

ADVATEK

L I G H T I N G

PixLite 4 Rugged Mk2 User Manual

Hardware Rev 1.0



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2 - Introduction

This is the user manual for the PixLite 4 Rugged Mk2 pixel controller, hardware version 1.0. The PixLite 4 Rugged 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 PixLite 4 Rugged Mk2 pixel controller is a product designed to take all the hard work out of your hardware pixel setup. It features a durable, compact IP67 rated weatherproof enclosure complete with high quality, heavy duty screw up connectors for all power, data and pixels. Integrating the PixLite 4 Rugged Mk2 controller with Advatek pixel tape and our weatherproof Meanwell HLG-240-12 PSUs, you can have a fully integrated plug and play outdoor pixel solution quickly and easily.

The PixLite 4 Rugged Mk2 features an output capacity of up to 16 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 4 Rugged Mk2 an excellent choice for your pixel lighting application.

This manual covers physical aspects of the PixLite 4 Rugged 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

3 - Installation

3.1 – Supplying Power

Power to the controller is applied via the male Power In connector. Advatek supplies IP67 rated HLG-240-12 Meanwell power supplies with a moulded mating female connector ready to plug straight into the controller. We also supply the moulded mating female power plug with tinned ends for use with your own power supply if desired. Since there are multiple options for connecting power, these components are sold separately. If using your own power supply, the input voltage can be anywhere between 5V and 12Vdc.

Note: It is the user's responsibility to ensure that the power supply used matches the voltage of the pixel fixture they are using and that it can supply the correct amount of power/current.

The pin out of the mating female Advatek power connector is shown in [Figure 2](#) below.

Figure 1: Location of Power Input

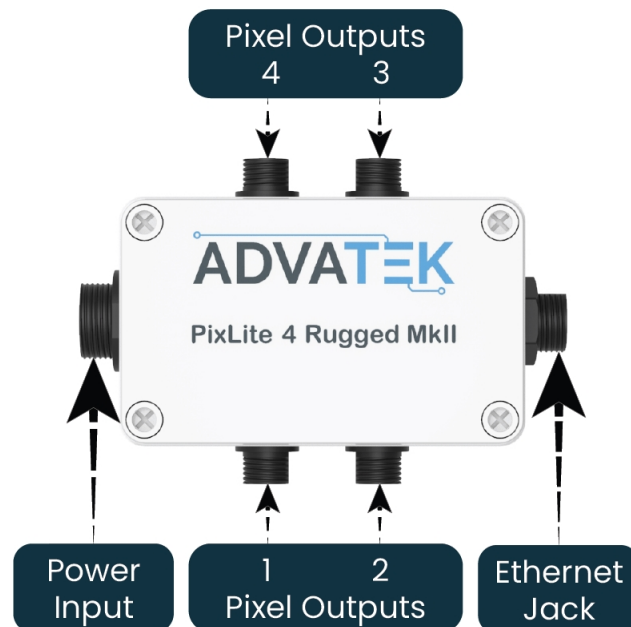
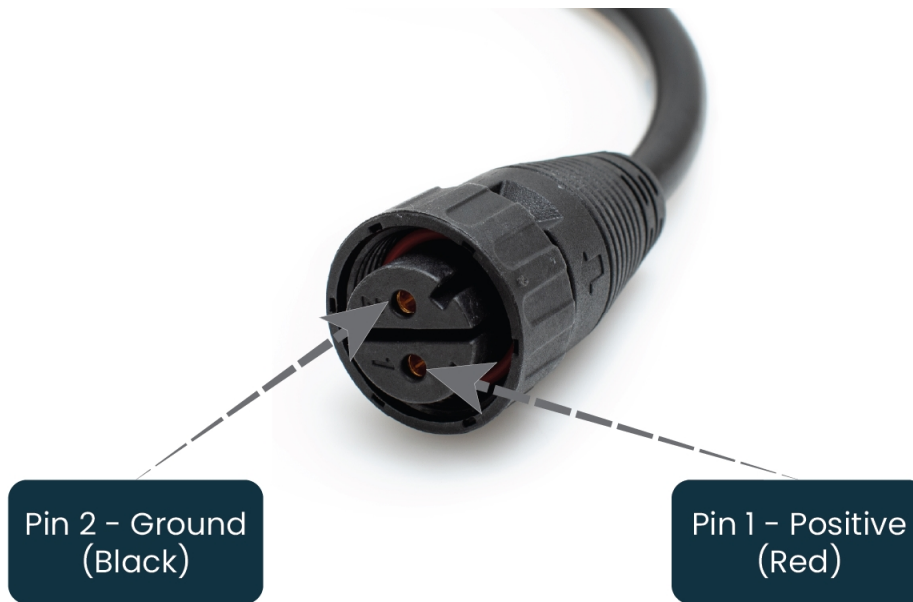


