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1 Introduction

Note: This document details management of PX24 and MX96PRO devices only.

PX24 and MX96PRO devices can be fully managed and configured via the web management Interface. The easiest way to access this interface is via LED CTRL, which allows for discovery and management of multiple devices in the one interface. By configuring the devices via LED CTRL using drag and drop patching of fixtures you can be assured that the software and hardware align without needing to open the web management interface. For information on configuration from within LED CTRL please refer to the LED CTRL User Guide available here: https://ledctrl-user-guide.document360.io/

Alternatively, the interface can be opened via any modern web browser by typing the device's IP address into the URL navigation bar. This allows for configuration of PX and MX devices from any device that has access to a web browser. Up to two clients can connect to the web management Interface at any one time.

Each page will dynamically adjust, based on the characteristics and running state of the device that is being managed. Live monitoring of the device is made possible by dynamic adjustments to monitoring pages, to represent real-time information about the device's operation, including advanced diagnostic information and statistics, such as incoming and outgoing frame rates, Ethernet packet statistics, universe data statistics and more.

This guide will step through every aspect of the web management Interface for PX24 and MX96PRO devices. Other resources, including device-specific user manuals, and latest firmware can be downloaded from here: www.ledctrl.sg/downloads

1.1 Control Dashboard

The Dashboard built into the Web Management Interface allows PX24 or MX96PROs to independently drive light shows without a computer or any source of live data.

The Dashboard allows users to record and play back pixel shows from the devices using the inbuilt microSD slot. Design your own breathtaking pixel shows, record them directly onto the microSD card and play them back as many times as you wish.

The Dashboard also unlocks the ability to create up to 25 powerful triggers and use advanced intensity controls to enable true standalone behaviour and enhance live environments.

Experience a new level of control with the dual-user login feature and a dedicated Operator Dashboard. Now, operators can access real-time playback and device control through the Dashboard, amplifying the flexibility of the LED CTRL controllers.

Section 4 of this document explains how to use the Dashboard.

2 Connection and Login

LED CTRL PX24/MX96 firmware includes a built in web application that is directly accessible and used for access to all configuration and management functions of the PX/MX devices themselves. This means that the application can be used with or without a connection to the internet. This application is called the Web Management Interface.

To discover and open the Web Management Interface from LED CTRL follow the instructions in the device specific Quick Start Guide (available from here: https://ledctrl.sg/downloads/).

Alternatively, the Web Management Interface can also be accessed in any web browser, by typing in the device's IP address into the URL bar.

Note: AutoIP / DHCP is enabled by default on all PX/MX devices, so the easiest method for first-time connection is via LED CTRL.

2.1 Login and Logout

When the Web Management Interface is opened, it will display a login screen and the option to login as Administrator or Operator. The user will be prompted for a password if required, as shown in Figure 1 below.

Note: If the password has been forgotten, then the device can be reset to factory defaults. See the relevant product user manual for specific instructions on this.

To logout of an active session, simply click the "Logout" button in the navigation sidebar. This will return the session to the Login screen.

Figure 1 – Web Management Interface Login Screen

3 Management Interface Workflow

The Web Management Interface is designed to provide flexibility during configuration whilst reducing the time and effort required. To take full advantage of the design, an understanding of the following workflow is required.

3.1 Management Interface Layout

The Management Interface has several locations where information can be found.

The navigation sidebar is filled with menu items that each represent a page. It can be collapsed to only show the page icons if more space is required for the main page area. When in mobile view, this sidebar is collapsed into a hamburger menu.

The upper bar shows the device's model name and nickname. There is also a button to view messages, and a button to switch between dark and light viewing modes.

The main area that occupies the screen is filled with information specific to the page that has been selected. Any messages that need to be communicated to the user will be displayed at the upper right-hand corner of this area.

An example message is shown in Figure 2 below and the list of messages that can be found by clicking the Messages icon in the upper bar is shown in Figure 3 below.

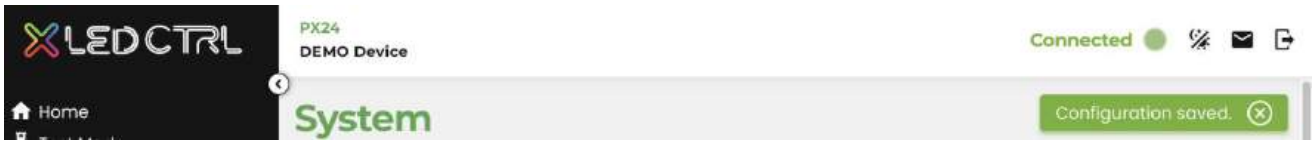

Figure 2 – A Success Message

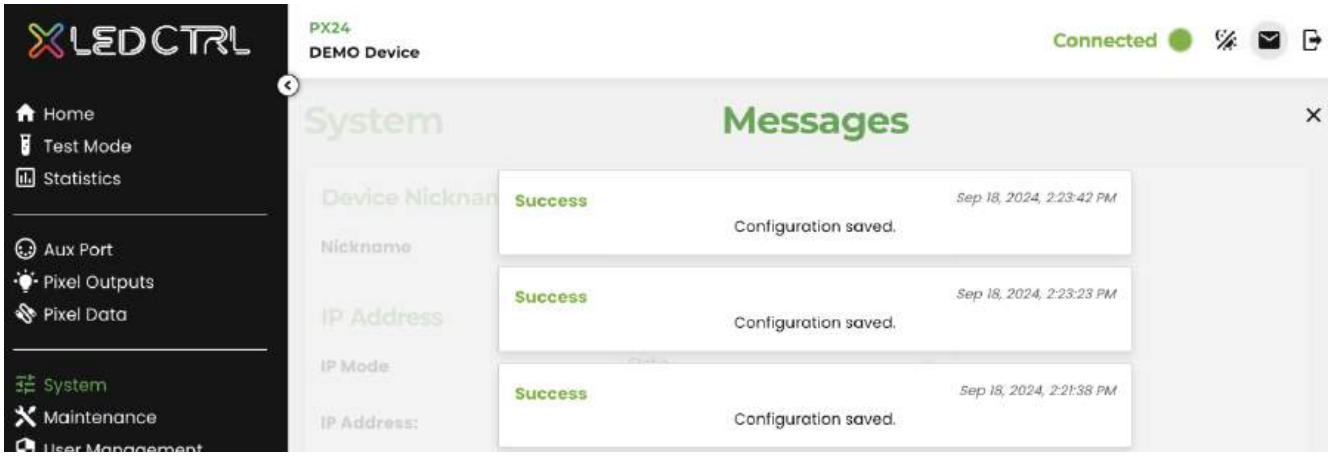

Figure 3 - List of all Messages

3.2 Apply a Configuration

Any changes that are made on a page will not take effect unless they are applied to the running configuration, which is the configuration currently being used to operate. It may be different to the saved configuration, which is advantageous when making changes that may need to be undone.

Once you have finished making changes on any page, click the "Apply" button to update the running configuration of the device and the changes will be immediately implemented. "Apply & Save" can also be used and is explained in Section 3.4 below.

Note: If configuration changes are made on a page, and that page is navigated away from without pressing "Apply", then the changes will be lost.

3.3 Save/Revert a Configuration

When changes are only applied to the running configuration, these will not be transferred to the saved configuration. The saved configuration is all the settings that the device boots up with on start-up. This means that if the device is power cycled, or if the Reset button is pressed, any unsaved configuration changes that have only been made to the running configuration will be lost. For this reason, a flashing "Save" button will be made visible in the upper bar, as shown in Figure 4 below.

Figure 4 - Unsaved Changes Button

Click the Save button to select one of two options, as shown in Figure 5 below:

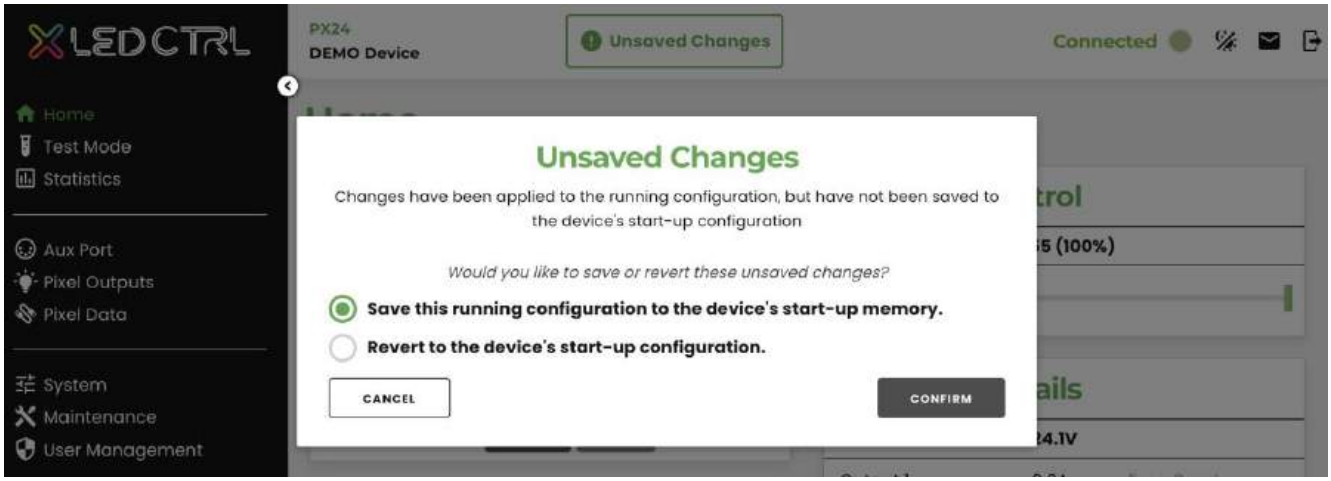

Figure 5 - Save and Revert Options

3.4 Apply and Save

If you are sure about a configuration change, the "Apply & Save" button may speed up the configuration process. When this button is clicked, all configuration changes will be applied to the running configuration and saved to the start-up configuration.

Note: This action saves all running configuration changes, including any other changes that have been applied to the running configuration and not saved.

4 Dashboard for local recorded scene management/playback

The Dashboard built into the PX24/MX96PRO allows the devices to record live data as scenes, organise scenes into playlists, and create triggers to enable true standalone behaviour and enhance functionality within a live environment.

A microSD card is required for most functionality, up to 2TB in size. If the card is not already formatted as FAT32, then it can be formatted on the SD Card page.

The Dashboard gives control over playback and mode selection of the device. Elements of the Dashboard can be rearranged and enabled/disabled, and a custom logo can even be uploaded to create a flexible and customizable dashboard for quick and easy control.

When paired with the Operator user, the Dashboard creates a restricted controlling interface for operators to access Dashboard features, whilst not having access to configuration and management abilities. See more on the Operator user in Section 13.

The Dashboard includes the following elements:

Element	Description
Intensity	Slider(s) to adjust the Programmed Intensity.
Playback	Playback details and controls.
Mode	View the mode, and change to various modes.
Scenes	Select a scene to begin playback (looping forever).

Playlists	Select a playlist to begin playback (looping forever).
Colour Palette	Playback one of 12 customizable static colours to all outputs.
Colour Picker	Playback any static colour with the wheel or sliders to all outputs.

Additional ability: Set fade time. This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%. This default fade time will be used for all relevant actions within the Dashboard.

Configuring the Dashboard is shown in Figure 6, and an example Dashboard that could be created is shown in Figure 7 below.

