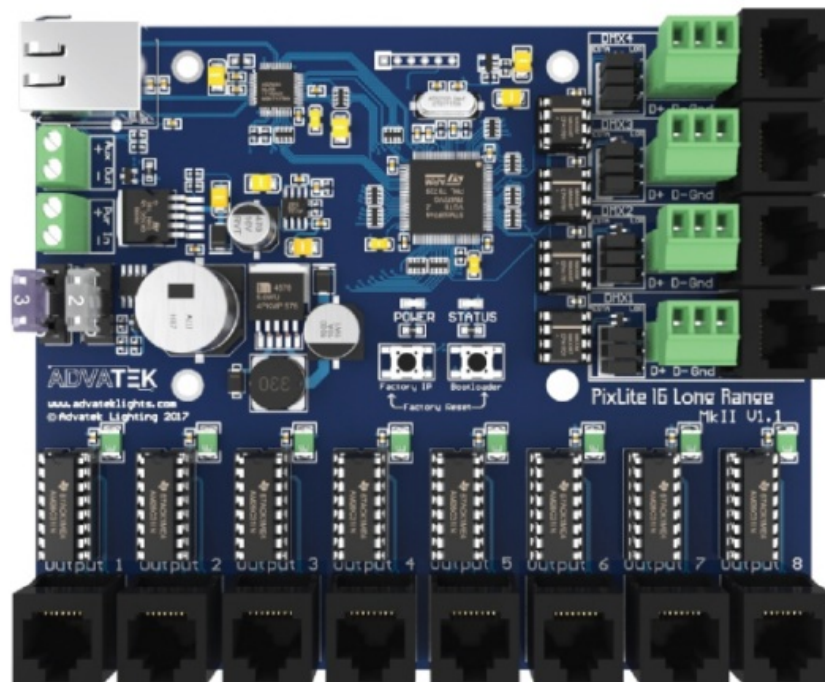




PixLite 16 Long Range Mk2 User Manual

Hardware Rev 1.0 – 1.1



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Introduction

This is the user manual for the PixLite 16 Long Range Mk2 pixel controller , hardware version 1.0 – 1.1.

The PixLite 16 Long Range 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.

This controller is designed to overcome distance problems typically encountered when running many pixels from a single location. The PixLite 16 Long Range Mk2 sends differential data signals directly out of the controller which can be transmitted reliably using any standard network cable at distances in excess of 300m (1000'). At the receiver end, the differential signals are then converted back to signals suitable for pixels. This system allows the user to distribute a large number of pixels from a centralized pixel controller easily, without needing to worry about the typical signal degradation problems.

The PixLite 16 Long Range Mk2 features an output capacity of up to 96 universes of multicast/unicast E1.31 or Art-Net data. This, combined with an advanced feature-set and easy-touse configuration software, makes the PixLite 16 Long Range Mk2 an excellent choice for your pixel lighting application.

This manual covers physical aspects of the PixLite 16 Long Range 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.advateklighting.com/downloads

Safety Notes

The board comes shipped in an anti-static bag and has several electrostatic sensitive components on it. Appropriate anti-static measures should be observed when handling the board. For example, you should never sit the controller on carpet, and you should avoid touching components on the controller unnecessarily.

Installation

4.1 – Supplying Power

Power to the controller is applied via the power bank screw terminal connector, located on the lefthand edge of the board, as shown in Figure 1 below. It is clearly marked on the PCB with its polarity.

Likewise, power to the receiver board is applied via the large screw terminal connector on the left hand edge of the board labelled 'Power In'. It is also clearly marked with polarity.

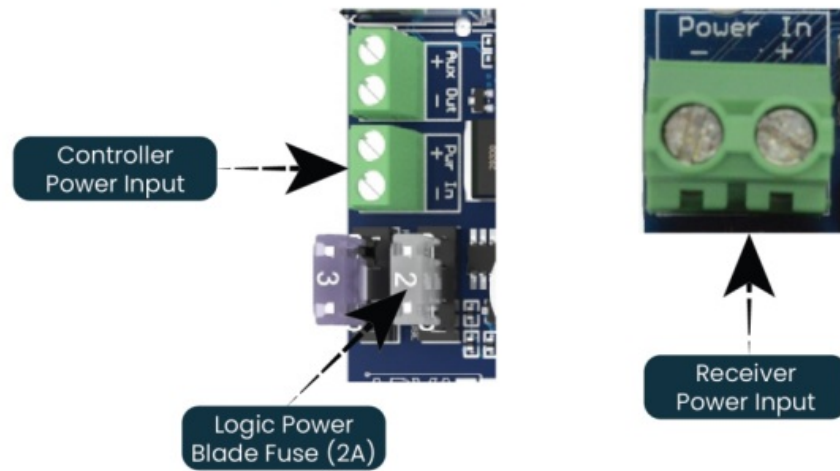
The PixLite 16 Long Range Mk2 transmitter control board requires a voltage of between 5V-24Vdc and a max input current of 1.5A @ 5V.

