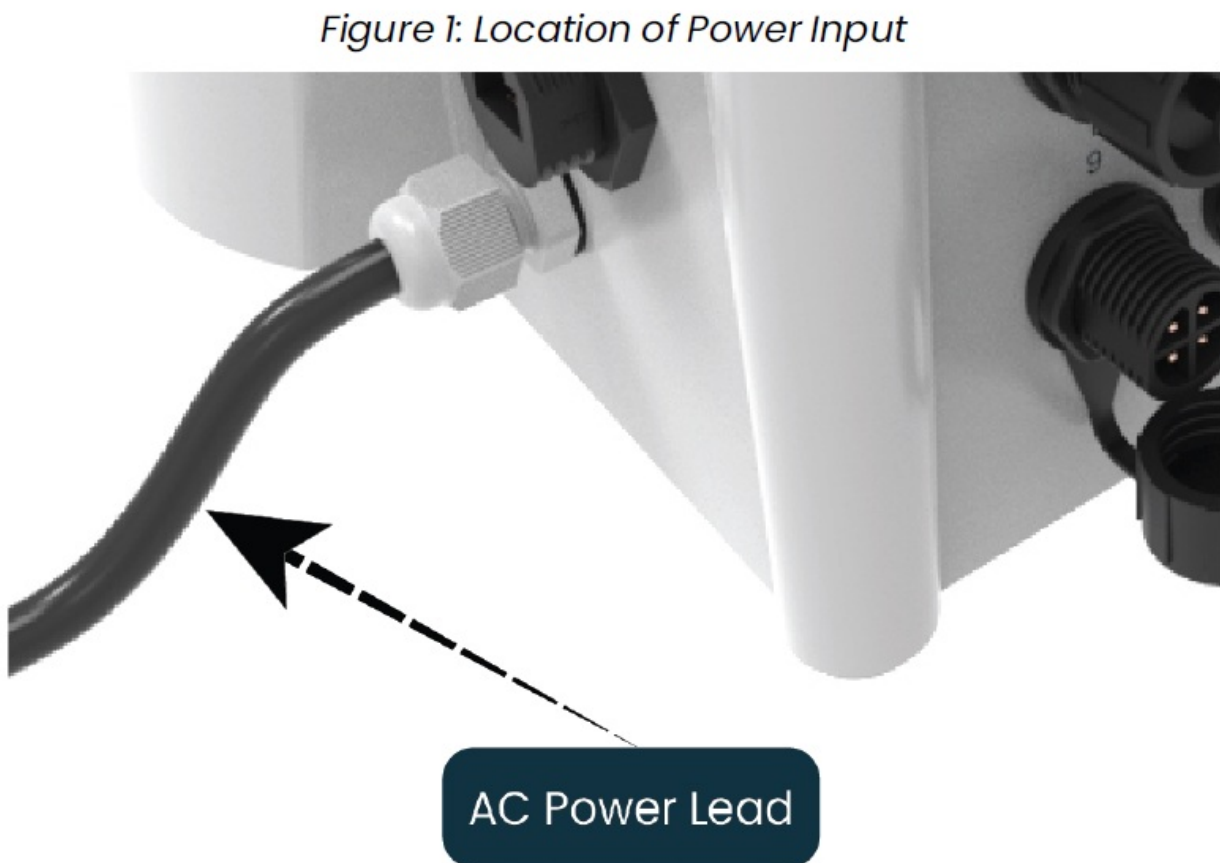
Refer to Section 8.1 for more information.

Installation

Supplying Power
The enclosure will have a 3m long region specific AC power plug exiting through the unit, as shown in Figure 1 below, which should be connected to the AC mains supply.
Figure 1: Location of Power Input

Figure 1: Location of Power Input

AC Power Lead

Output Fuses & Power Injection
Each individual output is protected by a mini blade fuse. The PixLite 16 Plug And Play Mk2 comes with 4A fuses by default. You may use any value of fuse, up to and including 7.5A, depending on your specific application. Individual outputs should not exceed 7.5A and the total current should not exceed the applicable current listed in the operating specifications table in Section 8.2. If your application requires more current than this, then you will need to inject power into the pixels directly.

The number of pixels that can be physically powered through this device may not be as high as the amount of pixel control data that is being output. There is no definitive rule as to how many pixels can be powered from the controller, as it depends on the type of pixel. You need to consider if your pixel load will draw more than 7.5A of current and whether there will be too much voltage drop in the pixel load for it to only be powered from one end. If you need to "inject power" we recommend bypassing the controller's power output pins entirely.

Control Data

Ethernet data is connected via a standard network cable into the RJ45 Ethernet jack located on the left-hand side of the unit, as shown in Figure 2 below. Each unit is supplied with an additional screw- up watertight mating connector for this port, allowing the user to crimp their own waterproof network cable. The controller supports Streaming ACN (sACN / E1.31) or Art-Net data.

Note: In order to achieve a reliable Ethernet connection, the mating Ethernet cap must be used. Installations that do not use this component may be subject to an unreliable connection.

