



PixNet MkII

User Manual

V1.0



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1 – Introduction

This user manual is for the PixNet MkII unit.

The PixNet MkII controller converts the E1.31 (sACN) or Art-net protocols from a lighting console, media server or computer lighting software into various other data protocols and outputs that data in real time to control pixel lighting fixtures. The PixNet MkII features an output capacity of up to 24 universes of multicast/unicast E1.31 data or Art-net data. It can output an additional universe of DMX512 outputs in sACN/E1.31 mode, bringing the total E1.31 universes up to 25. This combined with an advanced feature-set and very easy to use configuration software make the PixNet MkII an excellent choice for your pixel lighting application. Note that this manual covers the PixNet MkII controller with hardware revision V1.0 only. It only contains information specific to this unit, not the software configuration of PixNet controllers in general which can be found in the 'PixNet Configuration Guide'.

2 – safety notes

2.1 Static Electricity

The internal workings of the PixNet MkII is static sensitive, we advise you do not open the unit or touch any of the components inside.

2.2 Power Supply

The PixNet MkII can be powered using the provided plug top power supply and can be from 5V to 24V, power will not pass through to your pixels they will require independent power.

3 – Installation

3.1 Control Data

Control data to the PixNet MkII is achieved via the ethernet port on the front of the unit, the controller supports Streaming CAN (sACN / E1.31) or Art-Net data.

3.2 Installing the pixels

LED Pixels can be connected to the PixNet MkII via the phoenix connector screw terminals on the back of the unit, the connectors are labelled 1 – 4 and the pin out is listed on the back of the unit for reference. The pin out for normal mode is shown below.

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11	Pin 12
CLK	DAT 1	GND	CLK 2	DAT 2	GND	CLK 3	DAT 3	GND	CLK 4	DAT 4	GND

3.3 Expanded Mode

If your pixels do not use a clock line, you may activate the expanded mode on the controller.

In expanded mode the clock lines are used as a second data line, this means the controller has 8 outputs 2 outputs per connector.

This does mean that the number of pixels is halved per output so a total of 510 RGB pixels per output.

The advantages of using this mode means the refresh rates are improved, this is good for pixels that do not use a clock line as generally they are slower.

The pin out for expanded mode is shown below.

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11	Pin 12
DAT 1	DAT 2	GND	DAT 3	DAT 4	GND	DAT 5	DAT 6	GND	DAT 7	DAT 8	GND

4.0 – Network Configuration

4.1 Network Layout

Server/Host Machine > Router > Switch > PixNet MkII

Note: PixNet's can also be directly plugged into the router.

The above diagram shows a typical installation of a single PixNet MkII, multiple PixNet's can be plugged into the switch or router and will be detected by your system.

For large installations where 50 or more cards are used its beneficial to have IGMP snooping enabled in your switch and router.

For single use PixNet's you can directly plug the unit into a machines network adapter.

4.2 IP Addressing

4.2.1 Using a router

Routers have a DHCP server built inside, this means they decide and tell devices what IP and subnet mask to use if asked.

DHCP is enabled by default in all PixNet MkII controllers so it can immediately connect to a network using a router with DHCP enabled.

If DHCP mode is enabled, both LEDs will flash together until the controller receives an IP address, at which point the power LED will remain on solid and the status LED will flash slowly indicating it is in run mode and ready for use.

If a static IP address is assigned to the board, then the power LED will be solid from power up. If a DHCP timeout occurs the power LED will stop flashing and go solid also.

4.2.2 Using a switch/direct

It may be desirable to connect the controller directly to a switch 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 you 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.

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

If you want to connect the PixNet MkII directly to a PC then in addition to setting the computer's IP range as specified above, you may also need to use a crossover network cable as opposed to a straight-through cable.

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 Assistant, it can be forced to its default IP. A simple procedure can be employed on power up:

1. Hold down the "Status" button and power up the board
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 setup your PC's network settings to find the controller at this IP and change the IP settings to what you prefer. After changing the settings or if you power the controller off and on again, the controller will revert to using the saved settings.

5 - Operation

5.1 Startup

Upon applying power, if you already have pixels connected they may flash very briefly and then immediately turn off as the controller takes control of the pixels. If no data is being sent to the controller, then the pixels will remain turned off until valid data is received. During normal operation the green power LED will remain on solid and the status LED will flash slowly to indicate the controller is connected to a valid network and is ready to run. If the pixels are not controllable then make sure you have selected the correct pixel IC type in the Assistant config under the 'LEDs' tab. If no incoming data is received for a period of time, the pixels will be turned off automatically unless that option has been disabled in your configuration.