The Long Range receiver is the board that actually powers the lights and thus requires an appropriate power supply. Voltage to the power input is recommended to be between 5V and 12Vdc . The receiver will operate up to 24Vdc, however attention should be paid to cooling the controller when operating above 12V.

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 total maximum current through the receiver is 15A.

Figure 1: Location of Power Input



4.2 – Receiver Output Fuses

Each individual output is protected by a mini blade fuse. The PixLite 16 Long Range Mk2 receiver comes with 7.5A 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 15A.

4.3 – Transmitter Logic Power

Logic Power is automatically regulated from the power input. Simply connect your power supply of between 5V and 24Vdc to the power screw terminal. The logic circuitry is protected by a 2A mini blade fuse.

4.4 – Control Data

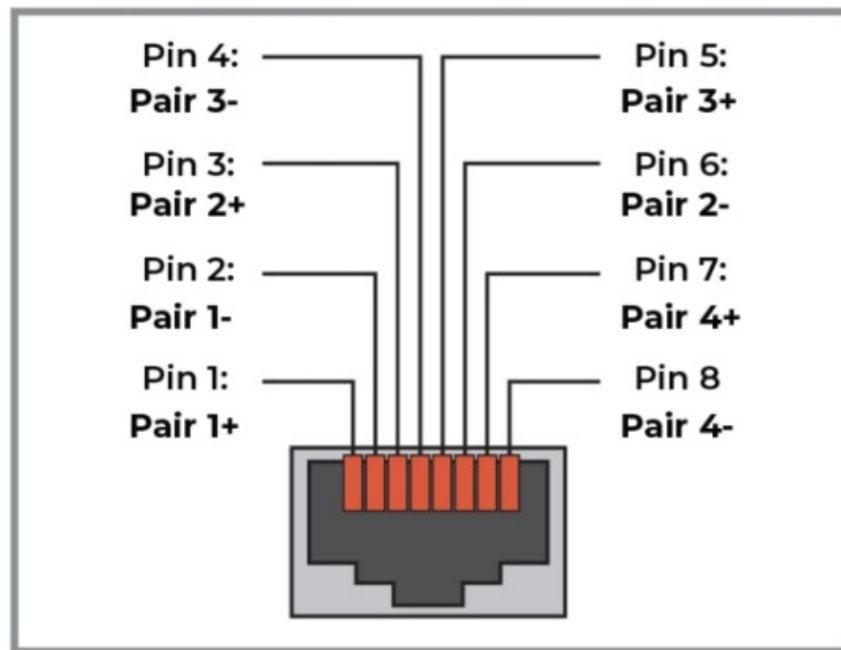
Ethernet data is connected via a standard network cable into the RJ45 Ethernet jack located on the left-hand side of the unit. The controller supports Streaming ACN (sACN / E1.31) or Art-Net data.

4.5 – Data Outputs

The receiver board outputs (RJ45 jacks) are located along the bottom edge of the control board.

There are 8 in total – each one containing 4 differential pairs. The pin-out of the RJ45 jack is shown below. It is not important to understand this diagram for most users, you simply use a standard network cable to connect the transmitter and receiver boards.