Figure 2: Position of Ethernet

Figure 2: Position of Ethernet
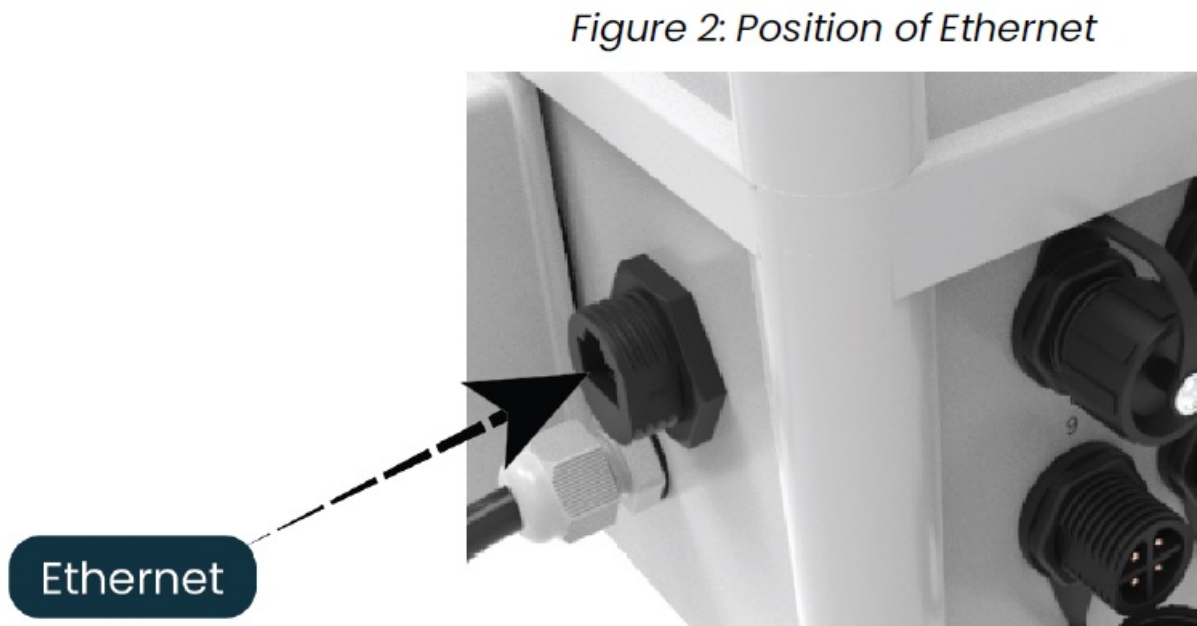
Connecting Pixel LEDs

The number of pixels a PixLite 16 Plug And Play Mk2 can drive is shown in Figure 3 below.

Figure 3: Pixel Set up
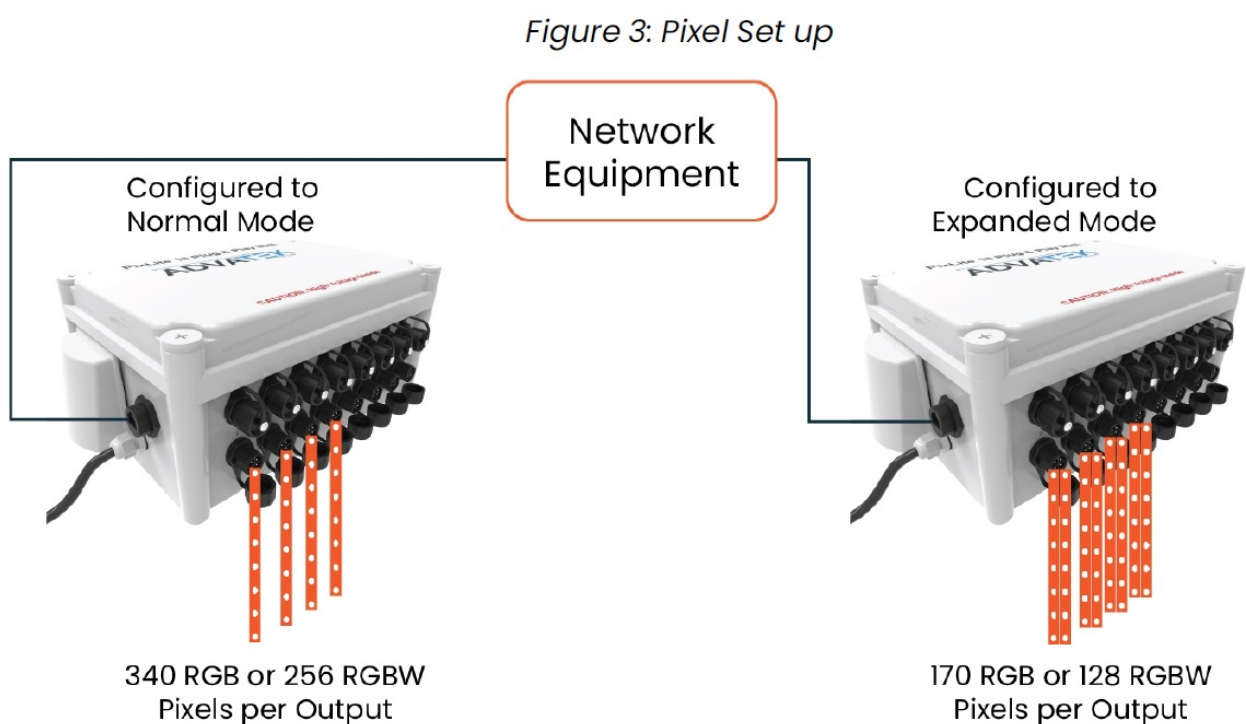
Pixel lights are connected to the controller via the 16 male screw connectors on the unit. The connectors are IP67 rated and are made from high quality nylon and use gold plated pins. Each individual connector is labelled with a channel number between 1 and 16. Simply plug your Advatek pixel lights into the mating sockets, screw up the covers and you are done. Ensure the connectors are screwed up all the way to guarantee proper internal connection. If using any cable extensions, plug these in-line with the panel connector and the lights.

If using lights not supplied by Advatek, then suitable mating connectors will need to be used to connect them to the male sockets on the enclosure. These connectors can be found on our website and are sold separately.

