TAIT

LightStrike
follow the magic

User Guide
Version 2.4.2

1. Basics

LightStrike provides performer and scenic tracking for OSC/UDP enabled consoles and sACN controlled rigs.

Initially developed for a critically acclaimed major new West End production, LightStrike tracks flying performers and scenic elements in up to 3 dimensions. Unlike some other tracking solutions, LightStrike doesn't require 3D models, but uses a calibration process to map inputs to outputs. LightStrike can be seen in major musicals and plays across the globe.

1.1 System Checklist

Although LightStrike supports several different network and configurations options, the following checklist will give you the best user experience and most flexible solution.

- ✓ Lighting/video console supporting sACN output (Eos-family, GrandMA3 etc.)
- ✓ DMX gateways/nodes supporting sACN per-address (DD) priority (ETC Net3/Response/MkII Gateways, Pathway Pathport DMX Gateways etc.)

Note: When using Pathway Pathport DMX Gateways, you should be on at least firmware version 4.1.1.

1.1.1 Hardware Requirements

Hardware requirements are dependent on the number of Conversions, Inputs and Outputs required. LightStrike runs natively on all Intel and Apple Silicon Macs.

Suggested hardware requirements can be found at lightstrikeapp.com.

1.1.2 Operating System Requirements

Minimum requirement macOS 10.15 Mojave

Full support for:
macOS 10.15 Mojave (Intel)
macOS 11 Big Sur (Intel/Apple Silicon)

1.2 Input Systems

An Input System supplies LightStrike with data which can be converted to moving light or media server positions. Input Systems provide full or partial positional information from automation or flying systems.

Each Input System has at least one unique UDP port which must match that of the sending system. Some input systems can be assigned to a specific network adapter to support more complex network setups.

1.2.1 Supported Input Systems

System	Axis (per ID)	Rotation	Control	Titles
EN-NET14 (Studio One Four)	1			
Foy	3			
Kinesys	1			
OSC	-		✔	
OTP-4 (E1.59)	3	✔		✔
PRG	1			
PosiStageNet 1	3			
PosiStageNet 2	3	✔		✔
STS	1			
Simotion (Stage Tech)	1			
Spikemark (Watchout)	1			
sACN (E1.31)	1		✔	

EN-NET14 (Studio One Four)
EN-NET14 and associated wire-pull encoders can be connected to automated and non-automated systems to provide positional information for a single axis. Multiple encoders allow tracking in up to 3 dimensions.

Flying by Foy
Positional information can be tracked by LightStrike to provide full 2D/3D performer flying tracking.

Kinesys
Tracking of scenery positions in up to 3 dimensions. Support for K2 V1.2.xxx and V1.3.xxx, and Vector V2.1.0.54 and later.

OSC (Open Sound Control)
OSC can be used to quit LightStrike or shutdown the machine it is running on.

OTP-4 (E1.59)
Tracking of automation data in up to 3 dimensions, plus rotation. OTP is highly scalable and allows large numbers of objects to be tracked from a single controller.

PRG

Tracking of positional data to support up to 3 dimensions. To provide maximum flexibility, you must specify how many properties (types of information about each object) are provided in the data packet, and the index of positional information (after the identifier).

Example: Object1, {Position}, {Velocity}, Object2, {Position}, {Velocity}
There are 2 properties per index and the position is at index 1.

PosiStageNet 1/2

Tracking of automation data in up to 3 dimensions (plus orientation in PosiStageNet 2). Support for multiple frames allows large numbers of objects to be tracked from a single controller.

sACN (E1.31)

sACN input can be used to enable/disable conversions, provide live offsets to other input systems, or as its own axis.

Silicon Theatre Scenery (STS)

Tracking of scenery positions, including revolve data.

Simotion (Stage Technologies)

Tracking of scenery positions in up to 3 dimensions. Multiple 'Nodes' are supported.

Spikemark

Tracking of motor positions using the 'Watchout' data format.

1.3 User Input Systems

Some types of input systems require additional calculations before the data provided can be turned into useful axis values. An example of this would be converting the position of a revolve in degrees into an X/Y coordinate.

1.3.1 Supported User Inputs

Revolve

Converts an Input System revolve position in degrees to either an X/Y coordinate, or a looping 0-359° value.

Supports: EN-NET14, Flying by Foy, Kinesys, OTP-4, PRG, PosiStageNet 1, PosiStageNet2, sACN, Silicon Theatre Scenery, Simotion (Stage Technologies), Spikemark (Watchout)

Trilateration (Foy)
Trilateration uses the lengths of wires and known winch/motor positions to calculate a 3D position.

Supports: Flying by Foy

Dual Point
Converts the position of two parallel points into the position of the centre of the points and the resulting angle e.g. hoists at either end of an angled truss.

Supports: EN-NET14, Flying by Foy, Kinesys, OTP-4, PRG, PosiStageNet 1, PosiStageNet2, sACN, Silicon Theatre Scenery, Simotion (Stage Technologies), Spikemark (Watchout)

Maths
Outputs the result of a user defined formula containing basic maths functions, including the values of two Input System positions.

Supports: EN-NET14, Flying by Foy, Kinesys, OTP-4, PRG, PosiStageNet 1, PosiStageNet2, sACN, Silicon Theatre Scenery, Simotion (Stage Technologies), Spikemark (Watchout)

1.4 Coordinates

In many cases a single Input System may be used to provide all positional data, but to support advanced configurations, LightStrike allows you to build coordinates from any supported Input System or User Input System. This means the X/Z position could, for example, come from Flying by Foy whilst the Y is provided by PosiStageNet.