Figure 2: Data RJ45 Pinout

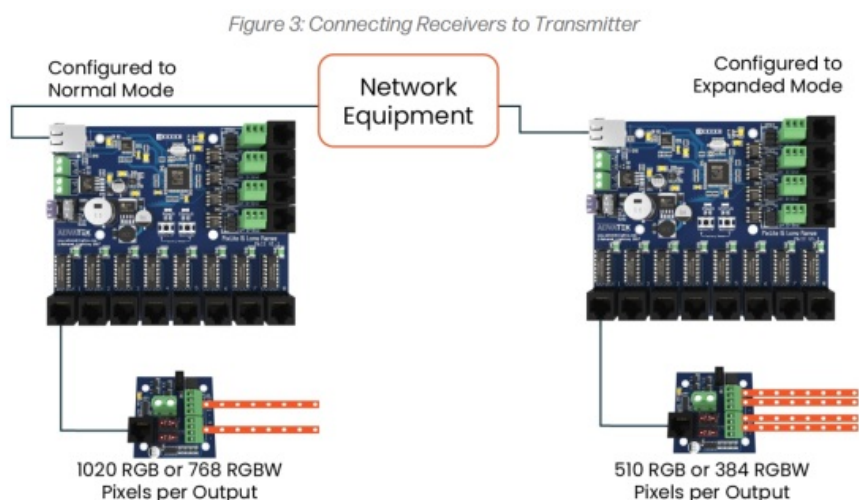


4.6 – Connecting the Transmitter to Receivers

4.6.1 – Basic Connections

Receivers are connected to the transmitter via the RJ45 jacks along the bottom edge of the control board. Each jack is labelled with its output number 1-8. These ports are not network ports, and should not be connected to any networking equipment. They are specifically designed to connect a PixLite transmitter with a PixLite receiver. For this reason, the standard network cable you use can be safely used in excess of 300m.

A typical setup is shown in Figure 3 below, which also shows how many pixels can be run off each output.



4.7 – Connecting Pixel LEDs

The pixel lights are connected directly via the 2 pluggable screw terminal connectors on

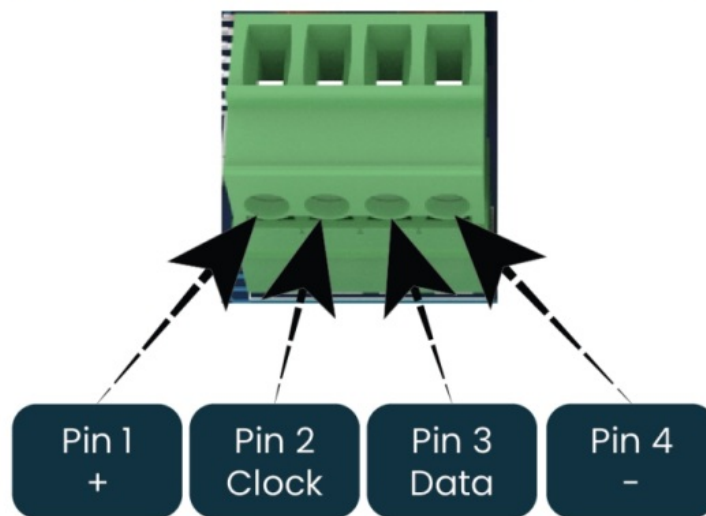
the receivers. Each connector is labelled with its output channel number (1-2) and pin 1 is also clearly marked . Simply wire your lights into each screw terminal and then plug them into the mating sockets.

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: Pixel Output Pinout - Expanded Mode Disabled



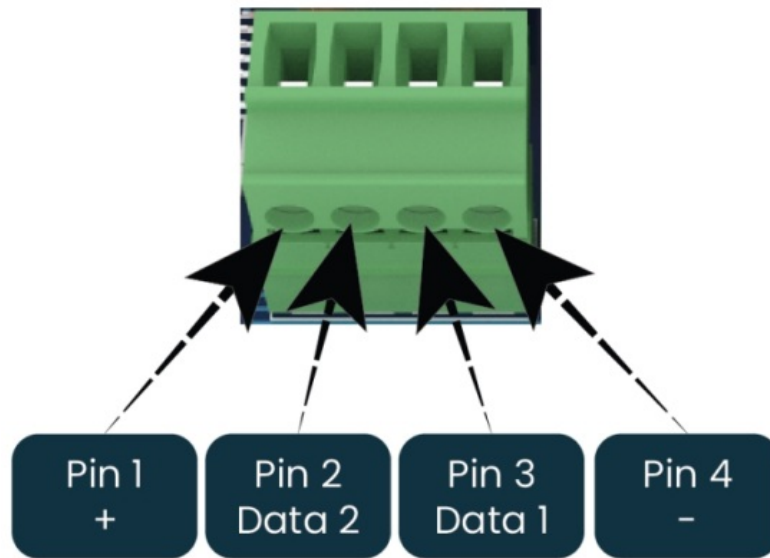
4.8 – Expanded Mode

If your pixels only use a single data line, you may optionally activate expanded mode on the controller. If using the PixLite 16 Long Range Mk2 with a PixLite T16X-S Mk3, expanded mode must be used, meaning that pixels can only use a single data line. The clock pins are not connected, as per the pinout below. In expanded mode, the clock signals are re-purposed for data signals instead. This means the controller effectively has twice as many pixel outputs (32), but half as many pixels per output can be run.

Expanded mode can help increase flexibility in a system as there are more outputs available. It can also assist by spreading out the number of controlled pixels across more outputs, which can help achieve higher refresh rates if clocked pixels aren't being used.