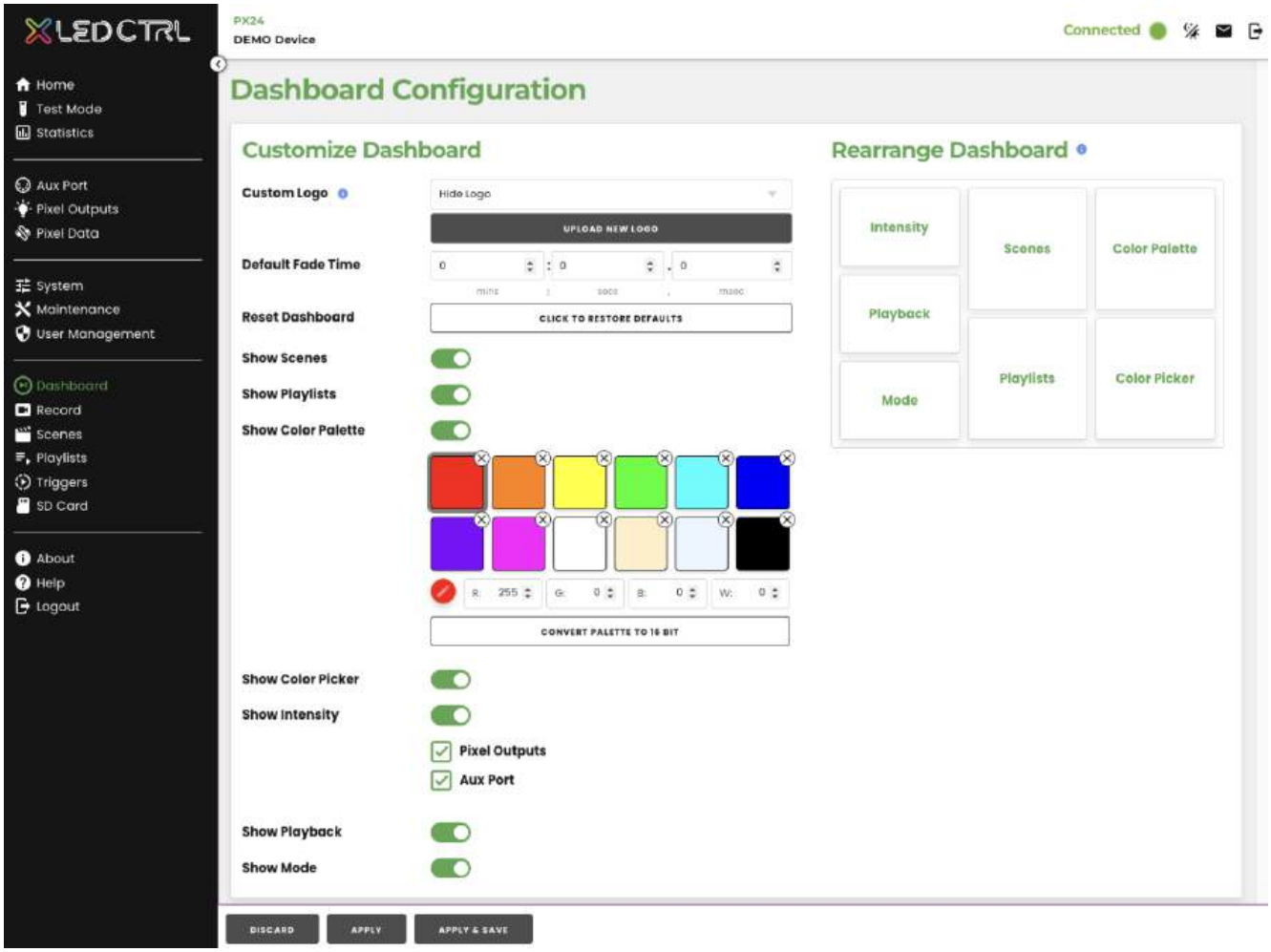

Figure 6 - Customising the Dashboard

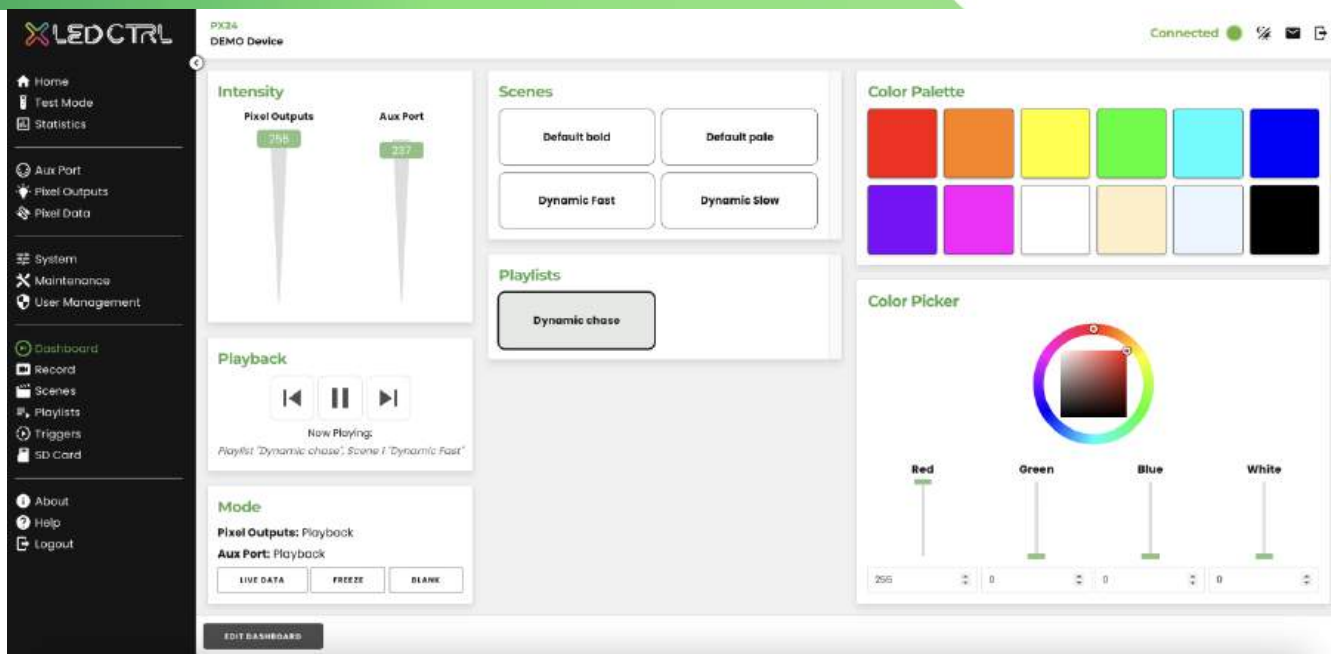

Figure 7 - Default Dashboard

4.1 Record Page

Scenes are created to capture live data for later playback. Each scene file may have a different number of recorded universes, pixel ports and/or Aux ports, depending on how it was recorded. Scenes are the building blocks of creating a show within the Dashboard, so it is important to understand how to accurately record a scene.

There are various methods for recording a scene. The simplest approach is via the Record page in the Web Management Interface. This page is shown in Figure 8 below.

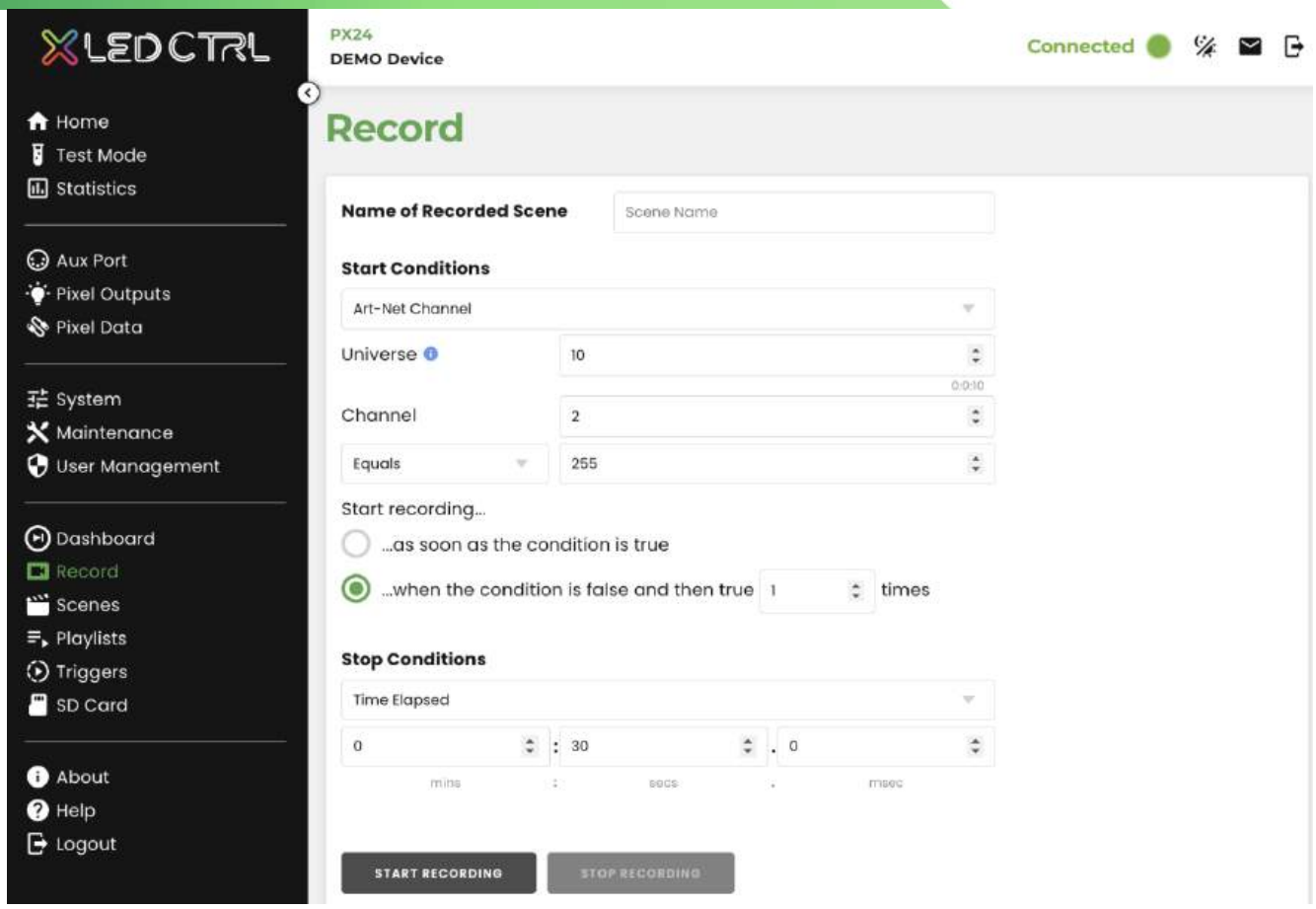

Figure 8 - Record Page of the Management Interface

To begin recording, simply click "Start Recording", and the device will automatically begin recording live data. To end the recording, click "Stop Recording". Scenes can be given a name when recording, to help differentiate scenes. If omitted, then the scene will be automatically named, EG "Auto-00001".

Scenes are recorded at the same frame rate as the incoming data source. It does not matter if the live data source has a fixed or variable frame rate; the controller will attempt to match the source frame rate when recording the scene file.

4.1.1 – Start Conditions

Start Conditions can be used to specify a condition that must be met, in order for the recording to start. When "Start Recording" has been clicked, the device will enter a state where it is waiting for the Start Condition to be met. When it is met, the recording will begin. This is useful for starting the recording on a specific frame.

Select an sACN / Art-Net / DMX512 channel, and specify a pattern (EG: Equals 255) that the channel must meet for the recording to begin. Also select whether to start recording as soon as the condition is true, or when the condition is false and then true a certain number of times. This may be useful when recording a looping effect if the initial state of the condition is unknown.

Alternatively, use the condition On Data Change, which will only start recording when the incoming data changes in value.

4.1.2 - Stop Conditions

Stop Conditions can be used to specify when to stop the recording. The recording will automatically stop when the Stop Condition has been met. This is useful for stopping the recording on a specific frame.

Select an sACN / Art-Net / DMX512 channel, and specify a pattern (EG: Equals 255) that the channel must meet for the recording to end. Also select whether to stop recording as soon as the condition is true or when the condition is false and then true a certain number of times. This may be useful when recording a looping effect if the condition is true multiple times during the effect.

Alternatively, use the condition Time Elapsed, which will stop recording after it has been recording for a specified duration of time.

4.2 Scenes Page

After a scene has been recorded, it is saved to the SD card as a ".scn" file. These scene files can all be viewed on the Scenes page of the Management Interface.

On this page, each scene is listed alphabetically, and there are various options available for managing the list. These options are described in the table below.

Scene Option	Description
Play Once	Click Play to playback a scene once and Stop to end the scene. This can help test if a scene has been recorded correctly.
Play on Loop	Click the looping Play icon to playback a scene on loop, forever.
Scene Details	Click the down arrow to view scene details, including file size, duration, and information about the recorded data.
Rename Scene	Give the scene a new name. Each scene name must be unique.
Delete Scene	Delete a scene(s) from the SD card. This action is permanent.
Download Scene	Download a scene from the SD card to the computer. This is useful for storing backups of recorded scenes.

4.3 Playlists Page

Playlists can be created to combine multiple scenes together to playback sequentially. This is useful for creating a sequence of scenes to be used for a show, or designing collections of scenes for various purposes.

A new playlist can be created on the Playlists page in the Web Management Interface. The Playlist Creator / Playlist Editor is used to build the playlist from existing scenes. This is shown in Figure 9 below, and the tools and options that are available for creating a playlist are described in the following table.

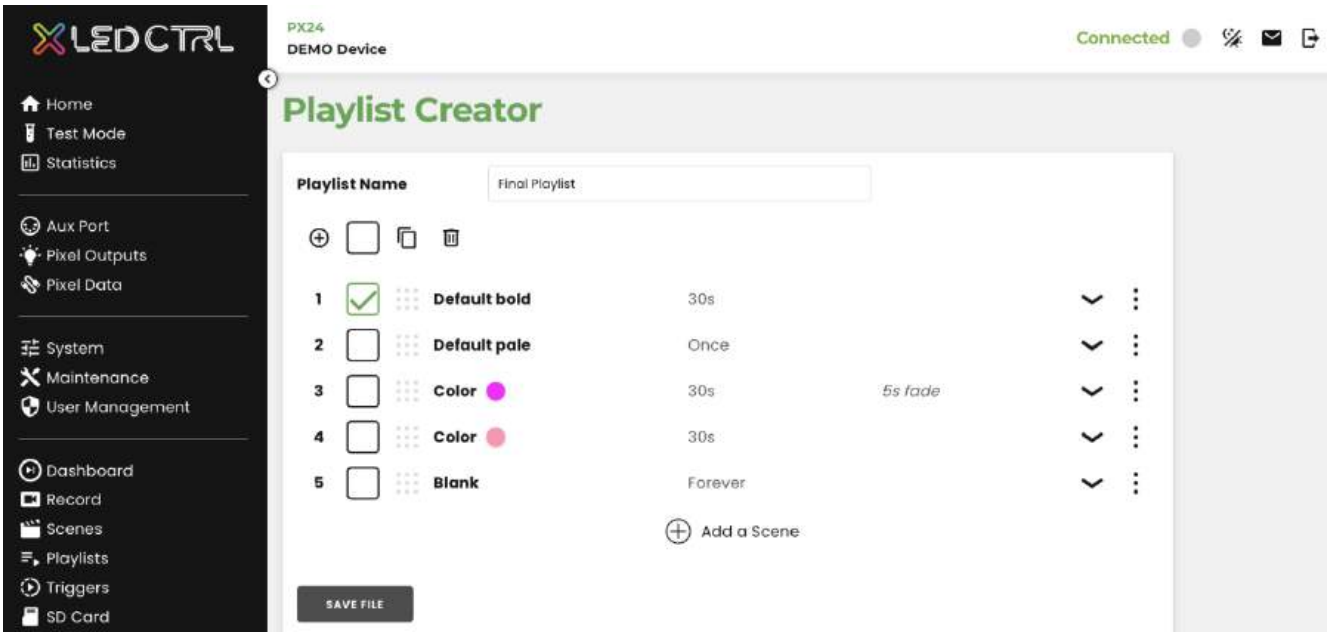

Figure 9 – Playlist Creator / Editor in the Web Management Interface

Playlist Option	Description
Playlist Name	Give the playlist a name. It will be listed under this name.
Add a Scene	Add a new scene to the end of the playlist.
Scene Options	Select a scene. Choose a recorded scene, or a built-in scene. Built-in scenes may be particularly useful between recorded scenes, or at the beginning or end of a playlist. Set a scene to play for a number of times, a duration of time, or to play forever, on loop. Setting a scene to play on loop is available for all scenes within the playlist, not just the last scene. This may be useful when the playlist should not continue further without being triggered to skip to the next scene. Set fade time. This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%.
Reorder Scenes	Grab the reorder icon to drag and drop where a scene is to be played back within the playlist.
Duplicate Scenes	Select any scene(s) within a playlist and duplicate them, including their settings. This is helpful when multiple scenes are to be played back with similar settings.
Remove Scenes	Remove any scene(s) from the playlist.
Save File	Save the playlist to the SD card, and return to the Playlists

The Playlists page in the Web Management Interface can be used to manage playlists. This page is shown in Figure 10 below.