LightStrike uses the following coordinate system:

X – Horizontal (left/right)
Y – Horizontal (near/far)
Z - Vertical (up/down)

Some Input Systems use different coordinate systems. More information can be found under Input Settings.

1.4.1 Zones
Each Coordinate can have one or more Zones. Each Zone represents a region in 1D, 2D or 3D space. Zones can have a label, colour and actions applied to them. Zones can be used for information purposes or queried by Logic (see below).

Licensed copies of LightStrike will display the current Zone within the Coordinate Monitoring display.

Zones cannot overlap but can be nested up to 2 deep.

1.5 Logic

Logic Actions are used to provide additional functionality based on the result of logic calculations. You may wish to use Logic to inhibit a particular fixture's intensity when an object is outside a particular zone, or when a performer flies higher than another for example.

Once created, Logic Actions can be applied to any Conversion of the applicable type.

Intensity

Intensity Logic Actions can be applied to Array/Map Intensity Conversions. They either inhibit or uninhibit the output level depending on the result of the calculation.

1.6 Output Systems

OSC (Open Sound Control)

OSC commands can be sent to any device which supports the protocol, including Eos-family consoles running version 2.3 or later. Sneak Entry/Exit using OSC is currently only available with Eos-family consoles.

UDP

UDP ASCII strings can be sent to any device which supports them, including Eos-family consoles.

sACN

sACN can be used to provide direct control of fixtures or media servers which support it. LightStrike supports per-address (DD) priority which allows only enabled addresses to be controlled by LightStrike whilst leaving another system in control of the rest of a universe. Only certain DMX nodes such as ETC Net3/Response/MkII Gateways or Pathway DMX Gateways support per-address priority. An sACN merge option is also available where this is not supported, although this may introduce some slight lag in larger systems.

1.7 Calculations and Dimensions

1.7.1 Calculations

LightStrike uses a process of calibration to calculate the output for a certain input. Your usage model will define how many points of calibration are required for each Conversion (parameter).

There are two methods for calculating output, each of which is targeted for certain types of usage.

Linear

Linear calculations are used for media servers/projection, or arrays of lighting fixtures such as bars or grids of pixels. For these purposes, there is no need to enter an intermediate value between the minimum and maximum output as it follows a linear course.

Non-linear

Non-linear calculations are mainly used for moving light fixtures. In these cases, the output is not linear from point to point but follows a curve. To calculate the required output, LightStrike requires an intermediate (middle) point.

Some Conversions only require the tracking of one axis, whilst others may track multiple axis. See Dimensions below.

1.7.2 Dimensions

LightStrike has 7 possible options for dimensions, which allows tracking of all combinations of axis.

1D X

The output is calculated by tracking the Coordinate's X axis, and comparing it with the corresponding minimum, intermediate (for non-linear) and maximum X output values. 2/3 calibration points required.

1D Y

The output is calculated by tracking the Coordinate's Y axis, and comparing it with the corresponding minimum, intermediate (for non-linear) and maximum Y output values. 2/3 calibration points required.

1D Z

The output is calculated by tracking the Coordinate's Z axis, and comparing it with the corresponding minimum, intermediate (for non-linear) and maximum Z output values. 2/3 calibration points required.

2D XY

The output is calculated by tracking the Coordinate's X and Y axis, and comparing them with the corresponding minimum, intermediate (for non-linear) and maximum output X and Y values. 6/9 calibration points required.

2D XZ

The output is calculated by tracking the Coordinate's X and Z axis, and comparing them with the corresponding minimum, intermediate (for non-linear) and maximum output X and Z values. 6/9 calibration points required.

2D YZ

The output is calculated by tracking the Coordinate's Y and Z axis, and comparing them with the corresponding minimum, intermediate (for non-linear) and maximum output Y and Z values. 6/9 calibration points required.

2D or not 2D?

That is the question. When should you use a 2D calculation vs a 1D calculation?

Example: a light is required to follow a performer on a track that can move vertically and horizontally (left/right). The light is rigged in front of the track and nearer to one end. As the light is hanging in a conventional manner (vertically), Tilt controls the vertical movement of the beam whilst Pan controls the horizontal movement.

1D. To calculate the Pan value, LightStrike only needs to know the horizontal (X) position as even if the performer moves up and down this will not affect the Pan output. Therefore, only a 1D calculation is required.

2D. To calculate the Tilt value, LightStrike needs to know both the horizontal (X) and the vertical (Z) positions. This is because as the performer moves away (horizontally) from the light, the Tilt value reduces i.e. the angles become shallower. Therefore, a 2D calculation is required.

If a fixture was rigged sideways, where Tilt controlled the horizontal movement of the beam, the use of 1D and 2D would be inverted.

3D XYZ

The output is calculated by tracking the Coordinate's X, Y and Z axis, and comparing them with the corresponding minimum, intermediate and maximum output X, Y and Z values. This option always uses non-linear calculations. 27 calibration points required.

1.7.3 Calibration

There are a few hints and tips for successful calibration. Following these guidelines will ensure you are able to easily calibrate LightStrike.