The pinout for expanded mode is shown in Figure 5 below.

Figure 5: Expanded Mode Pixel Output Pinout



Network Configuration

5.1 – Network Layout

Figure 6: Network Layout using a Server and Switch

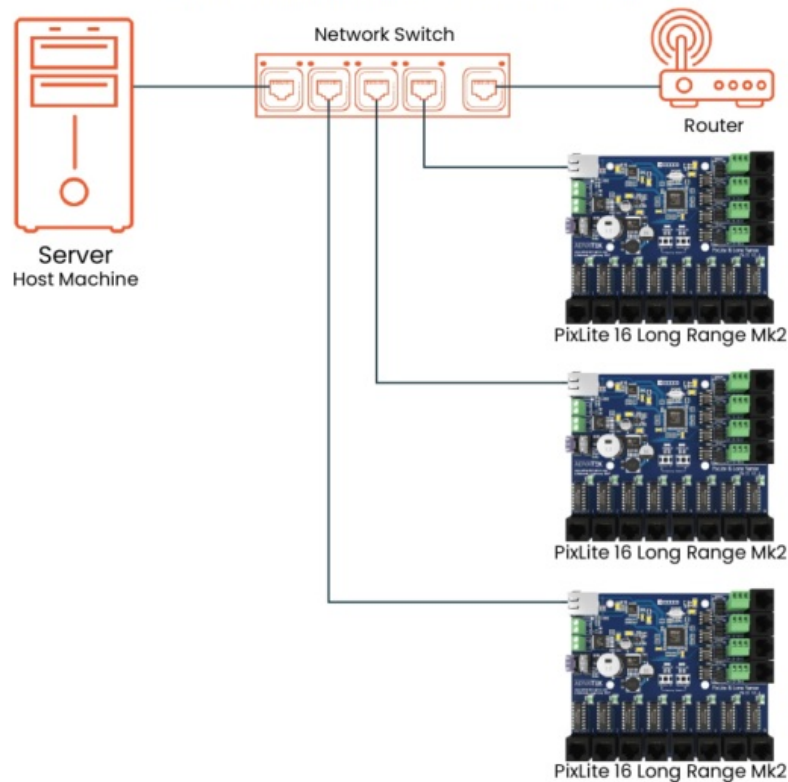


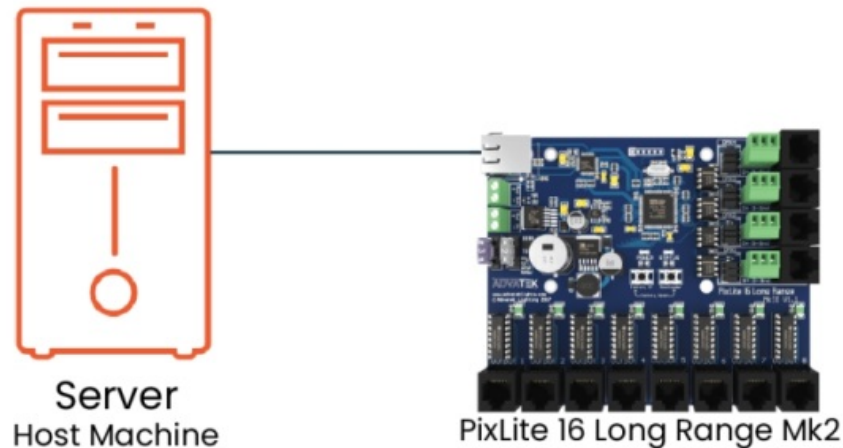
Figure 6 shows a typical network topology for the PixLite 16 Long Range Mk2 controller(s) LAN.

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



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.

5.2 – IP Addressing

5.2.1 – 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.