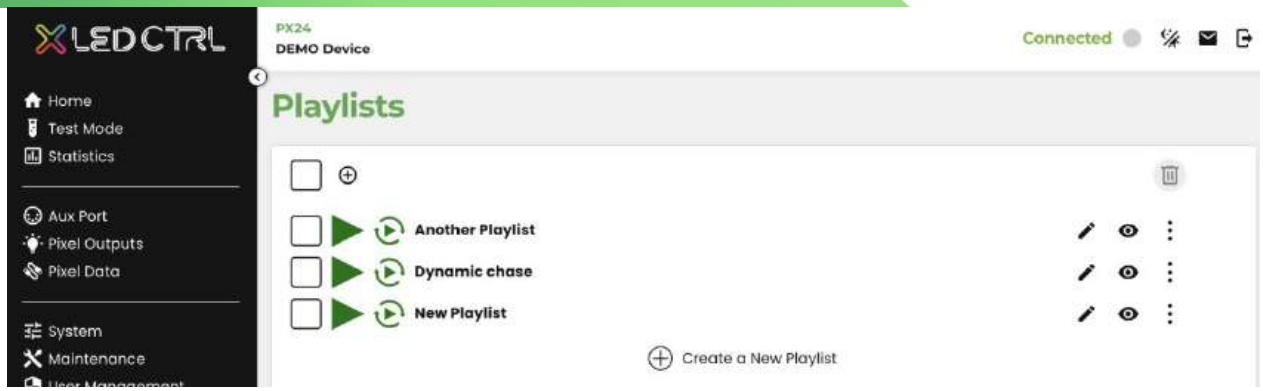

Figure 10 - Playlists Page of the Web Management Interface

There are many options available to help manage playlists. These are listed and described in the table below.

Playlist Option	Description
Play Once	Click Play to playback a playlist once and Stop to end the playlist. This can help test if a playlist has been created correctly.
Play on Loop	Click the looping Play icon to playback a playlist on loop, forever.
Rename Playlist	Assign a new name. Each playlist name must be unique.
Delete Playlist	Delete a playlist(s) from the SD card. This action is permanent.
Download Playlist	Download a playlist from the SD card to the computer. This is useful for storing backups of playlists. Note: Playlist files do not contain the scene files themselves. To backup a playlist, and all its contents, both the playlist file and all the relevant scene files should be downloaded.

4.4 Triggers Page

Triggers are what allow the Dashboard to enable standalone operation, and enhance live scenarios by integrating with other systems. A trigger is comprised of an Event, and an Action. When the event is detected, the trigger will fire, causing any configured action to occur.

4.4.1 Trigger Sources

Many events rely on a Trigger Source to be configured. A Trigger Source is an external universe or port that is constantly monitored by the device. Triggers can be configured to respond to an Event occurring within one of these Trigger Sources. Up to 3 Trigger Sources can be configured for any one device, and each one can be any of:

- sACN(E1.31)Universe
- Art-NetUniverse
- DMX512(AuxPort)Universe
- UDPPort

Setting a nickname for each Trigger Source may help with keeping sources organized. Trigger Sources can be added or modified on the Triggers page, in the Web Management Interface. This page is shown in Figure 11 below.

Note: Ensure changes to Trigger Sources and Triggers are applied to the device before exiting the Triggers page.

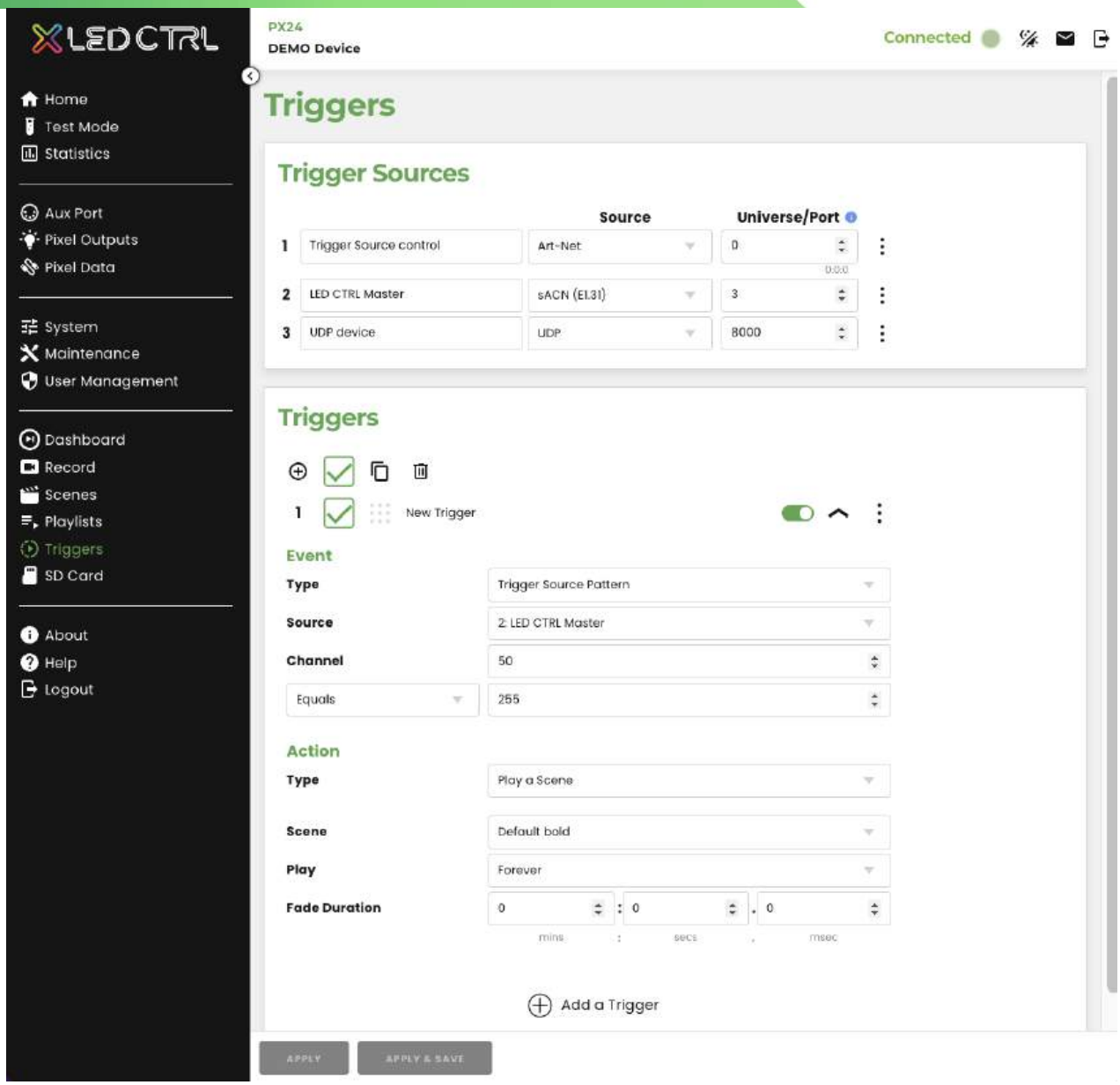

Figure 11 - Triggers page of the Web Management Interface

4.4.2 Trigger Events

A trigger's event is what causes the trigger to fire. Each type of event is explained in detail below.

Event Type	Description
On Device Startup	Trigger will fire when the device starts up, including when the device is powered on, and any moment it is reset.

Event Type	Description
Trigger Source Pattern	Trigger will fire when some pattern is met. This can be any of the following for a universe-type trigger source: - A specified channel is equal to a specified value - A specified channel is not equal to a specified value - A specified channel is within a specified range - A specified channel is outside a specified range Note: For the patterns "Within a range" or "Outside a range", there is another configurable option, which is useful for specifying when the trigger is intended to fire. Trigger on first matching value will execute the action only once when the channel's value first enters the matching range. If the channel's value exits and re-enters the valid range, the trigger will fire again. Trigger on every matching value will fire the trigger any time the channel's value changes within the valid range. For a port-type trigger source, the pattern to be met is a string match. Strings can be entered as either Plain Text or Hex. There is also an option to consider a string match when a UDP message is received that starts with the configured string, or is an exact match of the configured string. Some software that generates UDP messages will insert padding or termination throughout the message, so if these are required, then some of the common characters can be inserted when in "Hexadecimal" and "Exact Match" views. For most applications, setting "Starts With" and entering the message in as "Plain Text" will suffice, however for more specific control, exact hexadecimal strings can be configured.
Another Trigger Start	Trigger will fire when another specified trigger starts its action. This is useful for executing multiple actions at the same time, as long as these actions do not conflict.
Another Trigger End	Trigger will fire when another specified trigger completes its action. This is useful for "chaining" triggers together, so that multiple actions can occur sequentially.
Data Availability	Select Data Available to fire the trigger when the data source is active. Select Data Lost to fire the trigger when the data source is timed out. Select monitor All Outputs to only fire the trigger when all outputs meet the above requirement, or select monitor Any Outputs to fire the trigger when any of the outputs meet the above requirement. Also select whether Pixel Data and/or Aux Port Data is to be monitored.

4.4.3 Trigger Actions

A trigger's action is the task that will be completed when the trigger fires. If the trigger's action is deemed invalid (e.g. Pause, whilst there is no playback), then the action will simply not occur. Each type of action is explained in detail below.

Action Type	Description
Play a Playlist	Play a playlist, with the following configurable parameters: - Play the playlist once - Loop the playlist a specified number of times - Loop the playlist forever

Action Type	Description
Play a Scene	Play a scene, with the following configurable parameters: - Play the scene once (for recorded scenes) - Play the scene a duration of times - Loop the Scene a specified number of times(only for recorded scenes) - Loop the scene forever - Set Fade time This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%.
Start Recording	Begin recording live data, using the default naming convention, EG: "Auto-00001", with the following configurable parameters: - Record Indefinitely - Record for a specified duration of time
Program the Intensity	Optionally set the intensity for Pixel Outputs and/or Aux Port. The intensity can be set to a value between 0 and 255, with the option to fade to this value over a specified duration. Optionally configure whether Programmed Intensity should override Live Intensity or not for Pixel Outputs and/or Aux Port. For more information on Programmed Intensity, see Section 4.8.2.
Change to Live Mode	Set the device to Live mode. Set fade time. This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%. .
Stop Transient Mode	Returns the device to the last continuous mode. Set fade time. This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%. - Examples of a transient mode: Recording a scene, Playback for a specified number of times. - Examples of a continuous mode: Live data, Test mode, Playback that loops forever. This is useful for stopping a transient playback, or stopping a recording that is in progress.
Playback Control	Control playback during scenes or playlists: - Play (resume the scene or playlist after it was paused) - Pause - Toggle Play/Pause - Restart current scene Control playback during playlists only: - Skip to previous scene - Skip to previous recorded scene (skips any built-in scenes) - Skip to next scene - Skip to next recorded scene (skips ay built-in scenes) Set fade time. This is a "V" fade, which fades down previous content to 0%, and then fades up the new content to 100%.

4.4.4 Enabling/Disabling Triggers

Triggers can be enabled or disabled on this same page. If a trigger is required to be disabled for a time, then the toggle switch on the right-hand side of the trigger can be set to off. This allows triggers to be disabled, whilst not needing to delete them from configuration. To enable a trigger again, simply toggle the same switch to be enabled, and Apply the configuration change.

4.5 SD Card Page

Scene files and playlist files (and any other files) can be uploaded to the SD card via the SD Card page of the Web Management Interface. Simply select which files are to be uploaded, and start the upload process, which is shown in Figure 12 below.

Note: The upload will be cancelled if the SD Card page is closed.

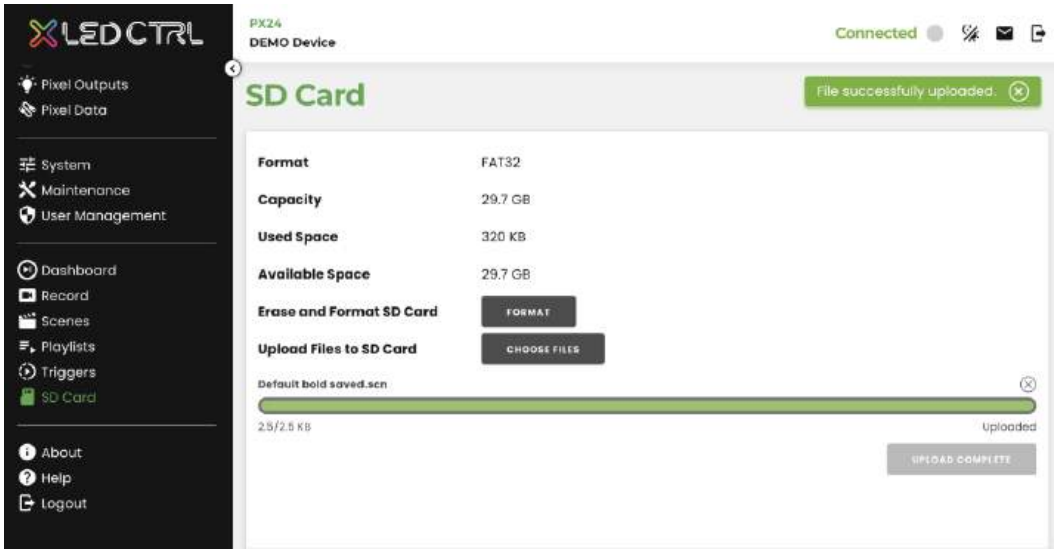

Figure 12 - Uploading files to the SD Card

The SD Card can be managed via the SD Card page. This includes the ability to view the format, volume capacity, and used and available space on the SD card.

The SD Card can also be formatted on this page, which erases and formats the card to FAT32. This is the only supported format, and so if an inserted SD Card has a different format, it can be corrected on this page.

4.6 Monitoring Performance

During recording, the Home page will show three graphical frame rate statistics:

- Incoming Live Data
- Recorded Data
- Outgoing Data

This is useful for monitoring recording frame rates, as shown in Figure 13 below.