- ✓ Choose fixtures located outside of the area to be tracked
- ✓ Fixtures within the tracked area should be rigged at 90° (on their side) where possible (Map Conversions may provide 'one-hit' solutions where this isn't possible)
- ✓ Maintain tilt direction (positive/negative degrees) when calibrating

Revolves

When calibrating positions for revolves, the points captured should assume a square as illustrated below:
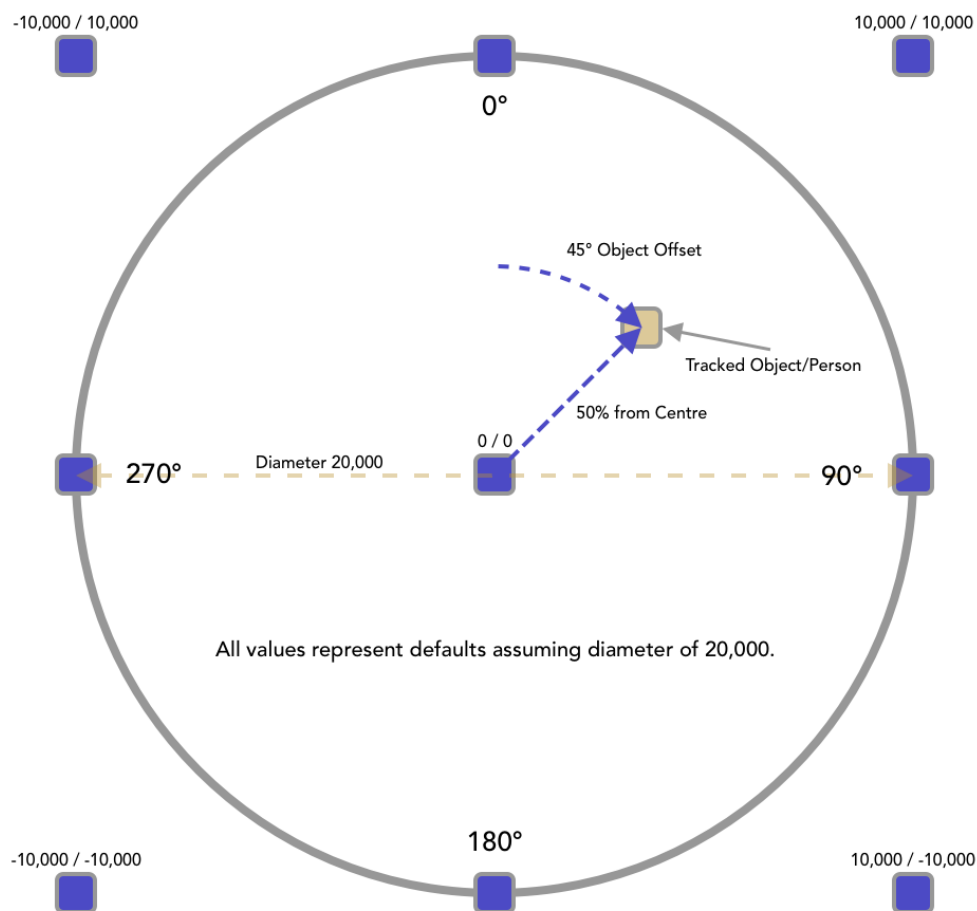
A tracked object is illustrated, showing how the Object Offset and % from Centre values are calculated.

1.8 Keyboard Shortcuts & User Interaction

Shortcut	Action
File & General Actions	
⌘ N	New show file
⌘ O	Open show file
⌘ S	Save show
⌘ ⇧ S	Save show with a new name
⌘ B	Send show to backup
⌘ W	Close window
⌘ Q	Quit LightStrike
⌘ ,	Open Settings
Table & Text Actions	
⌘ C	Copy selected items or text
⌘ V	Paste selected items or text
⌫	Delete selected items or text
⌘ Click	Add selected item to selection
⇧ Click	Select items between previously selected item and this one
⌘ G	Create Group from selected Conversions
⌘ F	Find Conversions using label or notes
Drag	Reorder or nest table items
Up Arrow	Nudge coarse up (some text fields)
Down Arrow	Nudge coarse down (some text fields)
⇧ Up Arrow	Nudge fine up (some text fields)
⇧ Down Arrow	Nudge fine down (some text fields)

2. Settings

Settings is designed to ease your workflow. When completing your initial setup of LightStrike begin with Console and work across each tab from left to right.

LightStrike show files use the 'lsf' extension. LightStrike continuously saves working changes to a persistent store, so quitting and relaunching will not lose changes. However, it is recommended to save regularly in case you need to go back to a previous version. LightStrike always saves files with a date/time stamp, so you are always saving a new version rather than overwriting a previous file.

Note: Settings and other show data is not automatically synchronised with a backup device but can be transferred at any time by going to File > Send to Backup, using the device status drop-down menu, or keyboard shortcut ⌘+B. It is also possible to start a transfer whenever you save on the Primary. See Application Settings.

2.1 System

System settings are all stored on the device and are not included in the 'lsf' show file.

It is possible to restore all system settings to factory defaults using the 'Restore Factory Defaults' button at the bottom of the display.

2.1.1 Device
Name
Choose a name to uniquely identify this device. This will be used as the source name for sACN data.

Mode
Choose the operating mode for this device

Primary – the device operates with a backup and will normally output data
Backup – the device observes a primary and will only output data if the primary fails
Standalone – the device operates without a backup and will normally output data

2.1.2 Network
Delay networking
Some faster Mac hardware will start LightStrike before the network interfaces are fully initialised. To ensure networking starts correctly Delay Networking delays the start of network activity in LightStrike for 5 seconds to ensure devices are online.

Backup IP
Enter the IP address of the backup device when in Primary mode.

Backup Interface
Communications between Primary and Backup can be bound to a specific network interface on the host machine. Alternatively, setting this to 'Default' will always use the default adapter in macOS System Preferences.