5.2.2 – Using a Switch/Direct

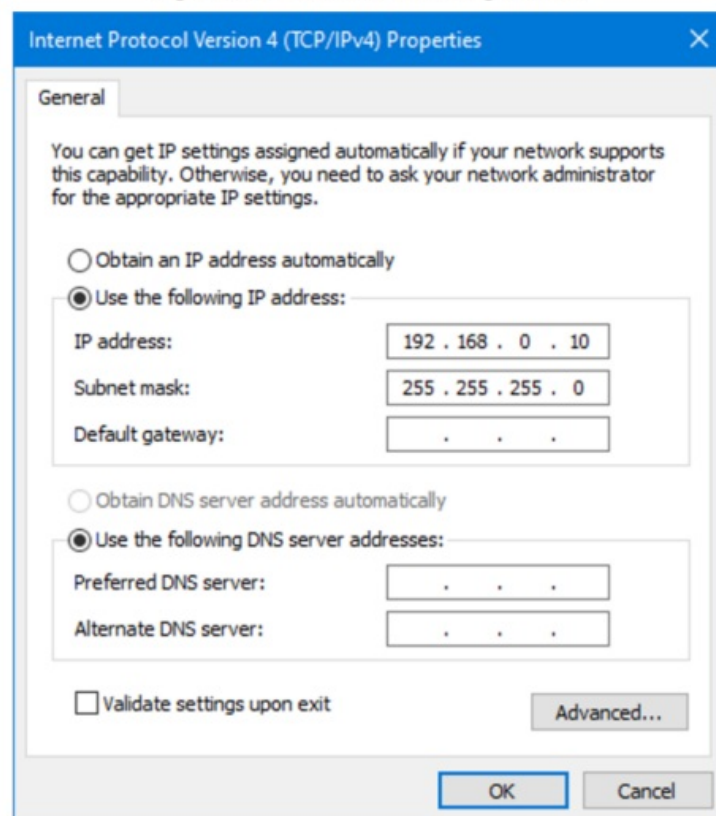
It may be necessary to connect the controller to a network without a DHCP server or even directly to the host machine instead of using a router. In this case (for first time configuration) you will need to ensure that the network adapter of your computer is set in the IP range that the controller will 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 8 shows a screenshot of typical computer network settings to communicate with a PixLite 16 Long Range Mk2 controller for the first time without a router.

Figure 8: PC Network Configuration



5.2.3 – 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. Hold down the "Factory IP" button on the PCB and power up the controller
2. 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.

Operation

6.1 – Start-up

Upon applying power, the controller will quickly begin outputting data to the receivers, 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, on the controller 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 receivers.

6.2 – 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.

6.3 – Outputs

6.3.1 – Pixel Outputs

Each of the 8 controller RJ45 output jacks can drive up to 12 universes of data. This allows for a total of up to 96 universes to be driven out of the one controller (in addition to 4 DMX512 Universe outputs).

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.

6.3.2 – DMX512 Outputs

The PixLite 16 Long Range Mk2 provides 4 DMX512 outputs which can be accessed either by pluggable screw terminal connectors or by RJ45 jacks. The hardware layer on which the DMX512 protocol operates is the RS485 electrical communications standard. This is a differential transmission system consisting of a two-wire differential signal pair and a ground connection.

Ideally the differential signals should be wired into a twisted pair cable. The D+, D- and ground connections are clearly labelled on the PCB for the screw terminal connectors.

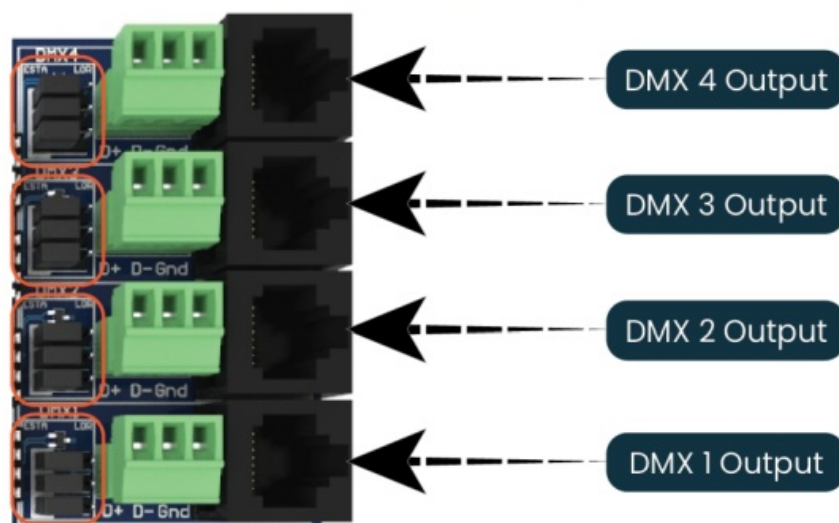
These outputs act as individual DMX512 universe outputs, effectively providing the user with an E1.31 or Art-Net to 4 x DMX512 bridge (in addition to the normal pixel outputs).

DMX512 signal data is also connected via the four vertical RJ45 sockets. On-board jumper links (circled in Figure 9 below) allow each RJ45 DMX output to use either the 'ESTA' wiring or the 'LOR' wiring configuration. (All controllers are shipped with the links in the 'ESTA' configuration.)

Note: DMX outputs are not electrically isolated.