Figure 2: Rugged Power Pigtail Pinout

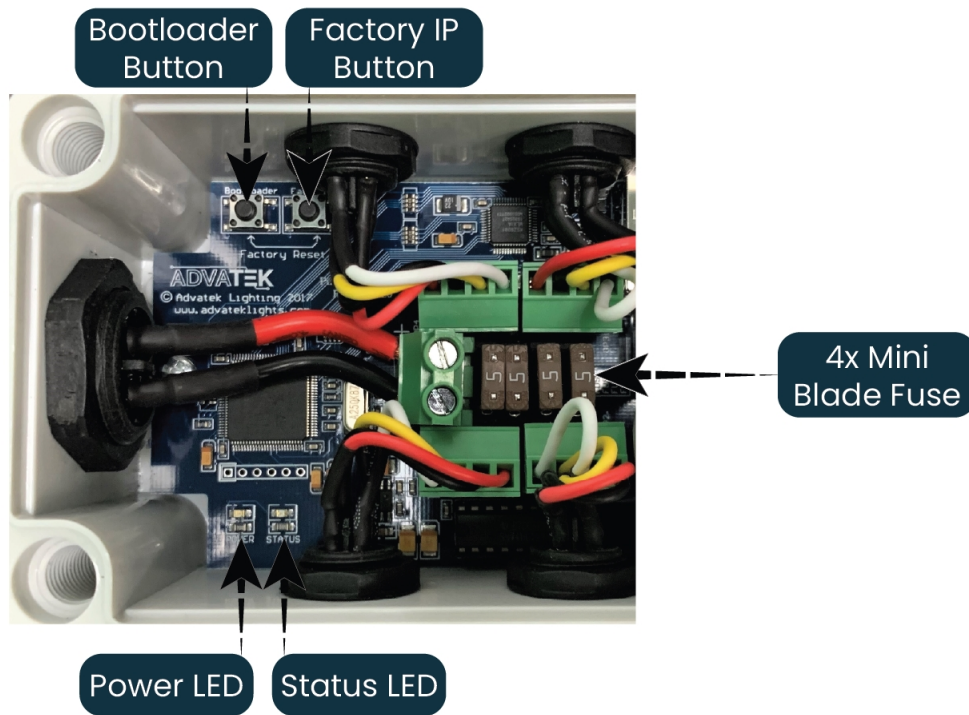


3.2 – Output Fuses & Power Injection

Each individual output is protected by a mini blade fuse. The PixLite 4 Rugged Mk2 comes with 5A 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 30A. 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.

Figure 3: Internal View of the PixLite 4 Rugged Mk2



3.3 – Control Data

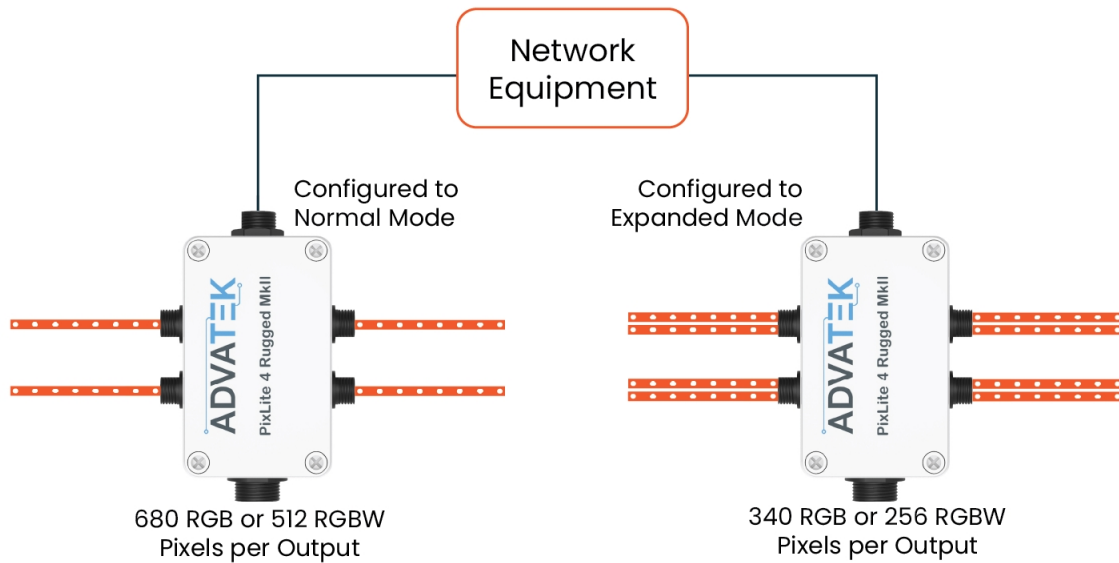
Ethernet data is connected via a standard network cable into the RJ45 Ethernet jack located on the right-hand side of the unit. Each unit is supplied with an additional screw-up watertight mating connector for this port, allowing the user to crimp their own waterproof network cable. The controller supports 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.