Backup Takeover
Network reliability varies due to a number of factors. To prevent the backup taking over unnecessarily on less reliable networks, but also allow a more seamless takover on high performance networks, two options are provided. This setting should be consistent on both Primary and Backup devices.

Standard – backup takes over after 2s (default)
Fast – backup takes over after 4.5s

Network Patch
Up to 5 named network interfaces are supported, and each of these is assigned to a specific network adapter or the default adapter. These interfaces are available to some Input/Outputs systems. The same physical adapter can be assigned to multiple interfaces.

When running with a primary and backup, the interfaces must be setup on both machines, ensuring the numbering remains consistent.

2.1.3 Application
Kiosk mode
When in Show Mode, Kiosk Mode auto hides the macOS Menu Bar and Dock, and prevents the machine from being shut down or restarted via the menu.

Reopen displays on load
When Reopen Displays on Load is enabled, all monitoring displays (Input, Coordinate, Output) will be reopened in their previous location after a show load/new or when launching LightStrike. This setting is ideal for show operation setups.

Note: On larger shows leaving Input/Output monitoring open during operation is not recommended as this creates additional load on the CPU which is best dedicated to processing fades.

Appearance
Automatic – Follow the system settings for light/dark mode
Always dark – Always display in dark mode
Always light – Always display in light mode

LightStrike will follow the system accent colour on macOS 10.15+ (Mojave), but will also display in classic LightStrike purple when using the multicolour option in macOS 11+ (Big Sur).

Save on quit
When save on quit is enabled, quitting LightStrike saves the show file to the last directory specified.

Send to backup on save
Whenever a save action is initiated by the user, the Primary will attempt to transfer the show file to the backup. This transfer does not occur on quit when 'Save on quit' is enabled.

Nudge Coarse
Many numeric text fields support nudging the current value using the arrow keys. Enter a value between 0.0-100.0 to be used when the Up/Down arrow keys are used.

Nudge Fine
Many numeric text fields support nudging the current value using the arrow keys. Enter a value between 0.0-100.0 to be used when the ⇧+Up/Down arrow keys are used.

Licensing
Select 'Edit' to enter licence information or deactivate an existing licence on this machine.

It is important that you enter the Name, Licence Key and for expiring licences the Expiry date, exactly as you received them. LightStrike will display the version purchased (Basic, Plus, Pro) and optionally time remaining when it is activated.

2.2 Console
Create fixtures and channels, and synchronise their addressing with supported consoles using OSC. Create capture sets to enable Auto Capture.

To synchronise channel addressing, or capture set targets, select from the supported consoles and enter the IP address and OSC Version where applicable. Ensure OSC is enabled on the console.

Subscribe

When 'Subscribe' is checked changes are continuously synchronised as they occur on the console.

Sneak Time

Enter a default Sneak Time to use for new Conversions. Changing this value does not impact Conversions previously created using the default time.

Note: The value entered here is also used by Auto Capture.

OSC User

Enter an OSC User number (any positive integer or zero) which can be automatically inserted into OSC or UDP strings using the OSC User Number replace character (See Parameters).

Note: The value entered here is also used by Auto Capture.
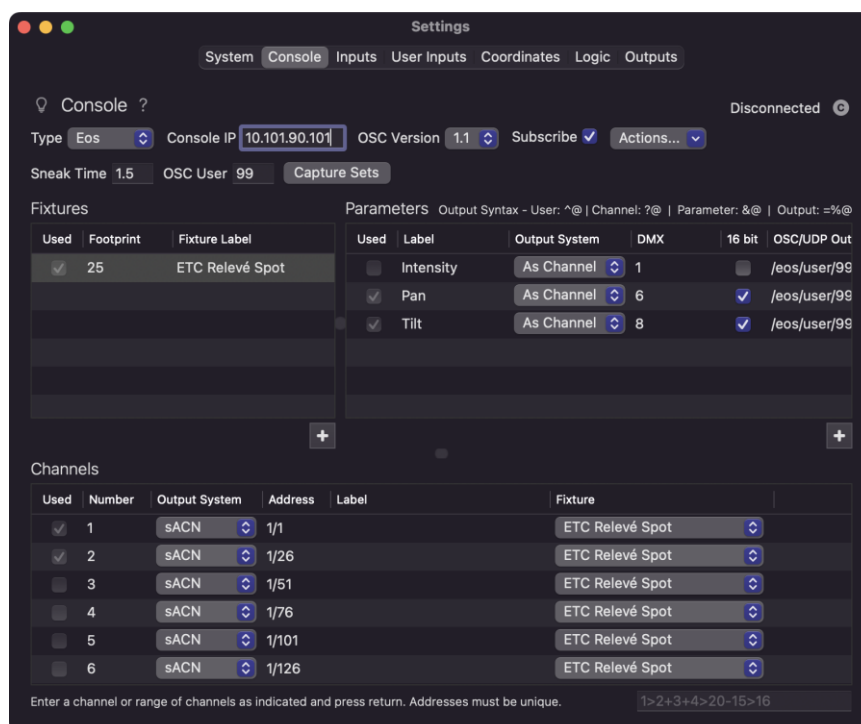
2.2.1 Actions

Connect to console

Initialises a connection to the selected console. If 'Subscribe' is checked, as soon as a connection is established any channel and capture set target information is immediately synchronised with the console and will then be updated automatically when changes occur on the console.

When a connection has been established the console connection indicator is displayed in green:

Disconnect from console
Disconnects from the selected console.