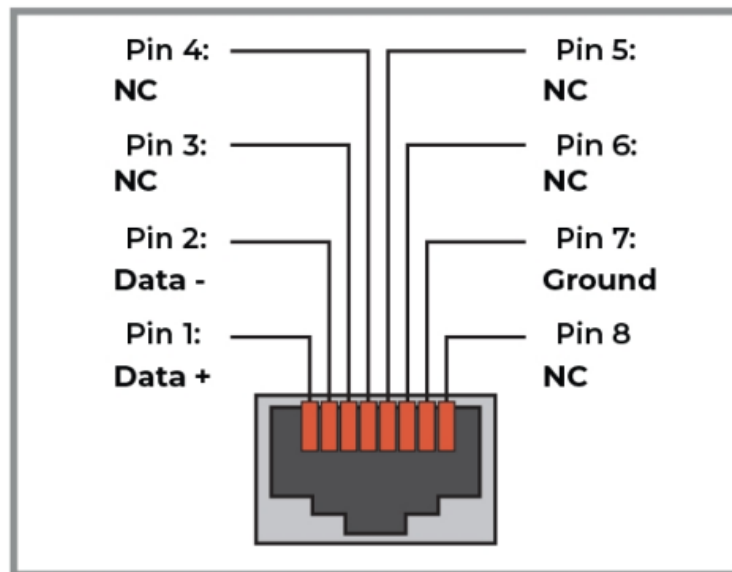
All these connectors and jumper links are located on the far right-hand edge of the controller as shown in Figure 9 below.

Figure 9: Location of DMX Outputs



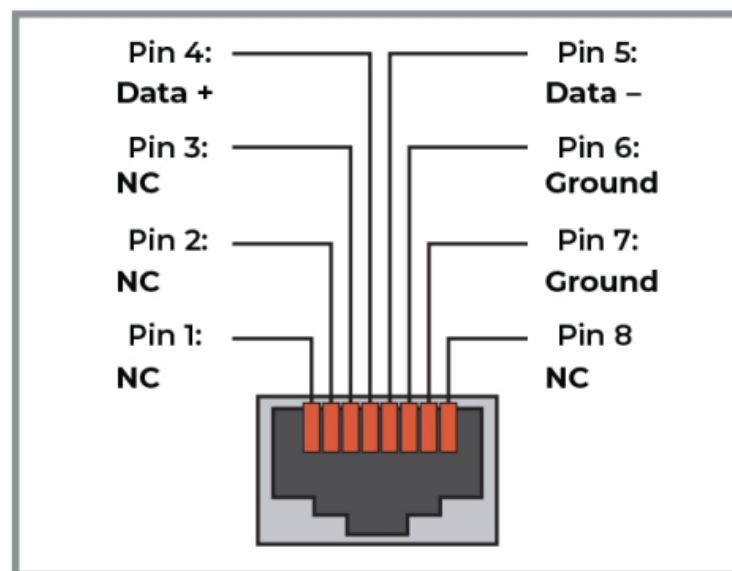
Below is the RJ45 socket pin-out for the DMX connectors when the “ESTA” wiring is selected:

Figure 10: ESTA Pinout



Below is the RJ45 socket pin-out for the DMX connectors when the “LOR” wiring is selected:

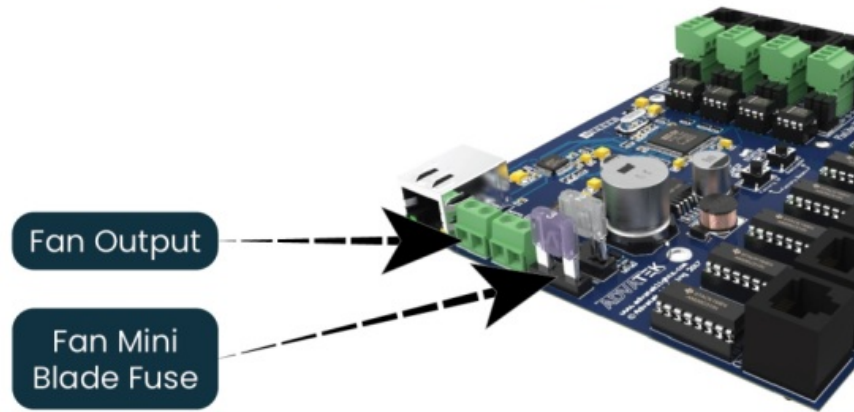
Figure 11: LOR Pinout



6.3.3 – Fan Output

The controller features an auxiliary fan output that can power an external fan(s) for cooling the enclosure that the controller is mounted in, as shown in Figure 12 below. This feature is useful in order to keep the temperature regulated when you mount the controller and a high wattage power supply together in a small, confined space.