Note: Some pixel protocols do not use the clock line and lights of this type will only have 3 wires. In this case you can leave the clock line disconnected.

Warning: It is very important not to short +ve onto the clock or data lines when using pixels greater than 5V. Note that this can also happen from poor waterproofing when rain shorts the higher voltage onto either of those wires in your pixels/wiring.
The cable length between the output and the first pixel should not exceed 15m.

Figure 4 shows the pin-out of the pixel output connectors.

Figure 4: Normal Mode Pixel Output Pinout

Pin 4 +Ve

Pin 1 Ground

Pin 3 Clock

Pin 2 Data
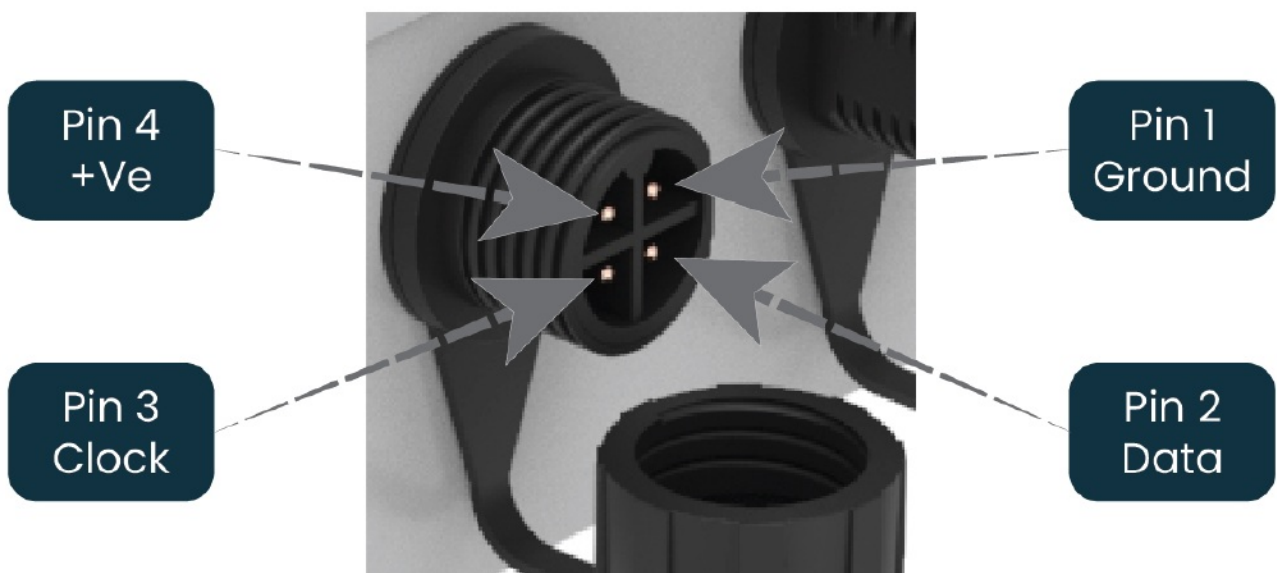
Expanded Mode
If your pixels do not have a clock line, you may optionally activate expanded mode on the controller, via the Advatek Assistant. In expanded mode, the clock lines are used as data lines instead. This means the controller effectively has twice as many pixel outputs (32), but half as many pixels per output can be run.
It is advantageous to use this mode with data-line only pixels, compared to normal mode, because the refresh rates will be improved. Pixels that only use a data line are generally slow compared to clocked pixels, so improving the refresh rate is beneficial. This is especially important if you are using close to the maximum number of pixels per output.
The pinout for expanded mode is shown in Figure 5 below.

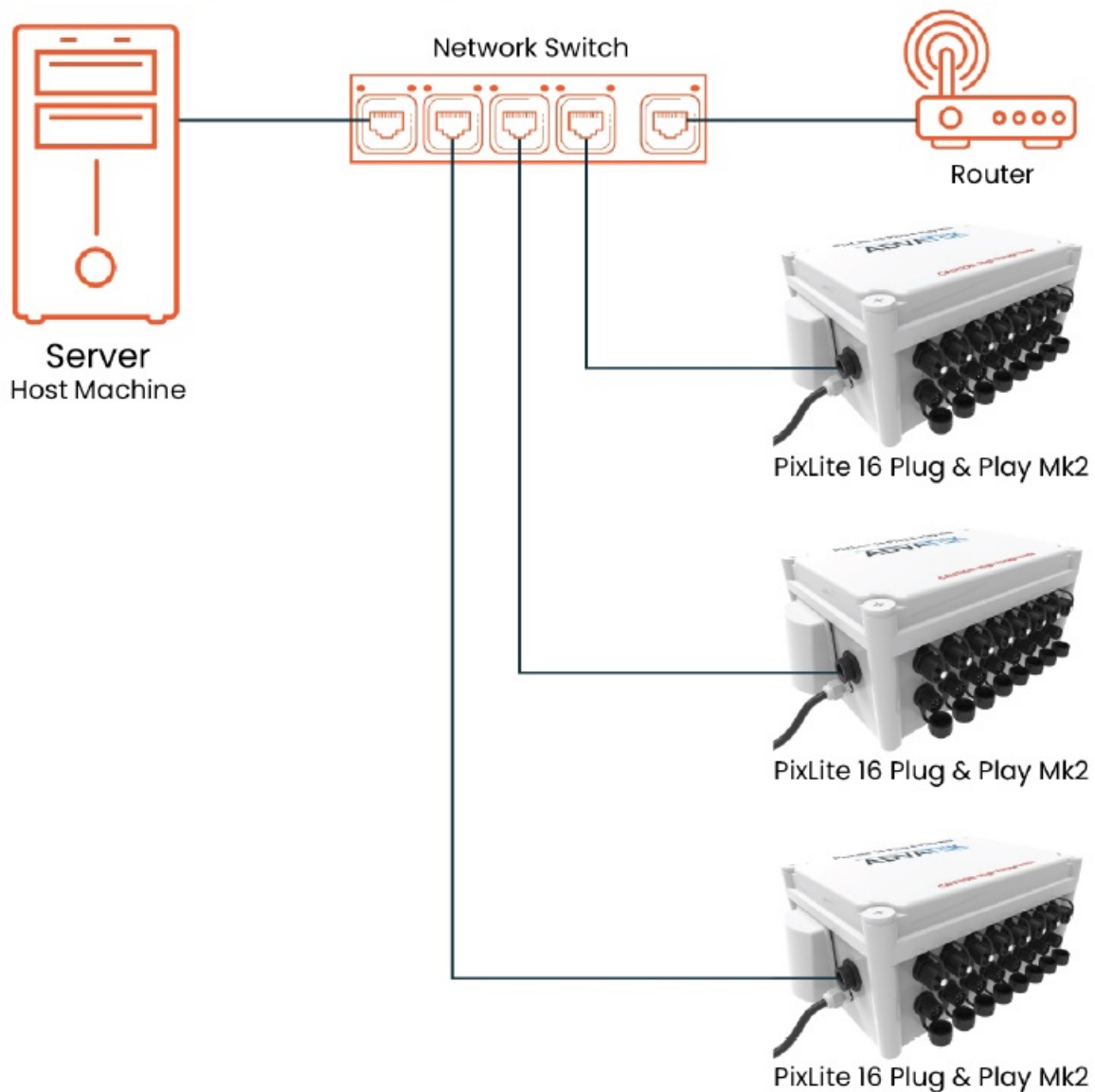**Figure 5: Expanded Mode Pixel Output Pinout**