Sync all channels with console
Initialises a connection to the selected console and synchronises the addressing and label of all channels with the console specified.

Sync selected channels with console
Initialises a connection to the selected console and synchronises the addressing and label of the selected channels with the console specified.

Sync capture set targets with console
Initialises a connection to the selected console and synchronises the list of channels contained within all capture set targets with the console specified.

Create conversions
Creates Conversions of the specified type for each parameter of the selected channels.

If the resulting Output System for a parameter is sACN, and the Channel is unaddressed (0/0), it will not be possible to enable the Conversions until they have a valid address.

Remove conversions
Removes any existing Conversions which are linked to any of the selected channels.

Link conversions
Discovers existing Conversions which have an output address matching any of the selected channels and links them to the appropriate channel.

2.2.2 Fixtures
Create, copy, or remove existing fixtures.

Used
Indicates if the fixture has been assigned to a channel.

Footprint

The DMX footprint of the fixture. This is required to ensure addresses of channels are unique and do not overlap.

Label

A user defined label for the fixture, usually the manufacturer and model.

2.2.2 Parameters

Create or remove existing parameters for the selected fixture.

Copied parameters can be pasted either within the same fixture or into another fixture.

Used

Indicates if the parameter has been assigned to any Conversions.

Label

A user defined parameter label such as 'Pan' or 'Tilt'. This label will be used in OSC/UDP output if the '&@' delimiter is used in the 'OSC/UDP Output' field (see below).

Output System

Choose the Output System which should be used by this Conversions linked to this parameter, for example OSC or sACN. 'As Channel' (default) indicates the parameter will use the Output System assigned to the Channel.

DMX

The DMX offset of this parameter within the fixture. For example, intensity is often the first address of a fixture so this would be entered as 1. See the console fixture library for further information.

16 bit

Defines whether this parameter uses 16-bit addressing, for example pan or tilt. If you wish to use sACN Capture with Conversions referencing this parameter, you must specify the correct size here, even if not using sACN for output.

OSC/UDP Output

Where OSC or UDP are used as the output system for any Conversions referencing this parameter, the string sent is defined here. Insert '=%@' at the point where the output value should be inserted. This will be replaced on output. Enter '^@' in place of the OSC user number, '?@' in place of the channel number, and '&@' in place of the parameter label. See OSC Output for more information.

Replace Character	Replace Value
^@	OSC User Number
?@	Channel Number
&@	Parameter Label
=%@	Output Value

2.2.3 Channels

Create, copy, or remove channels. To create new channels, first enter the number(s) desired using the delimiters below which will be validated for uniqueness when clicking the add button.

Thru   >
Plus   +
Minus -

For example '1>2+3+4>10-7>9' will create channels 1, 2, 3, 4, 5, 6 & 10.

Used
Indicates if the channel has been assigned to any Conversions.

Number
A user defined number for this channel which matches the console. Channel numbers must be unique.

Output System
Choose the Output System which should be used by Conversions linked to this channel and where the linked parameter is set to use Output System 'As Channel'.

Address
When sACN is selected as the output system for this channel, the address used for output is set here. You can enter values using either Universe/Address or Address format e.g. 2/1 or 513. If you wish to use sACN Capture for Conversions linked to this channel, you must specify an address here, even if not using sACN for output.

Label
A user defined label, such as the channel's purpose or location.

Fixture
Select the fixture type for this channel.

2.2.4 Capture Sets

Capture sets form the basis for Auto Capture. Each capture set represents a group of identified targets on supported consoles (such as palettes or presets) which contain the channel data to be captured. It is likely that a capture set may be created for each Coordinate.

Create, copy, or remove capture sets using the standard keyboard shortcuts and buttons. There are two types of capture set (one for each capture type) for more information see below.

Once capture sets are configured, synchronising their contents with supported consoles is done using the 'Actions…' menu.
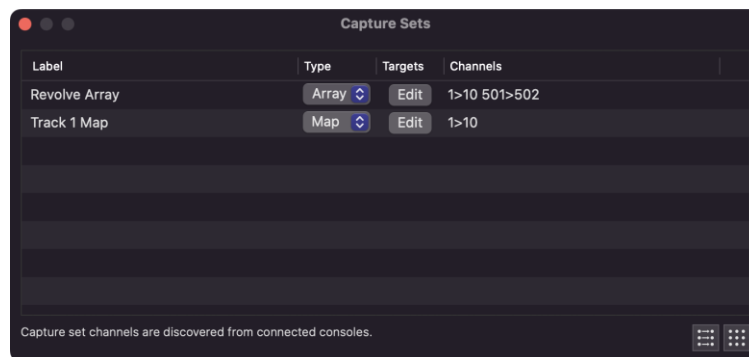
Label
A user defined label for the capture set.

Type
This can be either Array or Map. When Array is selected, it is possible to specify identifiers for up to 27 targets (dependent on the dimensions chosen). When Map is selected, any number of targets can be created and identified.

Targets
Choose the target type from the options below. For a capture set to be valid, a target type must be selected.

Available Targets
Eos-family
Preset
Intensity Palette
Focus Palette
Color Palette
Beam Palette

For capture sets with a type of Array, it is possible to identify up to 27 targets identifiers. First select the number of dimensions, then assign the target identifiers.

For capture sets with a type of Map, use the '+' button to create the desired number of targets, and then enter each target identifier.

Channels
Displays a superset of the channel numbers discovered within the targets specified. This is not editable.