3.4 – Connecting Pixel LEDs

The number of pixels a PixLite 4 Rugged Mk2 can drive is shown in [Figure 4](#) below.

Figure 4: Pixel Set up



Pixel lights are connected to the controller via the 4 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 4. 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.

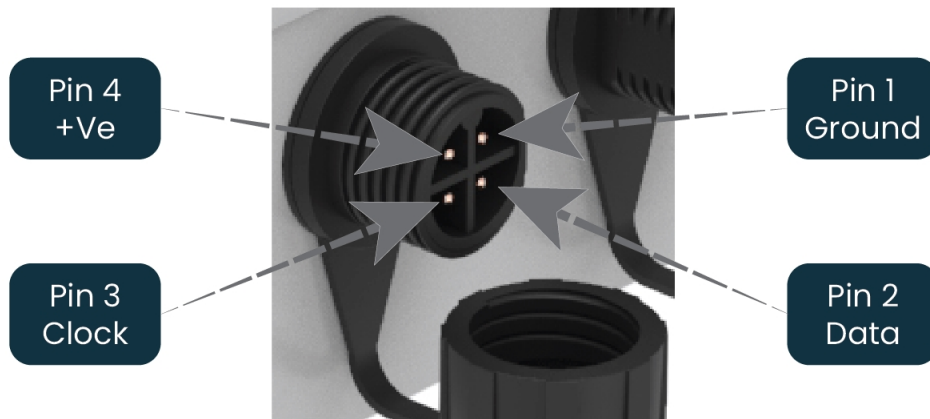
Note: Some pixel protocols do not use the clock line and lights of this type will only have 3 wires. In this case you can leave the clock line disconnected.

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 5 shows the pin-out of the pixel output connectors.

Figure 5: Normal Mode Pixel Output Pinout



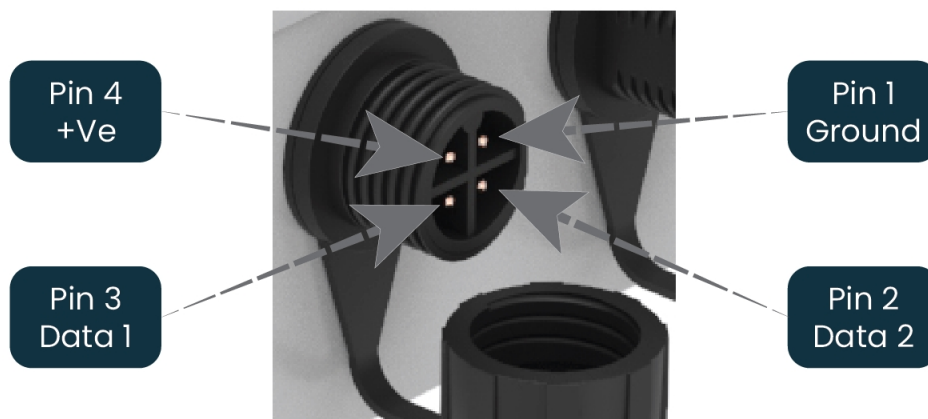
3.5 – Expanded Mode

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 (8), 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 6](#) below.