Figure 5: Expanded Mode Pixel Output Pinout

Pin 4 +Ve

Pin 1 Ground

Pin 3 Data 1

Pin 2 Data 2
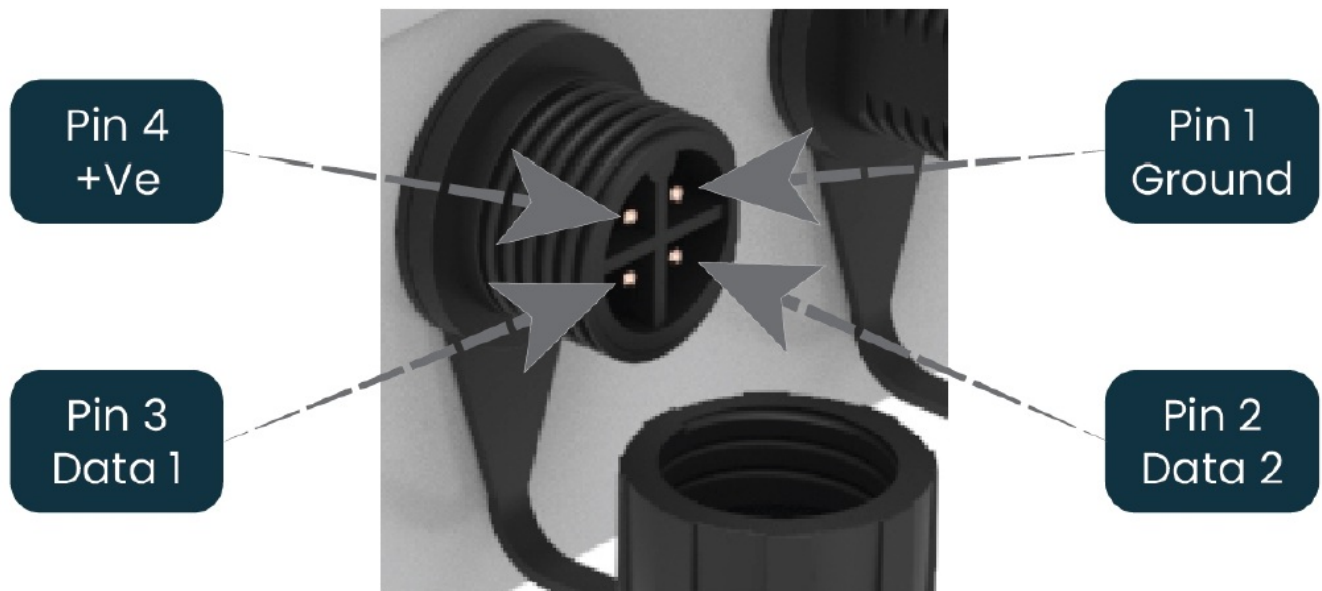
Network Configuration

Network Layout

Figure 6: Network Layout using a Server and Switch

Network Switch

Server
Host Machine

Router

PixLite 16 Plug & Play Mk2

PixLite 16 Plug & Play Mk2

PixLite 16 Plug & Play Mk2

Figure 6 shows a typical network topology for the PixLite 16 Plug And Play Mk2 controller(s) LAN. Installations using multicast sACN will benefit from the use of IGMP Snooping enabled network equipment when there are more multicast universes on the network than any one PixLite is using. If there are more than 96 universes of multicast sACN on the network then IGMP Snooping is mandatory.

Having a router on the network is not mandatory but is useful for IP address management with DHCP (see Section 5.2.1). When IGMP snooping, a router may also be required (depending on your network switch functionality).