Figure 12: Location of Fan Output



The output voltage of the fan output is the same as the input voltage. So, to run a 12V fan for example, you would need to use a 12V input voltage. The fan output can supply up to 15W of continuous output power and is PWM controlled. The output is protected by a 3A mini-blade fuse.







Basic operation is as follows: In the Advatek Assistant, the user can set a target temperature that the enclosure will ideally not exceed. The controller will then automatically adjust the fan speed based on the current temperature as measured by the controller's on-board temperature sensor.

For example, if the target temperature is set at 30°C then sometime before that temperature, the controller will turn the fan on and slowly ramp up the speed until it reaches 100% if required, in an attempt to maintain the temperature either at or below 30°C. If the temperature decreases the fan will slow down. The controller will attempt to keep the temperature below the set point. If the detected temperature reaches the set temperature, the fan output will be on 100% at this point.

6.4 – 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, 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 and any enabled DMX512 outputs simultaneously. 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 Long Range 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.advateklighting.com/downloads

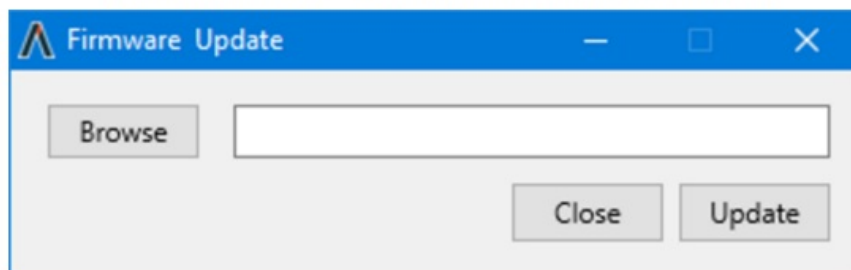
The downloaded file will be archived in a ".zip" format, which should be extracted. The ".hex" file is the file that the controller needs.

7.1 – 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 13 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 13: Firmware Update in the Advatek Assistant



7.2 – 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 7.1 fails.

1. Power down the controller 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 13 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. The controller should now be operating with the new firmware.

Specifications

8.1 – Operating Specifications

The table below specifies the recommended operating conditions for a PixLite 16 Long Range Mk2 controller.

Parameter	Value/Range	Units
Transmitter Input Voltage Range	5-24	V DC
Recommended Receiver Voltage Range	5-12	V DC
Absolute Max Receiver Voltage ¹	24	V DC
Max Current Per Receiver	15	A
Max Logic Current Consumption @ 5V	1200	mA
Fan Output Max Power	15	W
Recommended Ambient Temperature ²	-20 to +50	°C
Absolute Maximum Temperature of PCB Components	-40 to +80	°C
Maximum Current Per Receiver Pixel Output	7.5	A

1. Active cooling is highly recommended.
2. 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.

8.2 – Mechanical Specifications

The control board (Figure 14) and receiver board (Figure 15) dimensions and locations of all mounting holes are shown below.