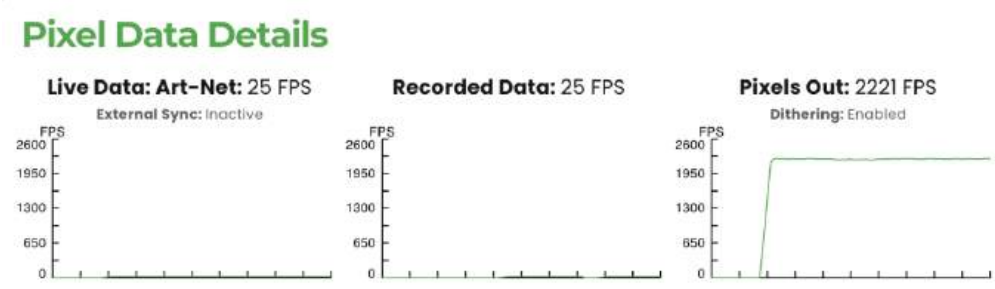

Figure 13 - Monitoring frame rates during recording

If, whilst recording a scene, the recorded data rate is not keeping up with the incoming data rate, consider the following:

- Decrease the frame rate of the incoming data source.
- Use a faster microSD card. Class 10 is required in most situations.
- Consider decreasing the number of universes to be recorded. This can be achieved by configuring the device for fewer universes.
- Try formatting the microSD card. This may be particularly useful if other files exist on the card, which may slow down the read/write speed. Note that this will erase all files on the card.

Note: If a scene is being recorded, the performance of the recording will take priority over the performance of displaying the data on the Pixels and/or Aux Port.

4.7 Behaviour During Playback

In some situations, it may be desirable for the pixel outputs and/or Aux ports to behave differently to what is being played back. For example, if a scene is to be played back to the pixels, whilst an auxiliary device is intended to continue responding to live data.

If this is required, then the "Behavior During Playback" fields can be modified, for pixel and Aux port outputs, independently. This can be done on the Pixel Outputs page (Section 9) and the Aux Port page (Section 8) of the Web Management Interface. Available behaviours are described in the table below.

Behavior Option	Description
Playback	The pixel outputs / Aux port will play back the scene or playlist, as normal.
Live Data	The pixel outputs / Aux port will not play back the scene or playlist, and will instead output live incoming data (Art-Net / sACN / DMX512).
Blank	The pixel outputs / Aux port will not play back the scene or playlist. The output(s) will instead be blanked.
Freeze	The pixel outputs / Aux port will not play back the scene or playlist. The output(s) will instead hold the last frame of data that was being displayed.

4.8 Intensity Control

The Dashboard adds the ability to control the intensity of the pixel outputs as a group, and the intensity of the Aux Port. There are two methods for controlling the intensity, which are both explained below.

4.8.1 Live Intensity

An external Art-Net / sACN / DMX512 channel can be mapped to the intensity, to allow for a live controlling channel to drive the intensity. This allows an external fader, dial, or some other controlling equipment to be in control of the overall intensity. The Aux Port can use any channel for Live Intensity, and this can be configured on the Aux Port page. The pixel outputs can also use any channel for Live Intensity, and this can be configured on the Pixel Outputs page. These two live intensities operate independently, and can be set to the same channel, or different channels.

4.8.2 Programmed Intensity

The intensity can be programmed to a specific value, between 0-255 (default is 255). This can be set either on the Home page, or with a trigger. When setting the Programmed Intensity via a trigger, you can set to it fade to the required value over a specified duration of time.

If a Live Intensity source is configured and actively controlling the device, it has priority over the Programmed Intensity by default. However, the behaviour of Programmed Intensity can be controlled via triggers.

Two behaviours are available - "Override Live Intensity", and "Prioritize Live Intensity". These behaviours are described in the table below.

Live Intensity	Programmed Intensity Behaviour	Active Intensity Control
Enabled and Active	Prioritize Live Intensity	Live Intensity
Enabled and Active	Override Live Intensity	Programmed Intensity
Enabled and Timed Out	Either	Programmed Intensity
Disabled	N/A	Programmed Intensity

The "Intensity Control" pane of the Home page is shown in Figure 14 below.

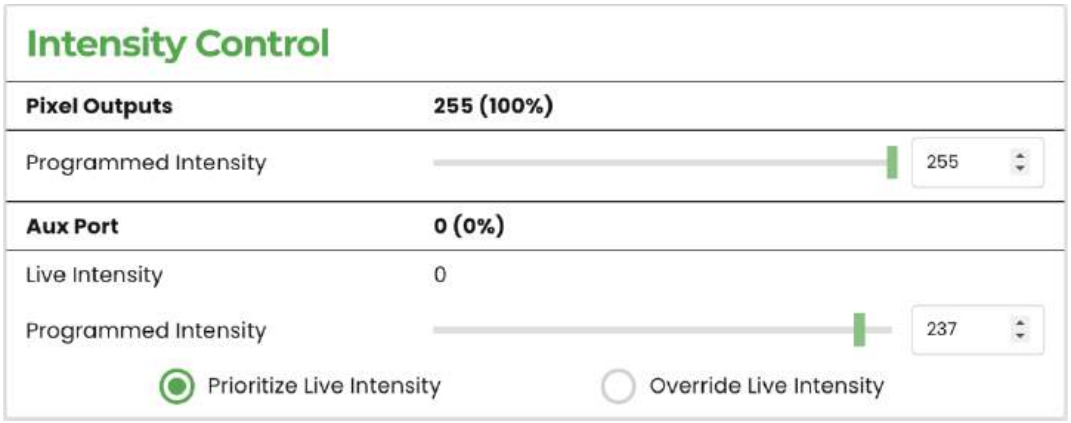

Figure 14 - Intensity Control on the Home Page

5 Home Page

Upon login, the first page that the Management Interface will display is the “Home” page. This page displays an overview of the device's current state, and is divided into various panes, as described in this section. The Home page may include or exclude various elements, based on the capabilities and configuration of the device you are connected to. This page is dynamic, i.e. content will automatically be adjusted in real time, making it a valuable page to remain open for monitoring the device.

An example of this page on a PX24 is shown in Figure 15 below.

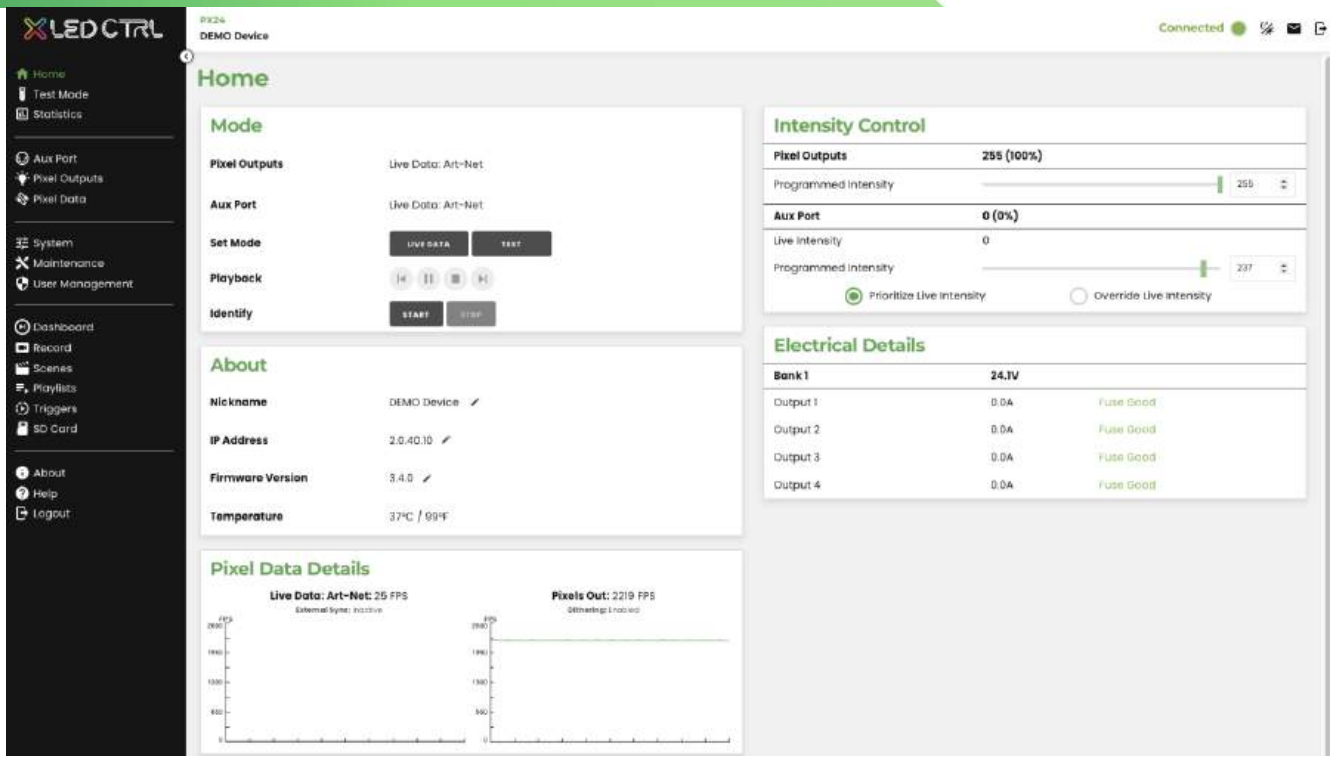

Figure 15 - Home Page

5.1 Mode

This pane displays an overview of the device's current operating mode, including information about the current mode of the pixel outputs and Aux port, and playback status if there is a scene or playlist currently playing back.

There are two buttons to set the device to a mode, including "Live Data" and "Test". Clicking either of these will immediately change the mode of operation.

There are playback control buttons for quick access to Toggle Pause, Skip Forwards, Skip Backwards, and Stop Transient Mode. These will become available when playback is in progress.

This pane is also where the Identify function can be accessed. Simply press "Start", and the multi-color status LED will flash yellow. This is a quick and easy way to ensure that you are connected to the correct device. Pressing "Stop" will set the LED back to its previous status.

Note: Only one PX24/MX96PRO device can be set to Identify at a time. If another device is set to Identify, the first device will automatically stop its Identify function.

5.2 About

This pane displays an overview of the device itself, including nickname, IP address, firmware version, and temperature.

5.3 Pixel Data Details & Aux Port Details

These panes show information about incoming and outgoing frame rates for pixel data, as well as Aux Port data. The current incoming and outgoing frame rates will be shown as a number above each graph, and there is a useful

graphical representation of current and previous frame rates. In this way, the current frame rate can be read, and any inconsistencies can easily be seen.

The status of External Sync and Dithering will also be shown above these graphs.

Note: Only the relevant graphs be displayed. For example, if Test Mode is enabled, then the Pixel Data pane will only show the outgoing frame rate.

5.4 Electrical Details

PX24 devices that feature Smart Electronic Fuses will display this pane on the Home page. Live bank voltage, as well as live pixel output current draw are all reported as numeric values.

There is also a report of the status of the Smart Electronic Fuses. "Fuse Good" indicates normal operation and "Fuse Bad" indicates the fuse has been tripped. Consult the relevant product's user manual for more information on these fuses.

6 Test Mode Page

This page allows you to remotely select a number of different test modes on the controller that can help to determine if your pixels are connected correctly and are working as they should. Simply select the test you wish to run from the drop-down box to turn it on, and the test will begin. The multi-color status LED will also display the test pattern, allowing you to visually confirm which test is running.

Unlike configuration pages in the rest of the Web Management Interface, changes on this page are immediately active on the device (there is no need to press an apply button).

Note: For a test pattern to correctly be displayed, the device should first be configured for the pixels that have been connected.

An example Test Mode page is shown in Figure 16 below.

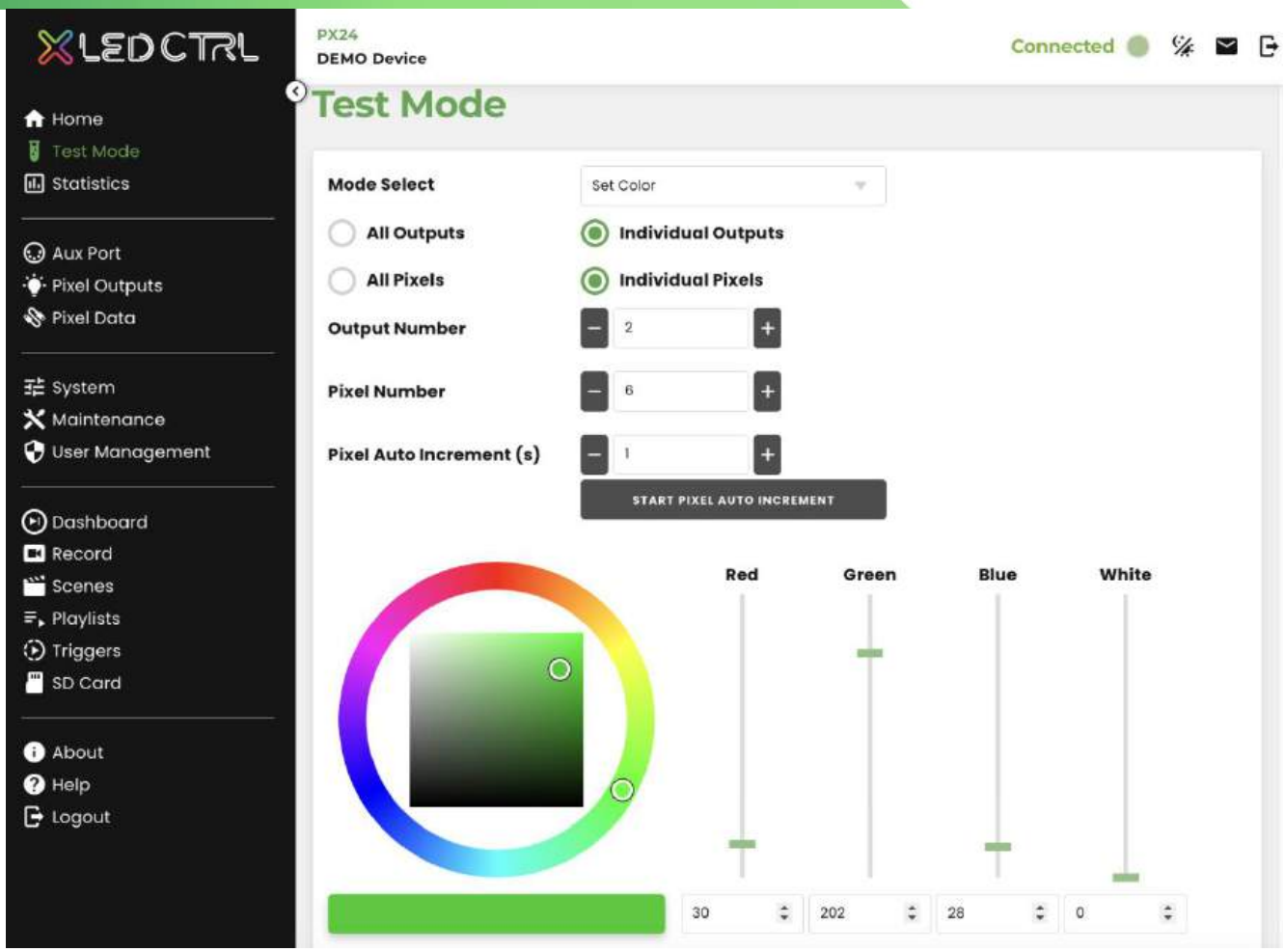

Figure 16 - Test Mode Page

6.1 Individual Outputs/Pixels

The test can optionally be applied to an individual output, or to an individual pixel. Setting the test to an individual pixel is useful for counting the number of pixels on an output, following the configuration that has been set up in Section 10. The increment and decrement buttons can be used to count up/down each output and/or each pixel.