Figure 7: Network Layout using Only a Server

Figure 7: Network Layout using Only a Server

PixLite 16 Plug & Play Mk2

Server
Host Machine
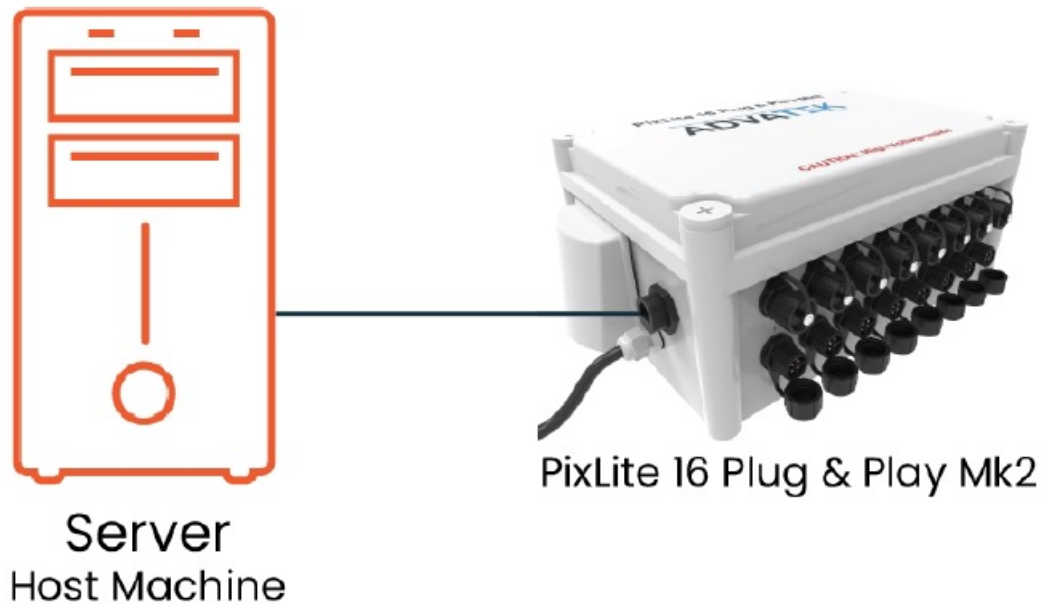
In a single controller installation, it may be preferable to connect the controller directly to the host machine, as shown in Figure 7. A crossover cable is not required in this case, but it may be used if desired.
The controller(s) can be integrated straight into any pre-existing LAN such as your media, home or office network, the above diagrams are only provided as examples.

IP Addressing

Using a Router
Routers have a DHCP server in them – this means they will tell a device plugged into them what IP address to use, if asked.
DHCP is always enabled by default on a PixLite controller so it can immediately connect to any existing network with a router. However, you may instead prefer to assign a static IP address once communications have been established via the Advatek Assistant. If the controller is in DHCP mode and is not assigned an IP address by a DHCP server, it will timeout after a short time (approximately 30 seconds) and default to a static IP of '192.168.0.50'.

If DHCP mode is enabled, both the status and power LEDs will flash together until the controller receives an IP address or times out to its default IP. After this, the power LED will remain on solid and the status LED will flash, indicating it is in run mode and ready for use.

If a static IP address is assigned to the controller, then the power LED will be solid from power up.

Using a Switch/Direct
It may be necessary to connect the controller to a network without a DHCP server or even directly to the host machine instead of using a router. In this case (for first time configuration) you will need to ensure that the network adapter of your computer is set in the IP range that the controller will default to (controller defaults to 192.168.0.50). This means your PC's IP should be 192.168.0.xxx where xxx is anything between 1 and 254, other than 50. The subnet mask on your PC should be set to 255.255.255.0.

Note: The Advatek Assistant software will automatically detect if a controller is connected to the network, even if it is outside the adapter's IP address range. It will prompt you to change the IP settings if this situation is discovered.

Once you can successfully discover the controller in the Advatek Assistant, we recommended setting the controller to a static IP address other than the default.

Figure 8 shows a screenshot of typical computer network settings to communicate with a PixLite 16 Plug And Play Mk2 controller for the first time without a router.