Figure 14: Controller Mechanical Specifications

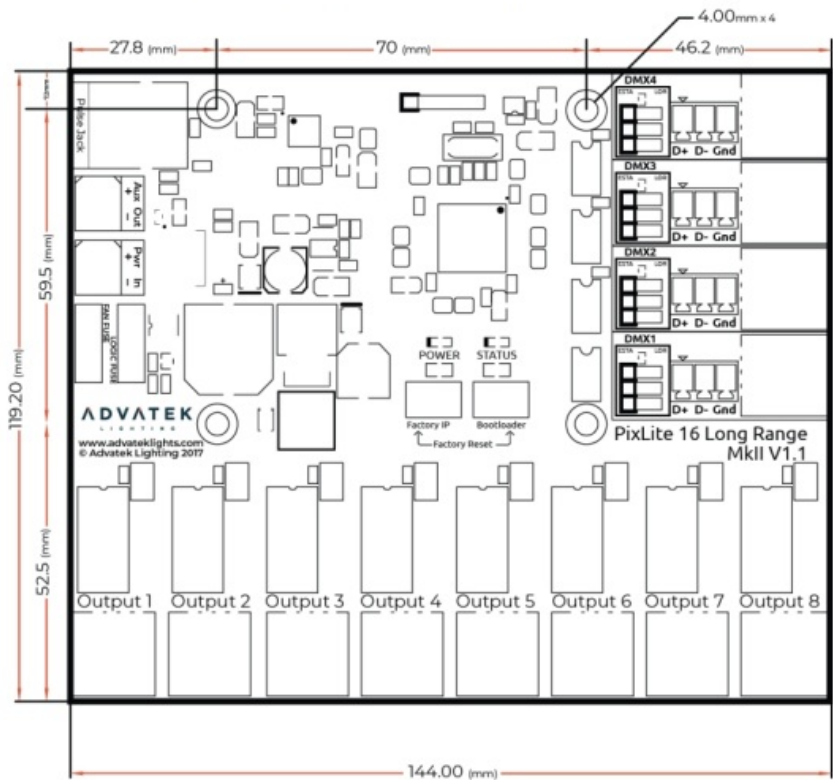
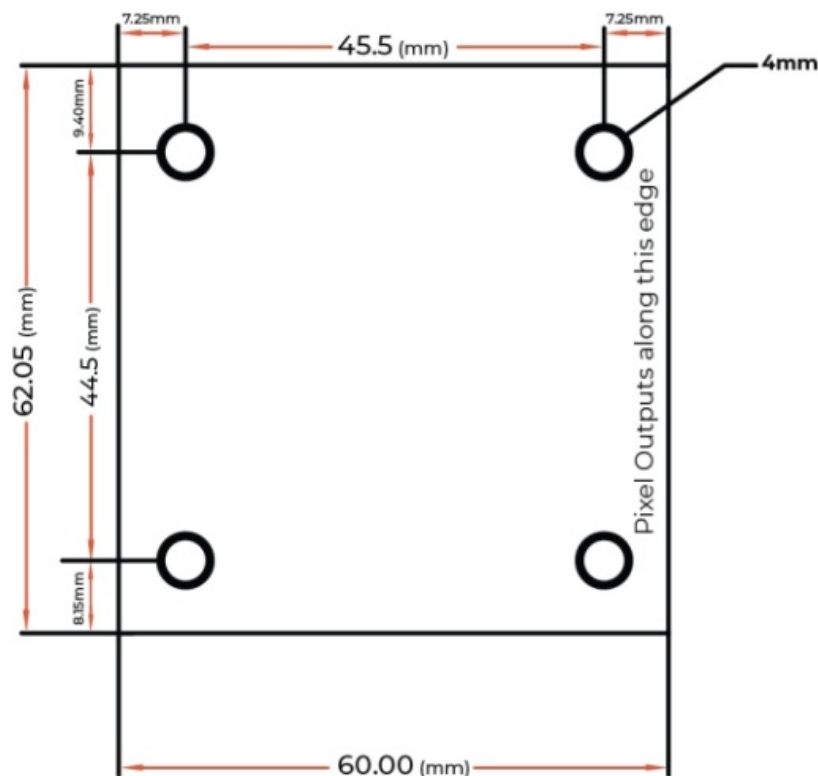


Figure 15: Receiver Mechanical Specifications



Troubleshooting

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

9.1 – 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

9.2 – No Power/Status LEDs

Ensure that your power supply is supplying correct voltage as per Section 4.1.

Additionally, ensure that it can supply enough current to drive the lights that are connected. You should also try disconnecting the pixel outputs and see if the controller then turns on. If the supplied power is correct, try performing a recovery firmware update as per Section 7.2.

9.3 – No Pixel Control

Check that the correct pixel IC type has been configured. Also check the physical wiring and pinout of the pixels, as well as the output fuses on the receiver.

9.4 – 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 information, and industry advice, you can refer to our online guides here:

www.advateklighting.com/blog/guides

You'll find information on management and configuration of the device in the PixLite Configuration Guide: www.advateklighting.com/downloads/user-manuals/pixlite-configuration-guide

For any other questions, you can reach out to our support team at the link below:

www.advateklighting.com/contact
support@advateklighting.com

9.5 – Reset to Factory Defaults

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

1. Power down the controller.
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. 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 Long Range Mk2 controller and receivers are supplied with a 3-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

U1, 3-5 Gilda Court


Mulgrave, 3170

VIC, AUSTRALIA

www.advateklighting.com

PixLite 16 Long Range Mk2 User Manual V20250606

Documents / Resources

	ADVATEK PixLite 16 Long Range Mk2 Pixel Controller [pdf] User Manual Hardware Rev 1.0, Hardware Rev 1.1, PixLite 16 Long Range Mk2 Pixel Controller, PixLite 16 Long Range Mk2, Pixel Controller, Controller
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References

- [User Manual](#)

ADVATEK

ADVATEK, controller, Hardware Rev 1.0, Hardware Rev 1.1, Pixel Controller, PixLite 16 Long Range Mk2, PixLite 16 Long Range Mk2 Pixel Controller

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