When a test is applied to an individual pixel, the Auto Increment feature can be used to automatically count through pixels. Set the speed at which the Auto Increment will count to (in seconds, from 0.2s to 10s), and press 'Start'.

This test will turn on pixels one at a time, respecting all advanced mapping options including Null Pixels, Grouping, Zig Zag, and Reverse. For example, if an output has 10 pixels configured, and 3 of these are set to Null, then the test mode will not illuminate the first 3 pixels.

6.2 Test Modes

Test	Description
Disabled	Test mode is not running.
RGBW Cycle	Automatic cycle through red, green, blue, and white in sequence.

Test	Description
Color Fade	Automatically fade through the entire colour wheel.
Set Color	Custom colour, selected by various controls.
Red	Solid red.
Green	Solid green.
Blue	Solid blue.
White	Solid white. For RGB pixels, all 3 colours are switched on. For RGBW pixels, only the white channel will be switched on.

7 Statistics Page

This page is where advanced diagnostic and troubleshooting information can be found, which can be useful in diagnosing irregular behaviour. Physical, electrical, and network-related statistics are all represented on this page. Each pane presents unique information, so this section will explain each one in detail.

The values within each pane can be reset by pressing the relevant "Reset" button. This will reset the statistic values within the device itself, meaning that all other clients currently connected to the Management Interface will also have these statistics reset.

An example Statistics page of a PX24 is shown in Figure 17 below.

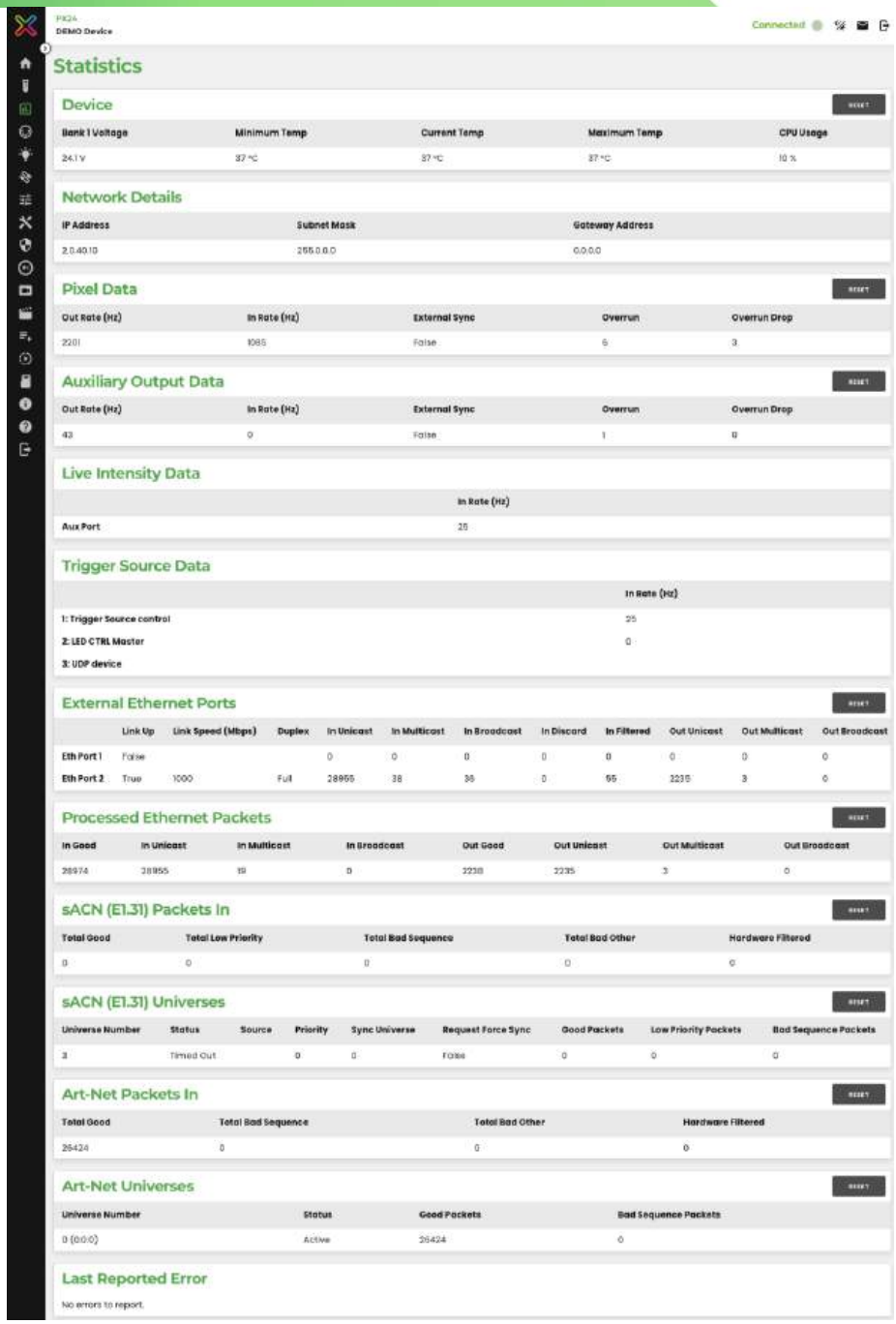

Figure 17 - Statistics Page

7.1 Device

Name	Description
Bank [Number] Voltage	Value of input DC voltage per input bank.
Minimum Temperature	Historical lowest temperature since power on, or since statistics reset.
Current Temperature	Live reading of the internal ambient temperature sensor of the device.
Maximum Temperature	Historical highest temperature since power on, or since statistics reset.
CPU Usage	Percentage of processing capacity currently in use.

7.2 Network Details

Name	Description
IP Address	Internet Protocol (IP) address assigned to the device.
Subnet Mask	Subnet mask assigned to the device. It is a masking field that limits the range of IP addresses that can communicate with the device.
Gateway Address	Gateway address assigned to the device. It is the IP address of the gateway through which communication can happen with a wider network and/or the Internet.

7.3 Pixel Data

Name	Description
Out Rate	Live reading of the outgoing frame rate of pixel data.
In Rate	Live reading of the incoming frame rate of the data source assigned to pixel data.
Sync Universe	Current universe number assigned by sending software to be the universe of sACN-Sync. Only visible when sACN is used as the pixel data source.
Force Sync	Whether the sending software is requesting the device to freeze and wait if the synchronization source is lost. Only visible when sACN is used as the pixel data source.
External Sync	True/False value indicating whether an external source of synchronization is being used. If this is false, then the Automatic Sync to Data Source failback will be engaged.
Overrun	The number of incoming “frames” that are classed as overrun. A frame is one group of all universes required for the pixel outputs. Overrun frames occur when a new set of universes are received by the PX/MX96PRO while processing/output of previous universes has not yet finished. Typically, this number will rapidly increase when the incoming frame rate is higher than the maximum achievable outgoing frame rate.
Overrun Drop	The number of overrun frames that have been dropped. If pixel outputs are configured to drop frames on overrun (See Section 9.2), then this number should match the number in "Overrun". Otherwise, this number will represent the number of frames that were automatically dropped by the device because it was impossible to catch up the output to the input source.

7.4 Auxiliary Output Data

This pane will only be visible when the Aux port has been configured to DMX512 Output.

Name	Description
Out Rate	Live reading of the outgoing frame rate of Aux port data.
In Rate	Live reading of the incoming frame rate of the data source assigned to Aux port data.
Sync Universe	Current universe number assigned by sending software to be the universe of sACN-Sync. Only visible when sACN is used as the Aux port data source.
Force Sync	Whether the sending software is requesting the device to freeze and wait if the synchronization source is lost. Only visible when sACN is used as the Aux port data source.
External Sync	True/False value indicating whether an external source of synchronization is being used. If this is false, then the Automatic Sync to Data Source failback will be engaged.
Overrun	The number of incoming “frames” that are classed as overrun. A frame is one group of all universes required for Aux port output. Overrun frames occur when a new set of universes are received by the PX/MX device while processing/output of previous universes has not yet finished. Typically, this number will rapidly increase when the incoming frame rate is higher than the maximum achievable outgoing frame rate.

Overrun Drop	The number of overrun frames that have been dropped. If the Aux port is configured to drop frames on overrun (See Section 9.2), then this number should match the number in "Overrun". Otherwise, this number will represent the number of frames that were automatically dropped by the device because it was impossible to catch up the output to the input source.

7.5 External Ethernet Ports

These statistics are reported for all Ethernet ports. If there are more than one port, then multiple lines will be used to represent the multiple ports.

The network map of a PX/MX device with dual gigabit Ethernet ports in Figure 18 below can be used to explain the position and direction of these ports and the processed Ethernet packets described in Section 7.6

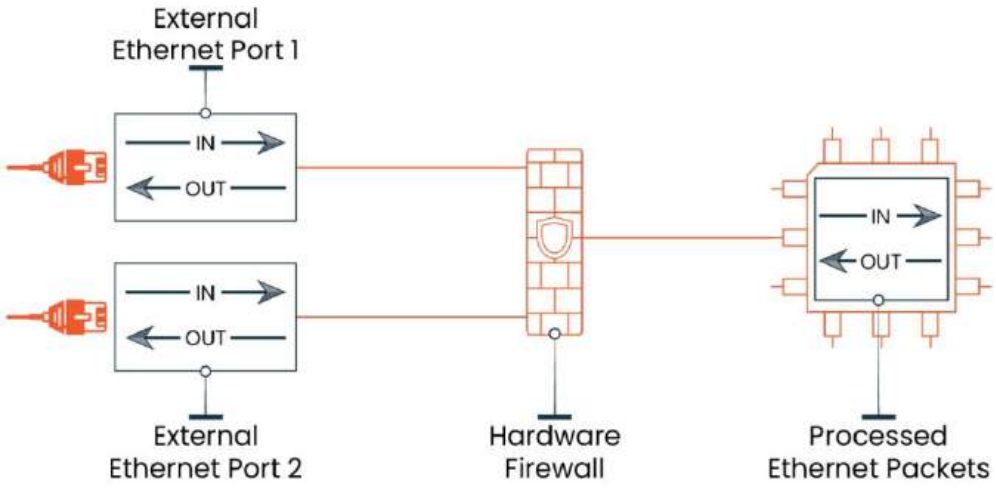

Figure 18 - Network Map of a device with Dual Gigabit Ethernet Ports

Name	Description
Link Up	True/False value indicating whether an Ethernet link has been established.
Link Speed	Maximum speed of the device that is connected to the Ethernet Port. E.g. An Ethernet Port connected to a gigabit speed network switch will report 1000Mbps.
Duplex	Full Duplex means bidirectional communication is possible on the Ethernet link. Half duplex means sending and receiving may not occur at the same time. In most installations, Half Duplex likely represents an error with the network cabling, as it is seldom used in modern technology.
In Unicast	The number of incoming unicast packets from outside the device.
In Multicast	The number of incoming multicast packets from outside the device.
In Broadcast	The number of incoming broadcast packets from outside the device.
In Discard	The number of incoming packets from outside the device that have been discarded due to errors.
In Filtered	The number of incoming packets from outside the device that have been filtered by the Universe Data Hardware Firewall.
Out Unicast	The number of outgoing unicast packets.
Out Multicast	The number of outgoing multicast packets.
Out Broadcast	The number of outgoing broadcast packets.

7.6 Processed Ethernet Packets

All packets that are processed will be shown here as either incoming or outgoing packets. If the device has a universe data hardware firewall in place, then the incoming packets shown here have passed through the firewall. Devices with a single Ethernet port will simply pass all network traffic, and so the packets shown here will then represent all network traffic to and from the device.

Refer to the network map in Figure 18 above to understand position and direction of these packets.

Name	Description
In Unicast	The number of incoming unicast packets that have been processed.
In Multicast	The number of incoming multicast packets that have been processed.
In Broadcast	The number of incoming broadcast packets that have been processed.
Out Unicast	The number of outgoing unicast packets from the processor.
Out Multicast	The number of outgoing multicast packets from the processor.
Out Broadcast	The number of outgoing broadcast packets from the processor.

All packets that are processed will be shown here as either incoming or outgoing packets. If the device has a universe data hardware firewall in place, then the incoming packets shown here have passed

7.7 Art-Net Packets In

Name	Description
Total Good	The number of incoming Art-Net packets that are classed as "Good" (i.e. correctly formed packet that has not been filtered by hardware).
Total Bad Sequence	The number of incoming Art-Net packets that are classed as "Bad" due to being received out of sequence.
Total Bad Other	The number of incoming Art-Net packets that are classed as "Bad" due to some other error with the packet.
Hardware Filtered	The number of incoming Art-Net packets that have been filtered by the Universe Data Hardware Firewall.