Figure 8: PC Network Configuration
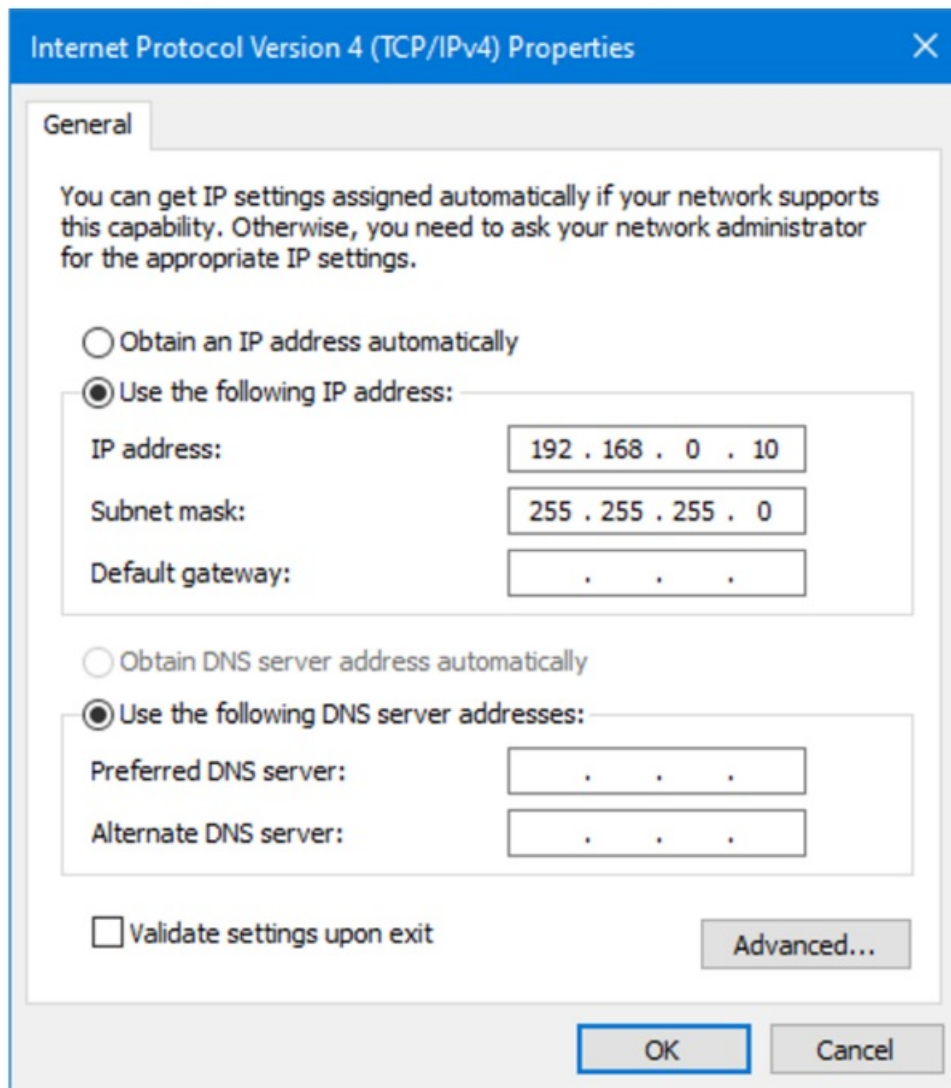
Forcing the Default IP Address

In the event that you forget the IP of a controller and you can't see it in the Advatek Assistant, it can be forced to its default IP. A simple procedure can be employed on power up:

1. Power down the controller and carefully remove the enclosure lid.

2. Hold down the "Factory IP" button on the PCB and power up the controller, taking special caution with the AC power being turned on.

3. After a few seconds release the button. The controller's IP address will now be 192.168.0.50.

You should now be able to set up your PC's network settings to find the controller at this IP and change the IP settings to a preferred static IP address.

Remember to put the lid back onto the controller as soon as you are finished with this procedure.

Operation

Start-up

Upon applying power, the controller will quickly begin outputting data to the pixels, commanding the pixels to turn off. If no data is being sent to the controller then the pixels will remain turned off until valid data is received. During normal operation,(when looking at the internal PCB) the green power LED will remain on solid and the red status LED will flash to indicate the controller is running and outputting any received Ethernet data to the pixels.

Sending Data

Input data is sent from the control PC/server/lighting console to the controller via Ethernet using a "DMX over IP" protocol such as sACN (E1.31) or Art-Net.

If no incoming data is received for a few seconds, the pixels will be turned off automatically unless that option has been disabled in your configuration. If the pixels are not controllable then make sure you have selected the correct pixel IC type in the Advatek Assistant under the 'LEDs' tab.
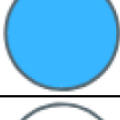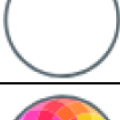
Outputs

Each of the 16 outputs on the PixLite 16 Plug And Play Mk2 can drive up to 2 universes of data. This allows for a total of up to 32 universes to be driven out of the one controller.

The refresh rate of the pixels will depend on the operating frequency of the specific pixel chip type. Higher speed pixels will result in higher refresh rates. Pixels with no clock line will have a relatively low refresh rate when a significant number of pixels are used on a single output. Advatek recommends the use of clocked pixels whenever using a large number of sequential pixels on any output. Typically, the refresh rate can vary from 20 fps at the low end on data only pixels and up to 100+ fps at the higher end.

Hardware Test Pattern

The controller features a built-in test pattern to assist in troubleshooting during an installation. To put the controller into this mode, carefully remove the lid and press and hold the 'Factory IP' button for 3 seconds (after the controller is already running) or turn it on remotely from the "Test" tab in the Advatek Assistant.

The controller will then enter the test pattern mode, where different test patterns are available as described in the table below. The pattern will display the test pattern on all pixels on each of the pixel outputs. Pressing the 'Factory IP' button while in test mode will move through each of the patterns successively in one continuous loop.

Test		Operation
	Colour Cycle	Outputs will cycle automatically through the red, green, blue and white colours at fixed intervals. Pressing the button moves to the next mode.
	Red	Solid Red
	Green	Solid Green
	Blue	Solid Blue
	White	Solid White
	Colour Fade	Outputs will slowly move through a full continuous colour fade. Pressing the button will loop back to the original colour cycle test mode.

To exit the test mode press and hold the 'Factory IP' button down again for 3 seconds and then release.

The hardware test requires that the pixel driver chip type and number of pixels per output are set correctly in the Advatek Assistant. In this way you can test if that part of your configuration is correct and isolate other possible problems with the incoming Ethernet data side.

Firmware Updates

The controller is capable of having its firmware updated (new software). An update is typically performed to fix problems or to add new features.

To perform a firmware update, ensure that you have your PixLite 16 Plug And Play Mk2 controller connected to the LAN network as per Section 5.1.

The latest firmware is available from the Advatek website at the following link:

www.advateklights.com/downloads

The downloaded file will be archived in a ".zip" format, which should be extracted. The ".hex" file is the file that the controller needs.

Performing a Standard Update

1. Open the Advatek Assistant. Click "Search" and once the desired controller appears in the main window, double click on it.