Figure 6: Expanded Mode Pixel Output Pinout



4 - Network Configuration

4.1 - Network Layout

Figure 7: Network Layout using a Server and Switch

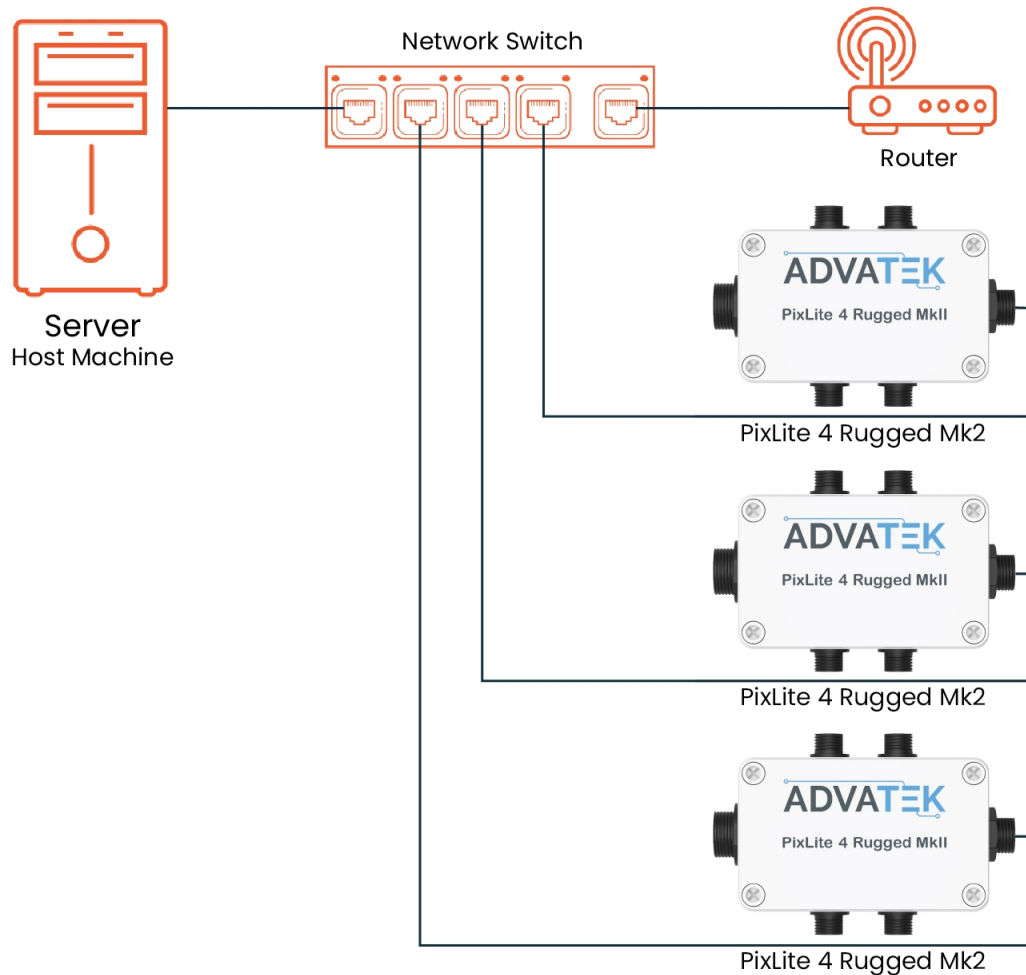
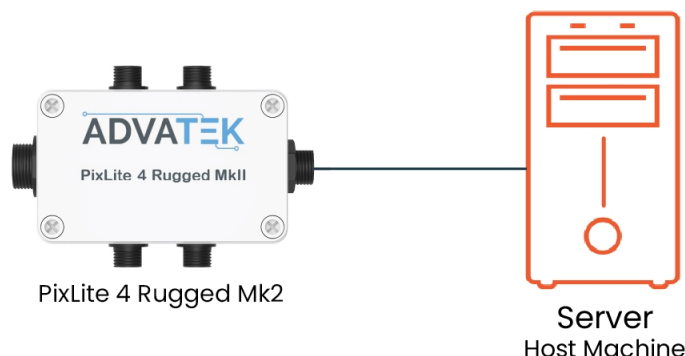


Figure 7 shows a typical network topology for the PixLite 4 Rugged Mk2 controller(s) LAN. Installations using multicast sACN will benefit from the use of IGMP Snooping enabled network equipment when there are more multicast universes on the network than any one PixLite is using. If there are more than 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 4.2.1](#)). When IGMP snooping, a router may also be required (depending on your network switch functionality).

Figure 8: Network Layout using Only a Server



In a single controller installation, it may be preferable to connect the controller directly to the host machine, as shown in [Figure 8](#). 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.

4.2 – IP Addressing

4.2.1 – 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.