7.8 sACN (E1.31) Packets In

Name	Description
Total Good	The number of incoming sACN packets that are classed as "Good" (i.e. correctly formed packet that has not been filtered by hardware).
Total Low Priority	The number of incoming sACN packets that are dropped due to being a lower priority than the active data source.
Total Bad Sequence	The number of incoming sACN packets that are classed as "Bad" due to being received out of sequence.
Total Bad Other	The number of incoming sACN packets that are classed as "Bad" due to some other error with the packet.
Hardware Filtered	The number of incoming sACN packets that have been filtered by the Universe Data Hardware Firewall.

7.9 Art-Net Universes

These statistics are reported for all Art-Net universes that the device has been configured to use. If there is more than one universe, then multiple lines will be used to represent the multiple universes.

Name	Description
Universe Number	Number of the universe that is being listened for.
Status	Status of the incoming universe. "Active" refers to a universe that is currently being received correctly. "Timed Out" refers to a universe that is not being received by the processor. Universes may time out due to sending software or network issues.
Good Packets	The number of incoming Art-Net packets on this universe that are classed as "Good" (i.e. correctly formed packet that has not been filtered by hardware).
Bad Sequence Packets	The number of incoming Art-Net packets on this universe that are classed as "Bad" due to being received out of sequence.

7.10 sACN (E1.31) Universes

These statistics are reported for all sACN universes that the device has been configured to use. If there is more than one universe, then multiple lines will be used to represent the multiple universes.

Name	Description
Universe Number	Number of the universe that is being listened for.
Status	Status of the incoming universe. "Active" refers to a universe that is currently being received correctly. "Timed Out" refers to a universe that is not being received by the processor.
Source	Source Name of the universe from the sending software.
Priority	Priority of the universe between 1-200. Typically, this is configurable within the sending software.
Sync Universe	The universe number assigned by sending software that provides the synchronization signal for this data universe. All pixel universes should have the same Sync Universe (if in use) – or the synchronization will not function correctly.
Request Force Sync	Whether the sending software is requesting the device to freeze and wait if the synchronization source is lost. All sACN universes should have the same value.
Good Packets	The number of incoming sACN packets on this universe that are classed as "Good" (i.e. correctly formed packet that has not been filtered by hardware).
Low Priority Packets	The number of incoming sACN packets on this universe, dropped due to a lower priority than the active data source.
Bad Sequence Packets	The number of incoming sACN packets on this universe that are classed as "Bad" due to being received out of sequence.

7.11 Latest Diagnostic Message

The device will sometimes list a diagnostic message in its statistics report. This is a unique message, as it can be held for as long as the device is powered. This field may be empty, however if there has been a diagnostic message raised by the device, it will be listed here.

8 Aux Port Page

This configuration page allows any Aux ports to be configured. The Aux port can be disabled by selecting "Off" as the mode. Alternatively, select any of the following modes for various functions.

An example Aux Port page is shown in Figure 19 below.

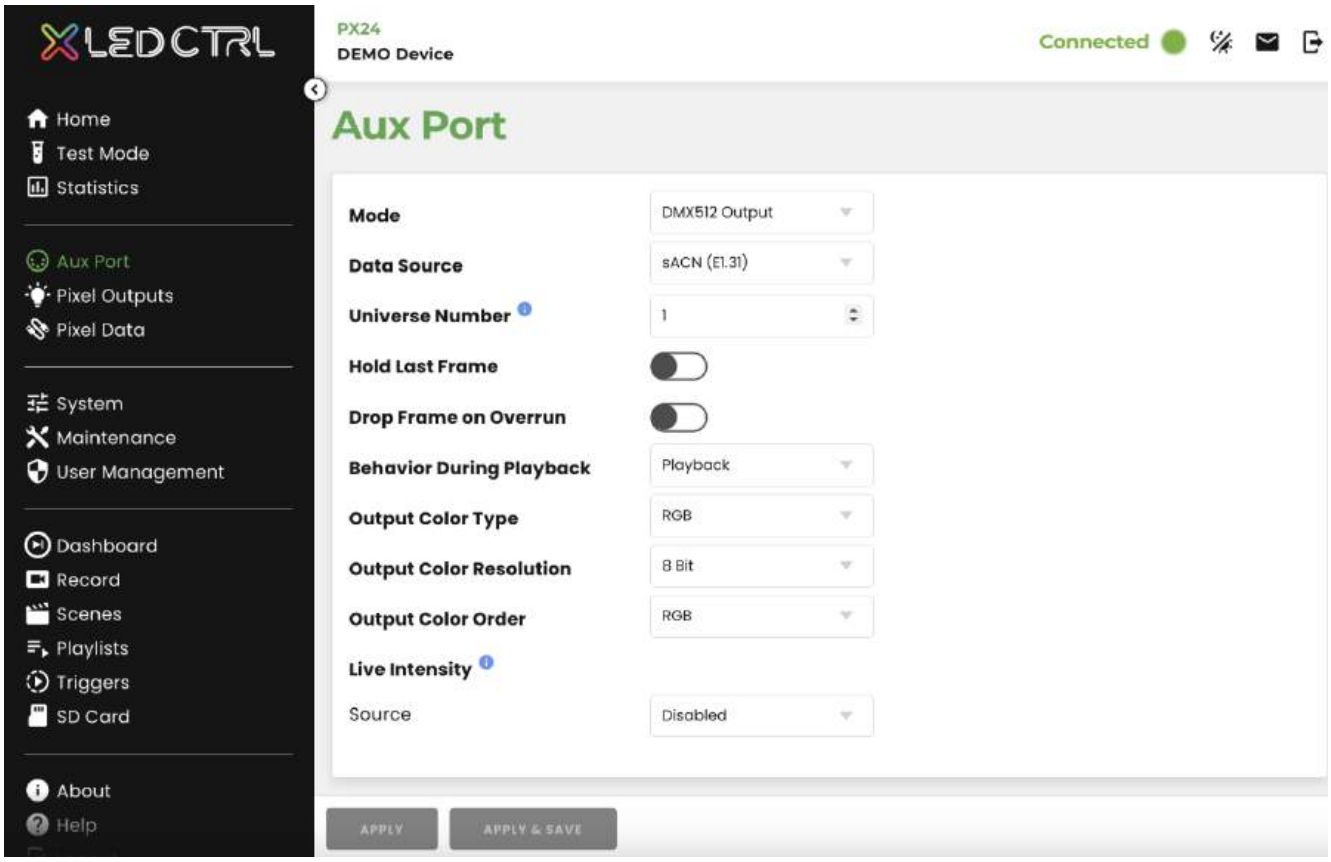

Figure 19 - Aux Port Page

8.1 DMX512 Input

Set "Mode" to "DMX512 Input" to allow the device to be driven by an external source of DMX512 control. Whilst this is limited to only a single universe of data, the device can use DMX512 as its source of pixel data for situations where a DMX512 control system is required to be used instead of Ethernet-based data. No additional configuration of the Aux port is required.

DMX512 Input can also be used as a Trigger Source, Live Intensity Source, and for start and stop conditions for recording.

Note: "Pixel Data Source" is also required to be configured to "DMX512 (Aux Port)" if you want to use an Aux Port's DMX512 input for pixel data. See Section 10.2.

8.2 DMX512 Output

Set "Mode" to "DMX512 Output" to allow conversion of a single universe of incoming sACN or Art-Net data to the DMX512 protocol. This allows any DMX512 device to be connected to this port and effectively be controllable through the same source of lighting control as the pixels.

The Aux port can be configured to be sourced from any universe number of either Art-Net or sACN. Simply select the data source and universe number as required.

"Hold Last Frame" and "Drop Frame on Overrun" are optional configurations, independent of the pixel output configuration.

"Hold Last Frame" configures the device to hold the last received data frame on the Aux port if the input data is disconnected or lost. Disabling this behaviour will result in the device timing out and blanking the Aux port after a few seconds of not receiving any valid input data.

In the event where an incoming frame on the Aux port data source is received during a previous frame's processing/outputting time, "Drop Frame on Overrun" configures the device to drop the incoming frame. This can assist in maintaining synchronization of outgoing frames from the Aux port, by removing the need for the processor to catch up when it is overrun with frames.

By enabling this option, the processor will instead drop these frames, which may lower the outgoing Aux port frame rate. Note that the maximum achievable outgoing frame rate of the Aux port will typically be much lower than the pixel outputs.

If disabled, the device will not drop a frame in the event of overrun data, unless two or more frames are received while still processing/outputting an old frame.

9 Pixel Outputs Page

This configuration page allows functionality and behaviour of the pixel outputs to be configured. Any configuration that is related to data flow is done on the "Pixel Data" page, described in Section 10, including data source selection, patching and advanced mapping options.

An example Pixel Outputs page is shown in Figure 20 below.

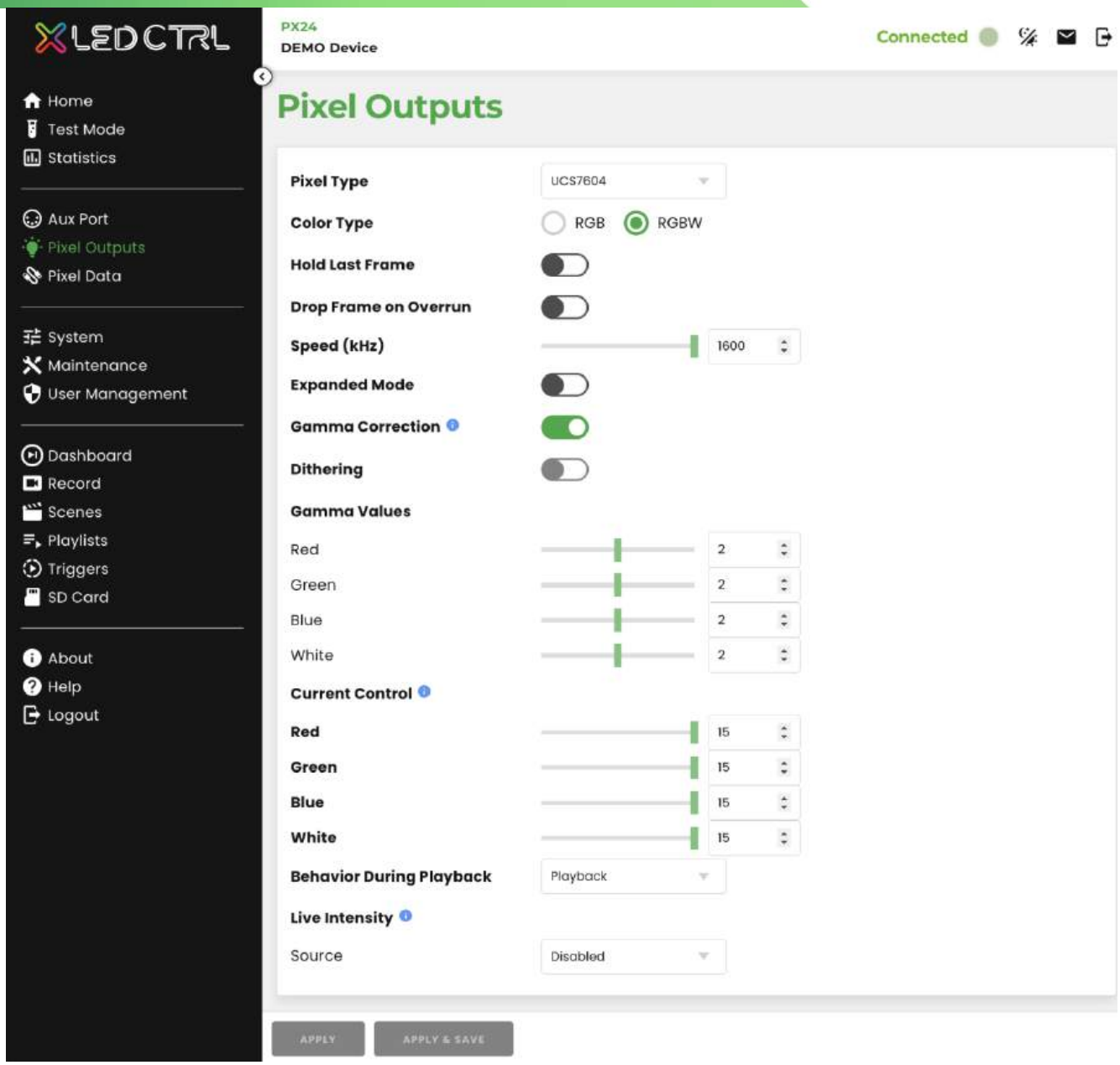

Figure 20 - Pixel Outputs Page

9.1 Pixel and Colour Type

Select the pixel type of the pixels to be connected from the drop-down list. This will populate the page with configuration options that are relevant to that specific pixel type.

The colour type will often default to the correct colour type for the selected pixel type and remain greyed out, as most pixels will only support one of RGB or RGBW. Pixels that support both types will allow selection between the two options.

9.2 Hold Lat Frame and Drop Frame on Overrun

"Hold Last Frame" and "Drop Frame on Overrun" are optional configurations, independent of the Aux port configuration.

"Hold Last Frame" configures the device to hold the last received data frame on all pixel outputs if the input data is disconnected or lost. Disabling this behaviour will result in the device timing out and blanking all pixel outputs after a few seconds of not receiving any valid input data.

In the event where an incoming frame on the pixel data source is received during a previous frame's processing/outputting time, "Drop Frame on Overrun" configures the device to drop the incoming frame. This can assist in maintaining synchronization of outgoing frames to the pixels, by removing the need for the processor to catch up when it is overrun with frames.

By enabling this option, the processor will instead drop these frames, which may lower the outgoing pixel frame rate. An example where this option may be beneficial is when a pixel grid exhibits 'tearing' - "Drop Frame on Overrun" can help reduce these effects, by attempting to maintain synchronization.

If disabled, the device will not drop a frame in the event of overrun data, unless two or more frames are received while still processing/outputting an old frame.

9.3 Speed

Pixel types that make use of a clock line allow configurable data operating speeds. The "Speed" slider can be used to change the frequency of the clock signal. Faster clock speeds can give a better refresh rate, but slower clock speeds can be beneficial for data integrity over long lengths of cable. If your clocked pixels are not stable, reducing the clock speed may help.