2. A configuration window will appear. Click on the "Misc" tab and then locate the "Update Firmware" button and click on it. A "firmware update" window will appear, as shown in Figure 9 below. Click "browse" to locate the firmware file you wish to use.

3. Click on the "update" button.

4. Once the update is complete, a message box will pop up saying it has completed successfully.

5. The controller will automatically reboot itself and then start running the new firmware application immediately.

If there is something wrong with the updated firmware, repeat the process again if it is still visible in the configuration utility. Otherwise, refer to troubleshooting in Section 9 for further information.

Figure 9: Firmware Update in the Advatek Assistant

Figure 9: Firmware Update in the Advatek Assistant
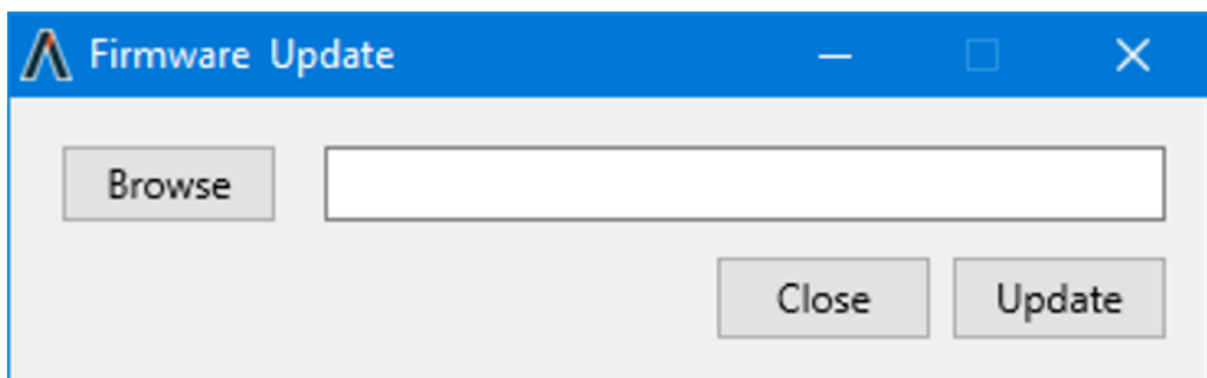
Performing a Recovery Firmware Update

On the rare occasion that the controller encounters an error with its firmware, a recovery firmware update can be performed. This may be necessary if the firmware update process in Section 7.1 fails.

1. Power down the controller and then open the lid and hold down the "Bootloader" button.

2. Apply power. The status and power LEDs should be flashing alternately to indicate the controller is in bootloader mode. It is now ready for a firmware update.
   The controller will default to an IP address of 192.168.0.50 in this mode, so you must ensure your PC performing the recovery is on a network in the same address range as this IP address (e.g. 192.168.0.10).
3. Using the Advatek Assistant, click search in the main window and you should see the controller appear with "Bootloader" in the firmware column. Double clicking on it will bring up the file browse window as shown in Figure 9 above.
4. Click browse to locate the firmware file.
5. Click on the update button. The update will only take about 5 seconds, and a message box will pop up once the update is completed.
6. Power the controller down again and place the lid back on carefully.
7. Apply power again. The controller should now be operating with the new firmware.

Specifications

Temperature of the Power Supply
The internal power supply is rated to provide 300W at 5V or 320W at 12V. However, the amount of power that can be drawn will depend on the temperature of the power supply. If the power supply reaches its derating temperature, the amount of power it can provide will begin to decrease. Refer to Figure 10 below for its characteristic derating curve. If the power supply reaches 50°C, it will begin to decrease its maximum load capacity. If the power supply reaches 70°C, it will completely shut down.

Figure 10: Derating Curve of the Internal Power Supply

Figure 10: Derating Curve of the Internal Power Supply
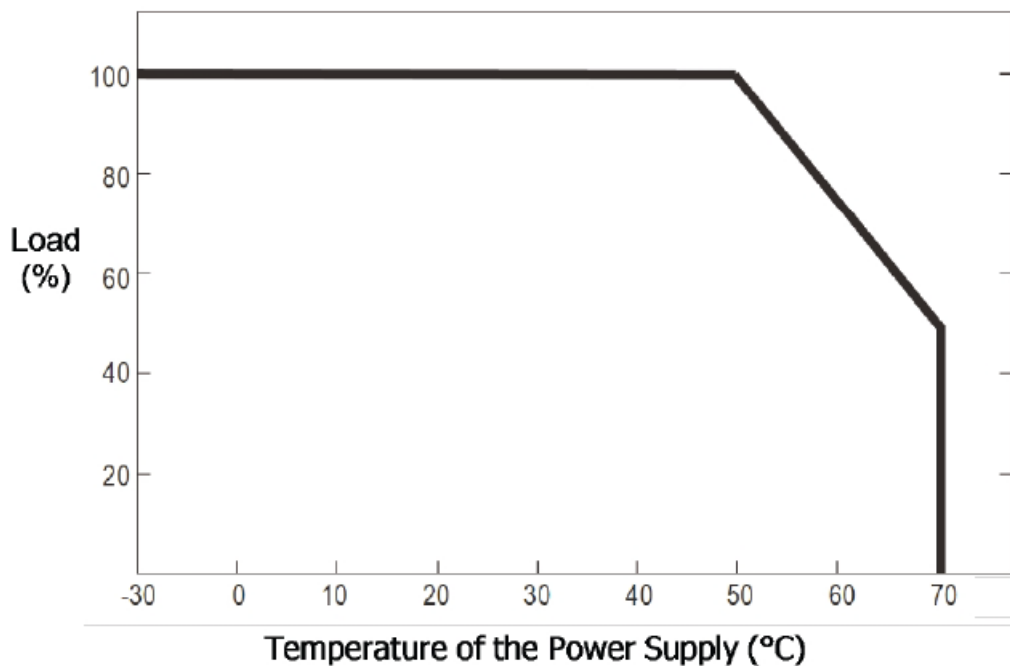
Operating Specifications
The table below specifies the recommended operating conditions for a PixLite 16 Plug And Play Mk2 controller.