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.

5.3 Outputs

5.3.1 Pixel Outputs

Each of the 4 outputs can drive up to 1,020 individual RGB pixels, or 765 RGBW pixels (6 DMX Universes of data). This allows for a total of 4,080 pixels to be driven out of the one controller (in addition to 1 DMX512 Universe output.) In expanded mode this limit is halved but the number of outputs is doubled, equaling the same number of total pixels. Driving a full 1,020 pixels out of a single output would also likely require power injection. How much power you need to inject and how often will typically vary depending on the number of pixels used, their voltage and their individual power consumption. The refresh rate of the pixels will depend on the operating frequency of the specific pixel chip type. Higher speed chips will result in higher refresh rates. PIXELS WITH NO CLOCK LINE ARE SLOW. The refresh rates on these pixels is unavoidably slower than clocked pixels.

5.3.2 DMX512 Output

The PixNet MkII has a DMX output on the front of the unit via an XLR connector.

This output acts as an individual DMX512 universe output, effectively providing the user with an E1.31 to DMX512 bridge (in addition to the normal pixel outputs). These do not convert Art-net data to DMX, only sACN (E1.31).

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, press and hold the 'Status' button for 3 seconds (after the controller is already running.) The controller will then enter the test pattern mode and will display red, green, blue and white sequentially in a repeating pattern on all pixels on each of the 4 outputs. Pressing the button while in this mode will then cycle through each of the four colours successively (on all outputs simultaneously) before returning to the current pattern again. To exit the test mode press and hold the 'Power' 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 configuration. 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 Upgrades

The controller is capable of firmware updates, the firmware updates add security updates and bug fixes, we do not release these on our website as they can go wrong, for support on this speak to your dealer.

6.1 Physical Setup

To perform a firmware update, connect your PixNet MkII to a computer and use the assistant.

6.2 Performing an update

1. Open the PixNet 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 "Upgrade Firmware" button and click on it. A "firmware update" window will appear (as shown in Figure 8).
3. Click "browse" to locate the firmware file you wish to download.
4. Click on the "update" button.
5. Once the download is complete, a message box will pop up saying it has completed successfully.
6. The controller will automatically reboot itself and then start running the new firmware application immediately.

7. The settings will be kept from before. If there is something wrong with the upgraded firmware, repeat the process again if it is still visible in the Assistant. Otherwise, refer to the troubleshooting section for further information.

6.3 Performing a “Forced Boot” update

1. Power down the controller.
2. Hold down the “Power” button.
3. 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 upgrade. The bootloader will default to an IP address of 192.168.0.50 so you must ensure you are running it on a network in the same address range as this IP address (eg. 192.168.0.10).
4. Using the 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 8.
5. Click browse to locate the firmware file.
6. Click on the “update” button.
7. Once the download is complete, a message box will pop up saying it has completed successfully.
8. The controller will automatically reboot itself and then start running the new firmware application immediately.
9. The settings will be kept from before.

If you have performed a forced update and there are still problems, then you should try a factory reset as described in section below. This will reset all settings back to the factory default ones after you’ve updated already to the latest firmware.

7 – Troubleshooting

7.1 LED Codes

Generally, controller status troubleshooting requires looking at the status and power LEDs on the controller. Please refer to the table below for condition codes for the onboard status and power LEDs.

POWER LED (GREEN)	STATUS LED (RED)	CONDITION
Solid	Flashing	Normal Operation, OK
Solid	Slow Flashing	Test Mode Running
Flashing Together	Flashing Together	DHCP Looking for IP
Solid	Solid	Main Application Not Running
Solid	Off	Main Application Not Running
Off	Solid	Main Application Not Running
Alternat 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	Rapid Flashing	Connected OK, Data OK
Solid	Off	Connected OK, Data None
Off	Off	No Link / No Power

8.2 No Status/Power LEDs On

Ensure the unit is plugged in and you are using the provided power supply.

8.3 No Pixel Control

Check that the correct pixel IC type has been selected in the dropdown box in the Assistant config under the 'LEDs' tab. Also check the physical wiring and pinout of the pixels.

8.4 Reset to Factory Defaults

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

1. Hold down the "Power" button AND the "Status" buttons together before applying power.
2. Power up the board.
3. Wait for both LEDs to flash together.
4. Release both buttons.
5. Power cycle (turn power off, wait 5 seconds then turn it on again)

9 – Warranty and Service

PixNet Units have a guarantee this can be used by contacting you dealer.

For support contact you dealer.