Data-only pixels that support multiple speeds of data transmission will also show this slider, which will configure the data transfer rate. Each speed has the same potential benefits as above.

9.4 Expanded Mode

Pixel types that are data-only (no clock line) can allow use of expanded mode. This mode converts the unused clock line on each pixel output to instead function as a data output. This means that data-only pixels can be connected to either a data or a clock line, allowing more flexibility and the potential for higher refresh rates.

The number of physical data outputs available is doubled, and the maximum number of pixels that can be connected to each output is halved. This means that the total number of pixels that the device can support remains the same, regardless of the status of expanded mode.

Note: When patching pixels in Section 10, see the relevant device-specific user manual for information on output pinout.

9.5 Gamma Correction

Gamma correction is the method used for correcting the output of the pixels so that they respond in a much more linear fashion when viewed by the human eye (the spectral response of the human eye is non-linear). This is particularly important when the pixels are being faded, and also provides more accurate and vivid colour representation.

Pixels higher than 8-bit will turn on gamma correction by default, however this can be disabled if desired. Gamma Correction can also be enabled on 8-bit or lower pixels.

Once enabled, the value of the gamma curve of each colour can be adjusted with the provided slider. Increasing these gamma values will increase the amount of correction applied to the output signal. Typically, a gamma-corrected value of 2.0 is a good place to start.

9.5.1 Dithering

Pixels that have 8-bit colour resolution, with gamma correction applied, can benefit from the use of dithering.

Dithering is a technique that creates additional “virtual” intensity levels. With dithering, a virtual midpoint between two intensity levels will be created by jumping back and forth between the two physical intensity levels very quickly. The rate at which this happens is faster than a human eye can detect, and so the resultant effect is an extra intensity level.

Using dithering will generally allow the perceived resolution of gamma corrected 8- bit pixels to be higher, allowing for a smoother pixel system. For Dithering to function correctly, a high output frame rate is required. The feasibility and benefit of using the Dithering feature in your system will depend on many factors.

9.6 Current Control

Some pixel protocols have an ability to digitally control the operating current of the LEDs. All pixel protocols that support this function will show the "Current Control" parameters on the Pixel Outputs page.

If the protocol supports global current control, then this single parameter will set the current for all colours. This control is useful for setting the overall current of the LEDs, which will result in a configurable overall brightness of the pixels. By using this parameter, a lower brightness can be achieved without sacrificing resolution, as the data resolution is still using the full range.

If the protocol supports current control for individual colours, then there will be a configurable parameter for each colour. This can be used for the same purpose as global current control, but it also allows the colour mixing of the pixels to be tuned. This can help to substantially improve the colour gamut available on your LEDs including the white balance. For example, if mixing red, green, and blue together results in a white that is not the desired colour temperature, then the current of each colour can be altered to create a white that is more desirable.

Pixels that support current control may have various resolutions and controls supported, so the Management Interface will populate the Current Control section with the appropriate fields for the selected pixel type.

10 Pixel Data Page

This configuration page allows the flow of pixel data to be configured, including data source selection, input data resolution, patching and advanced mapping options. The majority of this page is dedicated to the patching table, which allows configuration of these parameters to be made per pixel output.

An example Pixel Data page is shown in Figure 21 below.

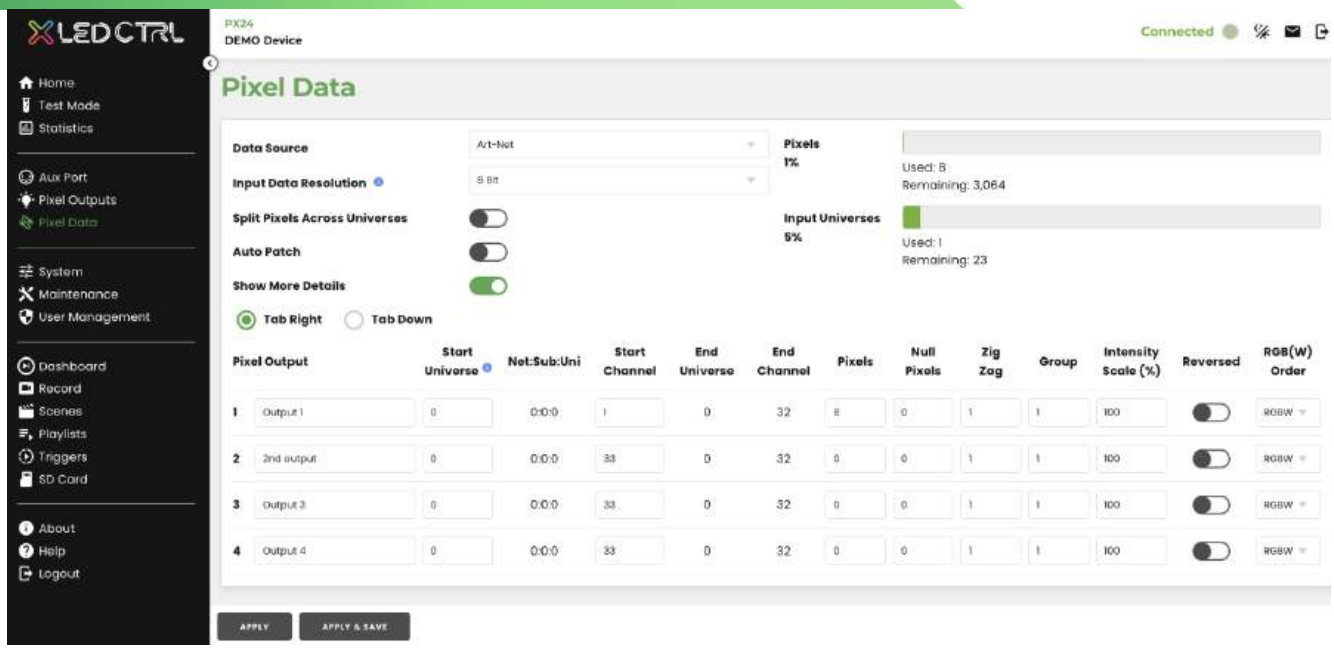

Figure 21 - Pixel Data Page

10.1 Input Resolution

Pixels with a resolution higher than 8 bits per colour can be operated from either an 8 Bit or 16 Bit data source. 16 bit control allows for precision in instances where this is needed. However, if 8 Bit is selected for higher resolution pixels, the incoming 8 bits of data can be mapped to a gamma-corrected curve, which makes use of the available resolution in the pixels.

When using 8 Bits of data, only 3 channels are required for each RGB pixel (4 for RGBW). When using 16 bits of data, 6 channels are required for each RGB pixel (8 for RGBW). Additionally, the number of universes each device can be configured for will not change. This then means that fewer pixels can be configured per device, or advanced mapping should be used - for example, "Group" can be set to 2 for every pixel output, in order to reduce the number of input channels used.

When selecting 16 Bits of data, there are two options for which orientation the data is delivered. High-Low will use the first input channel for the most significant 8 bits. Low- High will use the second input channel for the most significant 8 bits.

Note: Gamma correction and dithering are only available when operating with an input data resolution of 8 bits. If gamma correction is required for 16 bit operation, then this correction should take place at the sending software.

10.2 Patching Options

Above the patching table, there are a number of options that will affect how a patch might look. The first option is "Data Source", which is where the source of pixel data can be selected. Either Art-Net or sACN (E1.31) can be selected as Ethernet-based data sources. Alternatively, an Aux port that is configured to "DMX512 Input" can be used as the pixel data source - see Section 8.1.

Note: When Art-Net is selected, universe numbering will start at 0. When sACN is selected, universe numbering will start at 1. The patching table will dynamically adjust to suit this selection.

"Pixels can be split across universes" allows the use of channels 511 and 512 when working with RGB pixels, which will often result in the data for a pixel being sourced from multiple universes. It is good practice to avoid splitting pixels over universes, however this can be achieved if required by enabling this option.

When "Auto Patch" is enabled, the Start Universe and Start Channel for all additional outputs will be automatically calculated, based on the values set manually for Output 1. This feature is intended to help the user configure all their output channels even faster by automatically working out those fields based on other parameters already provided by the user. Simply enter in the Start Universe and Start Channel of Output 1, as well as any other information required in the rest of the patching table, and the rest of the patch will be calculated and entered automatically.

"Show more details" reveals more detailed information about the patch that are useful for further understanding what has been patched. "Net:Sub:Uni" shows the detailed Net, Subnet and Universe numbering of the Start Universe, which may be the format used in your sending software if working with Art-Net. "End Universe" and "End Channel" show the address of the last channel required for each output.

10.3 Patching Table

10.3.1 Shortcuts

Patching pixels on an MX or PX device is made intuitive and quick, with these efficient workflow features:

- Auto Patch is useful for quick sequential patching, see Section 10.2 above.
- Abovethepatchingtableisanoptiontochangethebehaviorofthe"Tab"keyon a keyboard. "Tab Right" is useful for entering information in a row. "Tab Down" is useful for entering information in a column
- When a mouse hovers over a field, an orange down arrow appears. This can be clicked to automatically populate elements beneath the arrow, with the same value as entered in that field. This is useful for quickly setting a group of outputs to have the same value for a column.

10.3.2 Pixel Output Nickname

Each pixel output can be given a nickname, which may help to keep outputs organized. This may be particularly helpful if each output has a unique purpose, or if the long range system is in use (EG: "Rx 1 Output 1", "Rx 8 Output 4", etc.).

10.3.3 Start Universe and Start Channel

Pixels connected to a pixel output will use sequential channel numbering. This simplifies patching the channels of an entire output of pixels down to two fields: Start Universe and Start Channel. These two values will be the channel for the first colour of the first pixel connected to that output. Then, depending on the values of the rest of that output's row, each pixel will be patched sequentially.

For example, if Start Universe is 1, Start Channel is 1, and RGB Order is "RGB", the following patch will be applied:

- U1,Ch1:Pixel1,Red
- U1,Ch2:Pixel1,Green
- U1,Ch3:Pixel1,Blue
- U1,Ch4:Pixel2,Red
- U1,Ch5:Pixel2,Green

- U1,Ch6:Pixel2,Blue,etc.

10.3.4 Pixels and Null Pixels

The "Pixels" field is the number of physical pixels that are connected to an output.

Sometimes the first pixel(s) on the output are required to be blank and not use any data channels. These are called “null” pixels. Any number of the physical pixels can be set as null pixels by entering the relevant number in the "Null Pixels" field. The first non- null pixel will be patched as the first pixel on that output that uses data channels.

10.3.5 Zig Zag

Zig Zag allows for a simpler physical connection of pixels in certain circumstances where the pixels connect in alternating directions. For example, the below matrix has 3 rows with 5 pixels in each. The simplest way to connect the data wires between rows is shown in Figure 22 below. Unfortunately, this results in every second row lighting up in reverse order as shown by the numbers which indicate the order below.

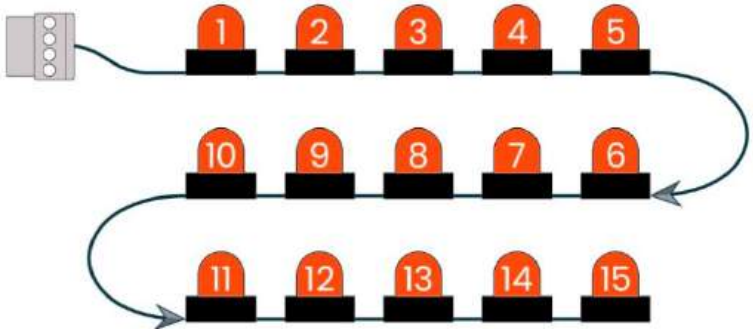

Figure 22 - Pixels in Reverse Order

Zig Zag allows this physical wiring to be *virtually* changed to the equivalent of wiring the pixels like Figure 23 below. In this example, you would set "Zig Zag" on the output to '5' to achieve this effect.

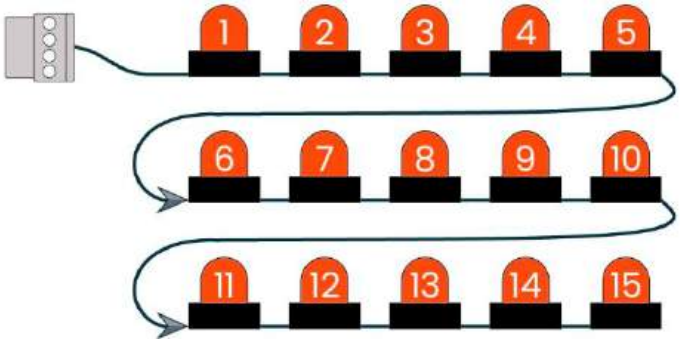

Figure 23 - Zig Zag Enabled to Correct Pixel Order

10.3.6 Group

Grouping allows physical pixels to be grouped together and treated as one single pixel in the sending software. For example, 150 physical pixels with a “Group” value of “10” will effectively become 15 “virtual pixels”. Each “virtual pixel” would now actually consist of a group of 10 physical pixels all grouped together.

This may be useful when there is a limit on the number of input universes available (for example, if Input Data Resolution is 16 bits or if the Aux Port is the pixel data source), as it reduces the number of input channels required to drive the pixels.

10.3.7 Intensity Scale

This allows a value between 0% and 100% to be used as a scaling factor for intensity. This is used in circumstances where the lights are too bright for your application.

Note: The output intensity will be a scaled version of the input intensity. E.g. If the Intensity limit is 50% the pixel output would halve all incoming data values.

10.3.8 Reversed

Enabling "Reversed" will cause the pixels to be patched in reverse order to the way that they are physically connected. This means the first physical pixel will be patched as if it were the last pixel on that output.

10.3.9 RGB(W) Order

The order of which the colours in a pixel are patched can be modified by selecting an option in the dropdown list. This is useful if the pixels are not physically wired in the standard red, green, blue, white order.

10.4 Usage Bars

There are two usage bars for a quick look into how many pixels and how many universes have been used. The upper bar refers to how many pixels have been assigned, of the maximum number of pixels a specific device can be configured for. The lower bar refers to how many universes have been assigned, of the maximum number of universes a specific device can be configured for.

With options like Colour Type and Input Data Resolution, the number of channels required for each pixel may change. This indicates how much capacity has been used. Advanced mapping options such as grouping can also affect these bars.

If the configuration has been set up to use more resources than are available, then the bar will turn red, and the configuration will not be able to be applied.