Parameter	Value/Range	Units
Input Voltage Range	100-240 (50/60 Hz)	V AC
Recommended Ambient Temperature 1	-20 to +50	°C
Internal Derating Temperature 2	50	°C
Internal Shutdown Temperature 2	70	°C
Total Max Output Current @5V	60	A
Total Max Output Current @12V	26.7	A
Total Max Output Power @5V	300	W
Total Max Output Power @12V	320	W
Maximum Current Per Pixel Output	7.5	A

1. Suggested limit only, the component temperatures must be kept within their absolute maximum ratings. Monitoring the component temperatures with the Advatek Assistant software is recommended.
2. Refer to Section 8.1 for information about derating, and Section 3.2 for suggestions for monitoring temperature.

Mechanical Specifications

The PixLite 16 Plug And Play Mk2 controller has dimensions as below. LxWxH is excluding the AC cable length.

Dimension	Metric	Imperial
Length	300mm	11.8″
Width	200mm	7.8″
Height	140mm	5.5″
Weight	3kg	6.6lbs
AC Cable Length	3m	10′

Figure 11: Mechanical Specifications

Troubleshooting

Generally, troubleshooting requires looking at the LEDs on the internal control board. There is a high voltage AC power supply inside the enclosure so extreme caution should be taken when opening the lid. In this case, use the following procedure:

1. Unplug the power from the controller before removing the case.
2. Apply power again once the lid is removed and the controller is in a safe position.
3. DO NOT TOUCH the inside components of the controller while power is applied, only look at the LEDs. If you want to change a fuse, power should always be removed first.
4. Power down and reattach the lid as soon as you have finished troubleshooting.

LED Codes

Please refer to the table below for condition codes for the onboard status and power LEDs.

Status LED (Red)	Power LED (Green)	Condition
Flashing	Solid	Normal operation, Main application running okay
Slow flashing	Solid	Test mode running
Flashing together	Flashing together	Looking for IP address (DHCP Mode)
Solid	Solid	Main application not running
Off	Solid	Main application not running
Solid	Off	Main application not running
Alternate flashing	Alternate flashing	Bootloader mode
Off	Off	No power

Please refer to the table below for condition codes for the Ethernet jack status LEDs.

Link LED (Green)	Data LED (Yellow)	Condition
Solid	Flashing	Connected okay, receiving data
Solid	Off	Connected okay, no data
Off	Off	No link established

No Lights On
Ensure that the outlet you are plugged into is active.
If the lights are not turning on at all then double check all power connections, pixel connections and fuses. To access the fuses on the control board the enclosure lid will need to be carefully removed as per Section 9. The control board uses a self-resetting thermal fuse for the logic circuitry and a 4A mini blade fuse on each individual output.

No Pixel Control
Check that the correct pixel IC type has been selected in the dropdown box in the Advatek Assistant under the 'LEDs' tab. Also check the physical wiring and pinout of the pixels, as well as the output fuses. Carefully remove the enclosure lid and check if any output fuses are blown, replace as required.

Other Issues
Check the LED codes as per Section 9.1. If the device still fails to perform as expected, perform a factory default reset on the device as per Section 9.5 below. For the latest more specific troubleshooting information and other help, you should refer to our online knowledgebase here: **www.advateklights.com/knowledge-base**

If you can't resolve your problem with the help of our knowledgebase, you can send an e-mail to: **support@advateklights.com** and a support ticket will automatically be created for you, or you can manually open a support ticket here: **www.advateklights.com/support**

Reset to Factory Defaults
To reset the controller to its factory default settings, do the following:

1. Power down the controller and carefully remove enclosure lid.
2. Hold down the "Factory IP" button AND the "Bootloader" button together.
3. Power up the controller, taking caution with the AC power in the box.
4. Wait for both LEDs to flash together.
5. Release both buttons and power down.
6. Replace the enclosure lid.
7. Power up the controller. It will now have factory default configuration.

Disclaimer

If you require support or warranty, please refer to Section 9.4 for information on creating a support ticket. You must be issued with a return authorization by Advatek support staff before returning any product.

The PixLite 16 Plug And Play Mk2 controller is supplied with a 1-year limited warranty and a repair/replacement guarantee. Please see the terms and conditions on our website for more information.

Art-Net™ Designed by and Copyright Artistic Licence Holdings Ltd.
This product has been manufactured by:
Advatek Lighting Pty Ltd
16 / 52 Corporate Blvd
Bayswater, 3153
VIC, AUSTRALIA

www.advateklights.com

Documents / Resources

ADVATEK LIGHTING PixLite 16 Plug And Play Mk2 User Manual Hardware Rev 1.1 ADVATEK CAUTION: High Voltage Inside	**ADVATEK LIGHTING PixLite 16 Plug Pixel Control Device** [pdf] User Manual PixLite 16 Plug, Play Mk2, PixLite 16 Plug Pixel Control Device, PixLite 16 Plug, Pixel Control Device, Control Device, Device

References

- 🌐 **Advatek Lighting - Pixel Controllers, LED Fixtures Suppliers**
- 🌐 **Downloads - User Manuals, Firmware, Pixel Control Software Guides**
- 🌐 **Knowledge Base Articles for Pixel Devices - Advatek Lighting**