2.3 Inputs
All configuration of input systems is done here. Some input systems have additional settings which appear in the table on the right. If an input system supports variables they can be added using the + button in the table at the bottom.

2.3.1 General
Enabled
When an input system is enabled the specified port is opened, and ready to receive data.

Port
The port(s) should be set to match the send port(s) on the external input system. Ports must be unique across input/output systems and each system has a suggested port prefilled. You can enter multiple ports separated by a comma.

Interface
Some input systems (mainly those using Multicast) can be bound to one or more specific network interfaces on the host machine. Alternatively, setting this to 'Default' will always use the default adapter in macOS System Preferences.

2.3.2 Variables
Variables are used for several purposes, including modifying user input systems and as user configurable offsets for other input systems.

All variables have a label to distinguish them and minimum/maximum outputs which are used to convert the raw data such as sACN into a useful value.

Offsets
An offset is used to adjust an input axis in either direction. An example may be to centre on a head rather than torso. As input systems use different systems of

measurement you will need to define variables with different ranges for different input systems.

Example:
If your input system provides values in millimetres, you may wish to set Min Output to -1000 and Max Output to 1000. This will allow you to modify the value being received by 1 metre in either direction.

Modifying User Input Systems
To track an object or person, some user input system types such as Revolve require extra information in addition to that provided by an automation input system. Where this is possible you will be able to select from the list of variables. You will need to specify a sensible Min Output/Max Output for these cases such as 0-100 for '% from centre'.

2.4 User Inputs
Creating and configuring user input systems is done here. Additional settings will appear in the table on the right. User input systems can be added using the + button.

2.4.1 Revolve
For more information on revolves see Calibration.

Resulting Coordinate (Output Degrees disabled):
X = X
Y = Y
Z = 0

Resulting Coordinate (Output Degrees enabled):
X = Degrees
Y = Degrees
Z = Degrees

World (not always shown)
The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

ID
The identifier of the input. This can be either a number or textual identifier such as '51' or 'Revolve'.

Variable (not always shown)

The identifier of the axis variable. Not all input systems support multiple axis for a single identifier. Select from X, Y or Z.

Clockwise

This should be checked if the input system increments degrees when rotating clockwise.

Offset Rotation / North

To provide useful coordinates 0° should be at 12 o'clock (north). Enter a value between 0-359 to correct this if necessary.

The 'North' value shows what the input system would be sending when at 12 o'clock (north) before the offset is applied.
Note: It is possible to 're-zero' a revolve using OSC. This can be useful if each move of a revolve provides relative rather than absolute position, or for normal calibration. Sending the following command using the OSC ID (see below) will store the current revolve position as 0.

/lightstrike/setup/userinput/revolve/{OSC ID}/zero

Min Input (0°)

Enter the value received from the Input System when the revolve is at its 0° position. This will usually be 0.

Max Input (360°)

Enter the value received from the Input System when the revolve is at its 360° position. This may be 360 or another value such as 36,000 depending on the Input System and configuration. If the input continues incrementing beyond the first 360° this should be the value after the first revolution.

Diameter

Enter the diameter of the revolve. This value is used to create an X/Y coordinate and is only used within LightStrike.

Example: Diameter 20,000 will produce coordinates from -10,000 X / -10,000 Y to 10,000 X / 10,000 Y. The centre of the revolve is always zero.

% from centre

To calculate the X/Y position of an object within the area of the revolve LightStrike needs to know where it is in relation to centre. 0% mean the object is at the centre of

the revolve, 100% means it is at the very edge. Create an Input System Variable with a range of 0-100 and map it here.

Object Offset
The standard calculations assume the object is positioned on the revolve at 0°. In reality of course that is mostly not the case. To allow LightStrike to know where the object is, create an Input System Variable with a range of 0-359 and map it here.

Output Degrees
By default, the calculations from a Revolve User Input provide X/Y axis values for use in Coordinates. Sometimes it is desirable to access values in degrees, such as with Map Conversions. Checking this box will output the position in degrees.

OSC ID
It is possible to re-zero a Revolve User Input using OSC. This identifier is used in the OSC string, allowing multiple User Inputs to be zeroed using the same command.

For further information see Offset Rotation / North.

2.4.2 Trilateration
To perform trilateration, LightStrike requires the positions of 3 winches/motors and the identifiers of each of those motors to read the wire lengths.

Resulting Coordinate:
X = X
Y = Y
Z = Z

Point ID (x3)
The identifier for this winch/motor

Point X (x3)
The X coordinate of this winch/motor

Point Y (x3)
The Y coordinate of this winch/motor

Point Z (x3)
The Z coordinate of this winch/motor

2.4.3 Dual Point

Combines the positions of 2 points and returns the position of the centre of the points, along with the angle. Can be used with trusses and flown bars which are rotated during performances.

Resulting Coordinate:
X = Position
Y = Angle
Z = 0

Point 1 World (not always shown)
The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

Point 2 World (not always shown)
The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

Point 1 ID
The identifier of the input. This can be either a number or textual identifier such as '51' or 'Motor 1'.

Point 2 ID
The identifier of the input. This can be either a number or textual identifier such as '52' or 'Motor 2'.

Point 1 Variable (not always shown)
The variable to be used from the input.

Point 2 Variable (not always shown)
The variable to be used from the input.

Spacing
The spacing of the two points in the same unit used by the Input System when the points are equal (usually horizontal). For example, if the data is provided in mm the spacing should be the distance between the points in mm. While accuracy is not essential, it does assist by providing real angles which aids usability.