4.2.2 - Using a Switch/Direct

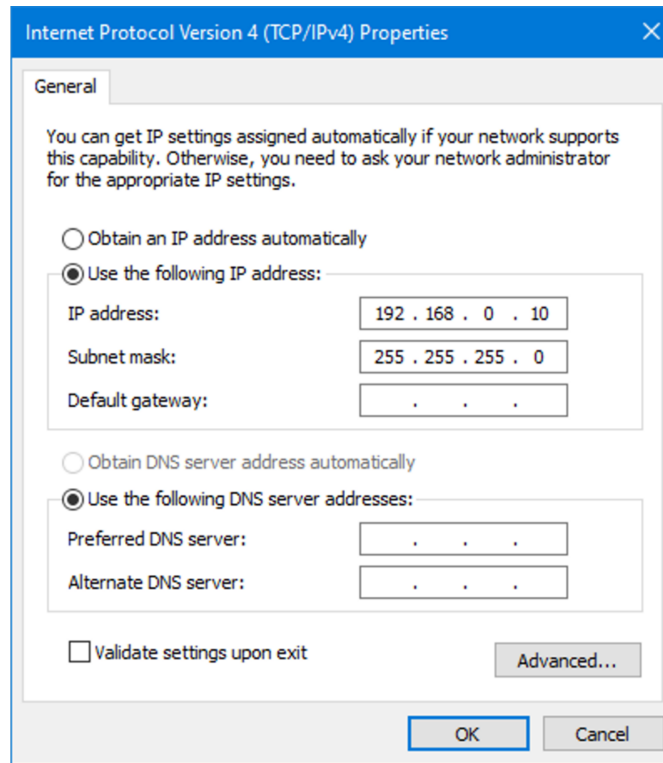
It may be necessary to connect the controller to a network without a DHCP server or even directly to the host machine instead of using a router. In this case (for first time configuration) you will need to ensure that the network adapter of your computer is set in the IP range that the controller will 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 9 shows a screenshot of typical computer network settings to communicate with a PixLite 4 Rugged Mk2 controller for the first time without a router.

Figure 9: PC Network Configuration



4.2.3 – 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
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.

5 - Operation

5.1 - 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.

5.2 - 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.

5.3 - Outputs

Each of the 4 outputs on the PixLite 4 Rugged Mk2 can drive up to 4 universes of data. This allows for a total of up to 16 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.

5.4 - 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.

6 - 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 4 Rugged Mk2 controller connected to the LAN network as per [Section 4.1](#).

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

www.advateklights.com/downloads

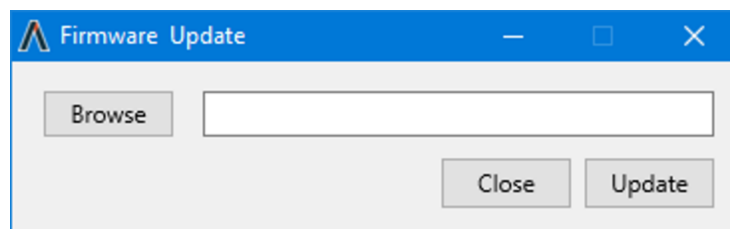
The downloaded file will be archived in a ".zip" format, which should be extracted. The ".hex" file is the file that the controller needs.

6.1 – 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 10](#) 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 8](#) for further information.

Figure 10: Firmware Update in the Advatek Assistant



6.2 – 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 6.1](#) 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 10](#) 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. Apply power again. The controller should now be operating with the new firmware.

7 - Specifications

7.1 - Operating Specifications

The table below specifies the recommended operating conditions for a PixLite 4 Rugged Mk2 controller.

Parameter	Value/Range	Units
Input Voltage Range	5-12	V DC
Max Current	30	A
Max Logic Current Consumption @ 5V	130	mA
Recommended Ambient Temperature ¹	-20 to +50	°C
Absolute Maximum Temperature of Internal Components	-40 to +80	°C
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.

7.2 - Mechanical Specifications

The PixLite 4 Rugged Mk2 controller has dimensions as below.

Dimension	Metric	Imperial
Length	125mm	5"
Width	75mm	3"
Height	70mm	2.8"
Weight	275g	9.7oz

Figure 11: Mechanical Specifications



8 - Troubleshooting

Generally, troubleshooting requires looking at the LEDs on the internal control board.

8.1 – 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

8.2 – No Lights

Ensure that your power supply is supplying correct voltage as per [Section 3.1](#). Additionally, ensure that it can supply enough current to drive the lights that are connected. You should also try disconnecting all outputs and see if the controller then turns on. If the supplied power is correct, try performing a recovery firmware update as per [Section 6.2](#).

8.3 – 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.

8.4 – Other Issues

Check the LED codes as per [Section 8.1](#). If the device still fails to perform as expected, perform a factory default reset on the device as per [Section 8.5](#) 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

8.5 – 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.
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.

9 - Disclaimer

If you require support or warranty, please refer to [Section 8.4](#) 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 4 Rugged 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.

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This product has been manufactured by:

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