11 System Page

This page includes configuration options related to the system, including device nickname, setting the device's IP address, and enabling the indicator LEDs. The indicator LEDs include both the status LED and Ethernet LEDs. With these disabled, the on-board buttons and Identify will re-enable the indicator LEDs for 30 seconds.

An example System page is shown in Figure 24 below.

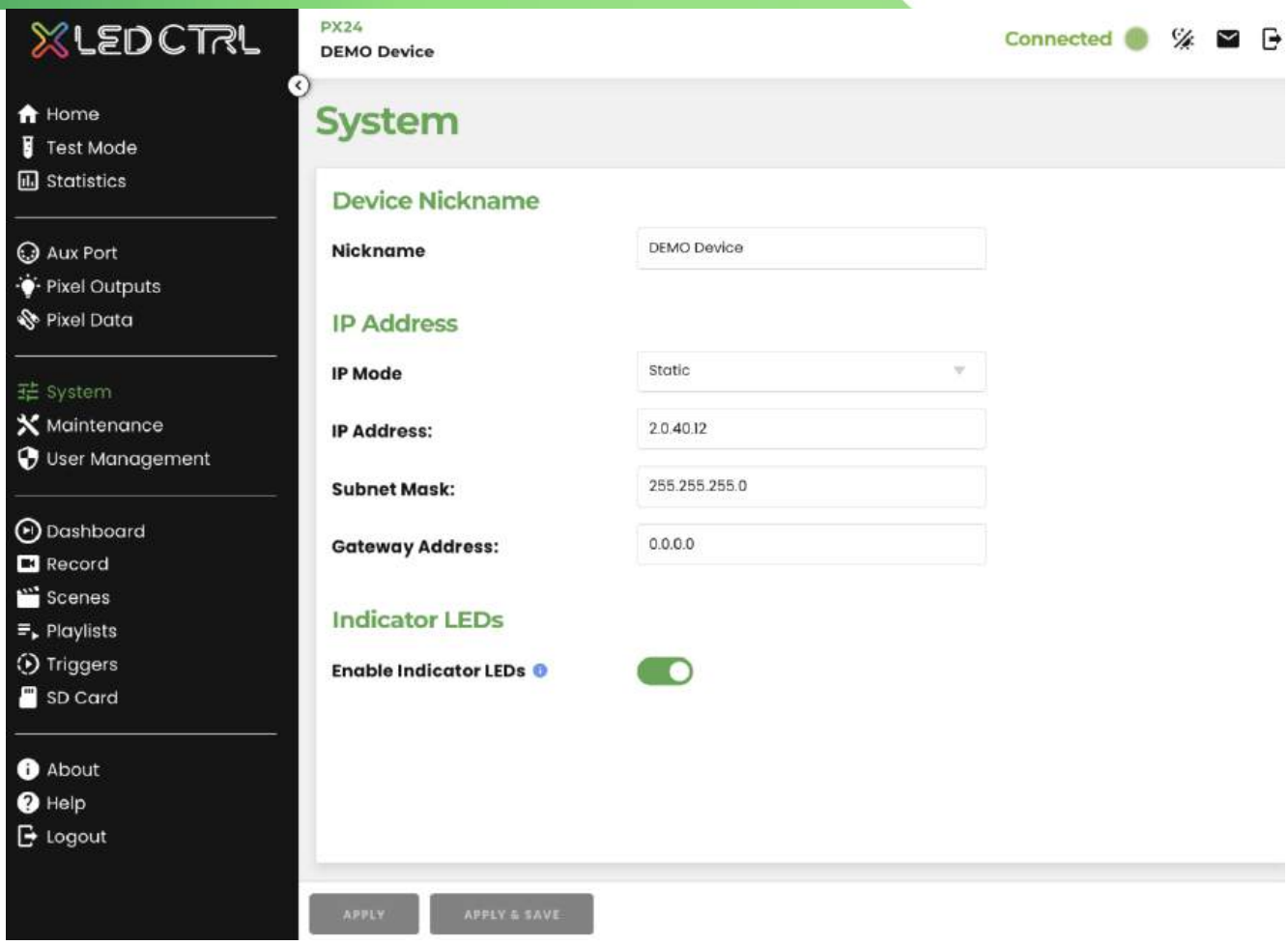

Figure 24 - System Page

11.1 Configuring the IP Address

Select "DHCP/AutoIP" to allow a DHCP server (such as a router) to automatically assign IP address settings to the device, and/or the "AutoIP" protocol to take effect in the absence of a DHCP server. AutoIP can be useful in an installation that uses a direct connection from a computer to a single MX/PX device (potentially first time configuration) or on any lighting network without a router.

Alternatively, select "Static" to assign a static IP address, subnet mask and gateway address. When allocating a static address, the IP address and the subnet mask both define the subnet that the device is operating on. You need to ensure that other devices that need to communicate with this device are on the same subnet. Therefore, they should normally have the same subnet mask and a similar but unique IP address.

The Gateway Address can be set to 0.0.0.0 if it is not required. If communication between the device and other VLANs or the Internet is required, the Gateway address should be configured (and will typically be the IP address of the router).

Regardless of the origin of the IP address, the current network details can be monitored in the Statistics page. See Section 7.2 for more information.

12 Maintenance Page

This page allows maintenance-based operations, including firmware updates, configuration import/export, device restart, and factory reset.

An example Maintenance page is shown in Figure 25 below.

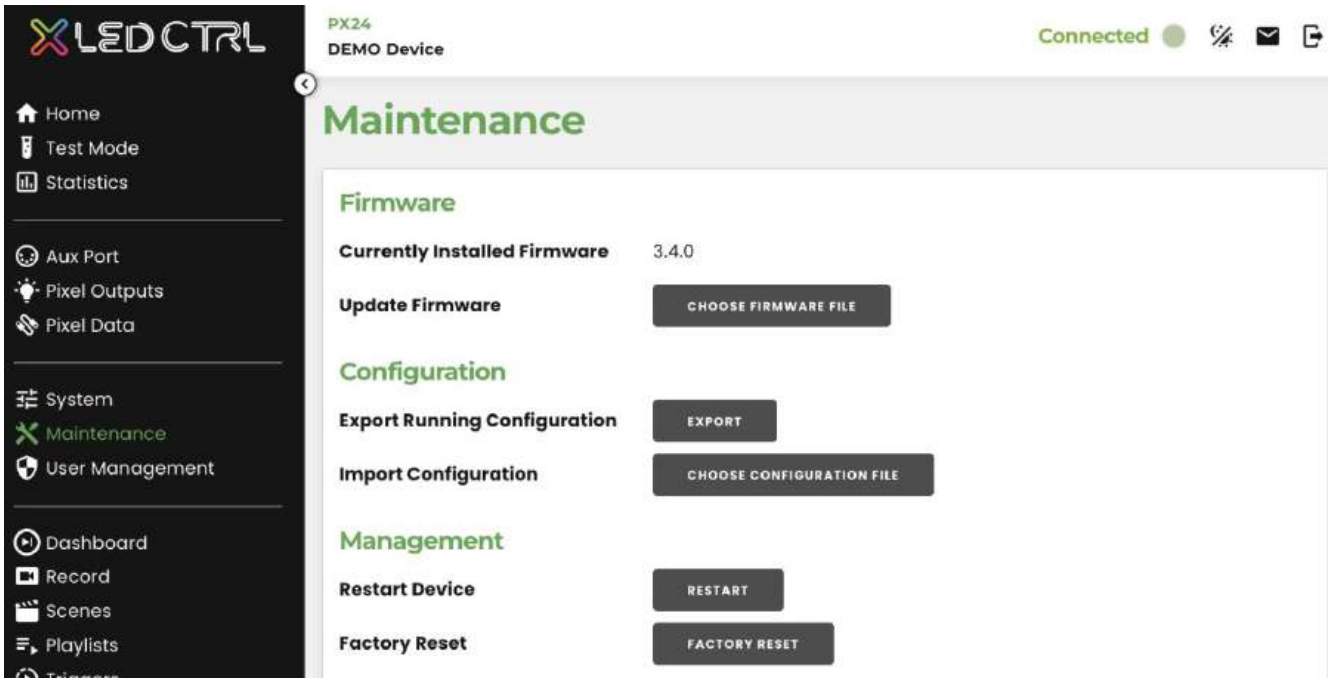

Figure 25 - Maintenance Page

12.1 Firmware Update

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

www.ledctrl.sg/downloads

The ".fw" file included in the downloaded zip archive is the file that should be selected for the firmware update.

12.2 Configuration Import/Export

The running configuration can be saved as a ".conf" file by clicking the "Save" button on this page. Upon export, the configuration file will automatically be downloaded to the managing device.

To import a previously saved configuration file, browse to the configuration file by clicking the "Choose File" button. Once a valid .conf file has been selected, there are optional exclusions that can be made. Any type of configuration that is set to be excluded from the import will simply be ignored upon configuration import. This is useful when duplicating configuration to another device in an installation, but some of the configuration (such as IP address or nickname) does not need to be copied.

Clicking "Load" will import the selected configuration file into the running configuration. To save this configuration, see Section 3.3.

12.3 Restart Device

In some situations, and in troubleshooting, it may be useful to restart the device. This action restarts the device, and any startup triggers will occur as if the device has just been powered up.

12.4 Factory Reset

To restore both the running configuration and saved configuration to factory defaults, simply click "Reset". A warning message will be displayed, requesting confirmation of this action. If "Yes" is clicked, then both the running and saved configurations will be restored to the device's factory default configuration.

Note: This includes all IP address settings, which may disconnect the running session.

13 User Management Page

This page allows management and passwords of the two users: Administrator and Operator.

An example User Management page is shown in Figure 26 below.

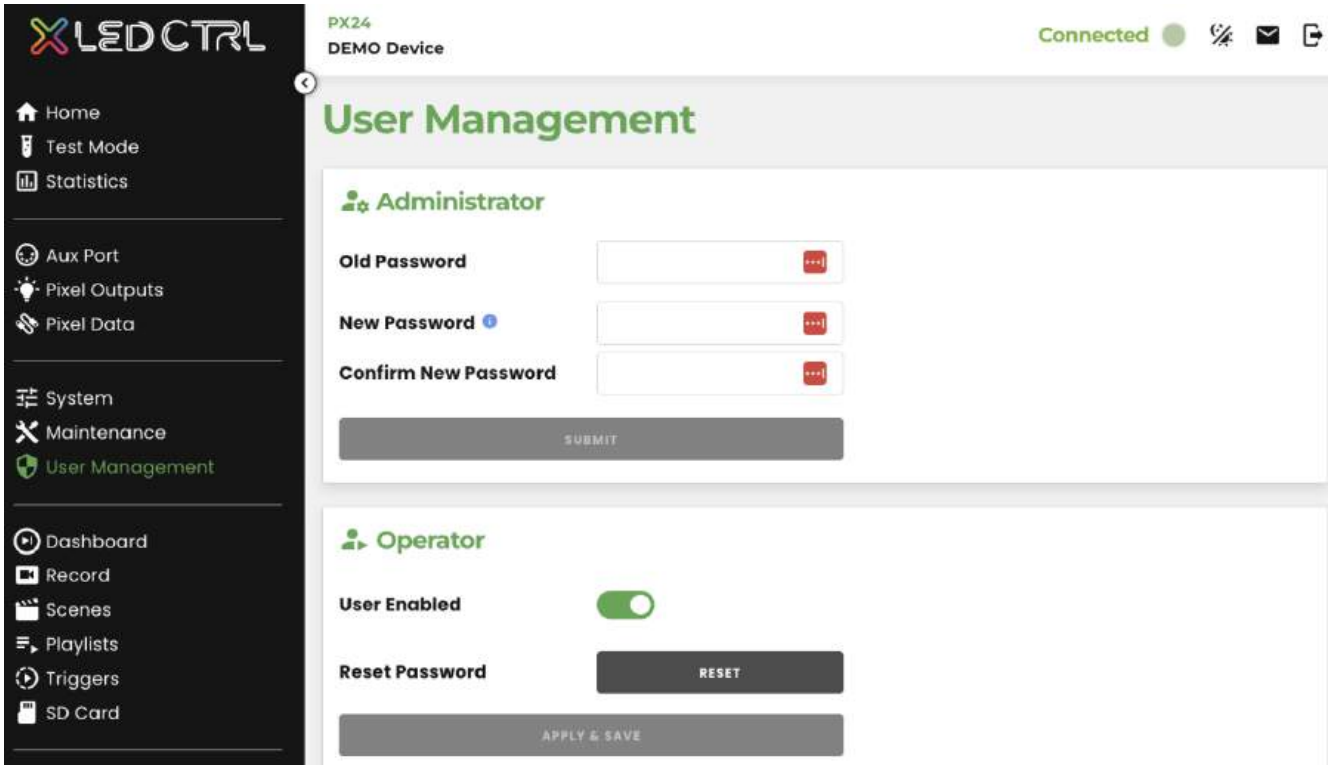

Figure 26 - User Management Page

13.1 Administrator

The administrator has access to the entire management interface, including the Dashboard, and configuration of the Dashboard.

To change the administrator's password, simply enter the old password, then enter the new password twice, and press "Submit". This new password for the device will be required upon next login.

If a password has been lost or forgotten, refer to Section 12.4 for information on resetting the device to factory default.

Note: By default, the device will have a blank password. To add a password, simply follow the above procedure, leaving the "Old Password" field blank. To remove a password, simply follow the above procedure, leaving both "New Password" and "Confirm New Password" blank.

13.2 Operator

The Operator only has access to the Dashboard, which the administrator will usually configure for them. This user can be enabled, and a password can optionally be set.

The Operator user allows restricted access to the device, and is primarily intended to allow in-house staff to control the Dashboard by changing scenes, intensity, etc. without the need for external and third-party controlling interfaces to be set up.

14 About & Help Pages

These pages offer useful information about the device, and additional resources that may be useful to operating the device.

14.1 About

The following information is shown on the About page:

Name	Description
Bootloader Version	Current version number of the device's boot application.
Hardware Version	Version number of the device's hardware design.
Firmware Version	Current version number of the device's main application.
MAC Address	Media Access Control Address - Unique network identifier assigned to this specific device for communication on the Ethernet network.

14.2 Help

Click on any of the links on the page to be directed to various resources that may assist in operating the device.