Invert
Inverts the calculated angle, so positive becomes negative and visa-versa.

2.4.4 Maths

Takes the positions of two points and uses an equation to calculate resulting output.

Resulting Coordinate:
X = Position
Y = Position
Z = Position

Variable A World (not always shown)
The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

Variable B World (not always shown)
The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

Variable A ID
The identifier of the input. This can be either a number or textual identifier such as '51' or 'Motor 1'.

Variable B ID
The identifier of the input. This can be either a number or textual identifier such as '52' or 'Motor 2'.

Variable A Variable (not always shown)
The variable to be used from the input.

Variable B Variable (not always shown)
The variable to be used from the input.
Equation
The formula used to calculate output.

Operators supported:
+   addition
-       subtraction
*   multiplication
/   division
(parenthesis
)   parenthesis

Variable Identifiers:

$a   Point A

$b   Point B

Example:

$a*$b+100

2.5 Coordinates

Creating and configuring coordinates is done here. Add coordinates using the + button.

A coordinate can have up to 3 axis (X/Y/Z) and each can track any combination of inputs.

ID

The Coordinate ID uniquely identifies a Coordinate and is used with the Coordinate Override feature (see Conversion Properties). The Coordinate ID can be changed to another unique value using the 'Change identifier' context menu option.

Note: Changing the Coordinate ID may impact existing shows making use of Coordinate Override as external sources of sACN will also need to be updated to reflect the new value.

Label

Choose a label for this coordinate to easily identify it such as 'DS Slider'.

System (X, Y, Z)

Select the input system to be used for the X, Y or Z axis of this coordinate. Choose 'User' to track a User Input System.

World (X, Y, Z)

The identifier of the input world (sometimes called node). Not all input systems support worlds. This can be either a number or textual identifier such as '0' or 'one'.

ID (X, Y, Z)

The identifier of the input. This can be either a number or textual identifier such as '51' or 'Slider.

Variable (X, Y, Z)

The identifier of the axis variable. Not all input systems support multiple axis for a single identifier. Select from X, Y or Z.

Multiplier (X, Y, Z)

Enter a value to permanently multiply this Coordinate by the amount specified. This may be useful to normalise values across a number of inputs being transmitted with different units.

Multiplier and Offset are processed in the standard mathematical BIDMAS order of operations i.e. Multiplier then Offset.

Offset (X, Y, Z)

Enter a value to permanently offset this Coordinate by the amount specified. This may be useful to normalise values across several inputs being transmitted with different origin points.

Multiplier and Offset are processed in the standard mathematical BIDMAS order of operations i.e. Multiplier then Offset.

2.5.1 Zones

When a Coordinate is selected, it is possible to add Zones using the + button. Creating a Zone with an existing Zone selected will create a nested Zone.

Copied Zones can be pasted either within the same Conversion or into another Conversion.

Note: Zones can be nested up to 2 deep, but cannot overlap or be larger than their parent. When a Zone's limits are displayed in red, the Zone is invalid and will not be used for calculations. Edit the Zone or its parent until the text displays in white.

Zone

You can enter a label such as 'Centre Stage' and select a colour to display by clicking the small grey box.

Min/Max

Enter minimum and maximum values for each of the applicable axis. Minimum values must be less than maximum values.

Actions

Add or remove Zone Actions. See below.

2.5.2 Zone Actions

Zone Actions are triggered whenever Coordinate enters or exits a Zone. You can add one or more Zone Actions to any Zone.

Zone Actions send a user defined OSC command whenever the change occurs. A 'Test' button allows the command output to be tested.

Desk Control
It is possible to enable desk control for a Zone Action, this allows the resulting OSC command to be turned on and off from the lighting console.
Set the address, size (16 bit) and a range to enable the Zone Action.

Send
As OSC packets are sent via UDP, it is possible that a packet may be dropped. To help ensure the command reaches its destination, you can choose to send it between 1 and 5 times.

Command
The OSC command can provide a single numeric or string argument which should be entered following an '=' character.

Examples:
/eos/user/99/chan/1000/param/y_rotate=-180
/eos/user/99/set/sub/21/label=Enter Zone A

2.6 Logic
Creating and configuring Logic Actions is done here. You can add Logic Actions using the + button.

A Logic Action must be valid before its result will be applied. Ensure the traffic light indicator is either red, or green.

Traffic Lights
None   Invalid
Red   Inactive (the opposite of the specified Result will be applied)
Green   Active (the specified Result will be applied)

Label
A useful reference for this Logic Action, for example 'Outside Centre Area'.

Formats
Logic Actions can be creating using any of the following formats. Select items from the drop-down menus to build each action.

{Coordinate A} [Is Inside] {Zone A}
{Coordinate A} [Is Outside] {Zone A}

{Coordinate A} [Is Less Than] {Coordinate B} {Axis (X/Y/Z)}
{Coordinate A} [Is Greater Than] {Coordinate B} {Axis (X/Y/Z)}

Result
Select either Inhibit or Uninhibit to choose the action when the Logic Action is active (green). When the result changes, it is applied using either the Sneak Time, or the Logic Fade Time selected in the Input/Output display.

2.7 Outputs
All configuration of output systems is done here. Some output systems have additional settings which appear in the table on the right.

2.7.1 General
Enabled
When an output system is enabled the system will prepare to output data using the other settings provided.

IP Addresses
Where allowed, enter an IP address which should be used as the destination of messages for the output system.

Advanced
You can also enter complex combinations of interface numbers, IP addresses and ports using the syntax 'interface:ip-address:port'. IP address must be specified, but interfaces and ports can be excluded, in which case the primary interface(s) and port for the output system will be used.

Example (primary interface(s): 2, primary port: 6001):

Entering the following string in IP Addresses '10.0.0.1, 10.0.0.2:6002, 1:192.168.2.1:6005, 1:192.168.2.2' results in:

Transmitting on interface 2 to 10.0.0.1:6001, 10.0.0.2:6002 and transmitting on interface 1 to 192.168.2.1:6005, 192.168.2.2:6001.

Port
Where allowed, enter a port number which should be used by the output system. Ports must be unique across input/output systems and each system has a suggested port prefilled.

Interfaces
Select which network interfaces to use for sending data for this output system. Alternatively setting to 'Default' will always use the default adapter in macOS System Preferences.

Rate
Enter the output rate for this output system in milliseconds where allowed.

2.7.2 Additional Settings (sACN)
Priority
Enter the priority from 0-200 to be used for sending sACN packets. The sACN priority is used by receiving devices to decide which source of data to use. A higher number means the data will be used over that of a lower priority.

Per Slot Priority
Enter the priority from 0-200 to be used for sending active sACN per-address (DD) packets. The sACN priority is used by receiving devices to decide which source of data to use. A higher number means the data will be used over that of a lower priority.

Note: When using DMX nodes supporting per-address (DD) priority, it is important that 'Per Slot Priority' is set higher than the lighting/video console. In addition, setting 'Priority' to a lower number than the console may help recover cleanly in the unlikely event of a full system failure.

Merge Output
By default, LightStrike uses per-address (DD) priority sACN to allow other control systems to retain ownership of other fixtures on the same universe. Not all DMX node manufacturers support this so LightStrike includes an option to merge other sources with LightStrike data. ETC and Pathway gateways support sACN per-address priority.

Note: Using Merge Output will have a noticeable effect on performance when using multiple universes, particularly on devices with lower specifications.

### Backup Takes over at higher Priority
When this setting is enabled, if a backup takes over it will transmit using an sACN priority and per-address (DD) priority 1 higher than the primary. This ensures that even if the primary is still online, gateways will use the backup as a source instead of the primary.

3. Main Interface

The main interface is split into five sections: Controls, Conversions, Display, Logging and Monitoring.

3.1 Controls

The Controls area provides settings, status, and output options.
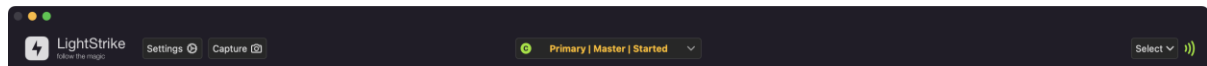
3.1.1 Settings

Enter Settings using the button on the left of the window.

3.1.2 Capture

The capture button opens a menu with options for capturing sACN for either Array or Map Conversions, and for accessing the Quick Cal feature.

3.1.3 Status

The status bar shows the device mode, status and whether output is started. The status is split into 3 sections

Device Mode | Device Status | Output Started

Device Mode displays the current mode of this device; Primary, Backup or Standalone (see Device Mode)

Device Status will display Master, Waiting or Tracking. A Primary/Single device will always display Master. A backup device will initially display waiting until it has connected to the Primary at which point it will display Tracking. If the backup takes over it will switch to displaying Master.

Output Started displays whether this device is currently enabled for output or 'Started'. When the 'Start Output' menu item is selected, or 'Output at Launch' is checked, the device will attempt to activate output. A backup will also display 'Started', even when in a Tracking state. This ensures output will occur when it takes over.

Note: Restoring to a Primary after the Backup has become Master is not supported. However, Backups can be brought online and offline as required.

The status area also provides access to networking functions which can be accessed from the arrow to the right of the bar.

Start/Stop Output

The 'Start/Stop Output' menu item enables or disables output for this device. When this menu item is selected LightStrike checks for an active licence and ensures the number of enabled Conversions is within the limit for the licence type. The same checks occur on a backup to ensure it is permitted to take over control if the Primary device fails.

If a valid licence cannot be found, LightStrike will offer to run in Demo Mode. This will provide output for a varied and limited amount of time after which it will cease. Demo Mode is intended for testing purposes only.

The status bar displays the current output status (this icon can also be clicked to start/stop output):

))) Started
))) Stopped

Connect to console

Initialises a connection to the console specified in Settings (See Console). If 'Subscribe' is checked, as soon as a connection is established any channel and capture set target information is immediately synchronised with the console and will then be updated automatically when changes occur on the console.

When a connection has been established the console connection indicator is displayed in green:

C

Disconnect from console

Disconnects from the console specified in Settings (See Console).

Send File to Backup

Attempts to send the current show file to a connected Backup.

Transmit Active Zone Actions (Enter Only)

Transmits Enter Actions for all Zones which are currently active. See Zone Actions for further details.

Note: It is possible to trigger these Actions using OSC by sending /lightstrike/send/zone/actions/active/enter

Transmit Active Zone Actions (Full State)

Transmits Enter Actions for all Zones which are currently active, and Exit Actions for all Zones which are currently inactive. See Zone Actions for further details.

Note: It is possible to trigger these Actions using OSC by sending /lightstrike/send/zone/actions/active/state

Output at Launch

For show running it is mostly desirable to have LightStrike automatically enable output when it starts. Checking 'Output at launch' will enable output as soon as LightStrike launches.

3.1.4 Select

The select menu provides options for selecting Conversion based on certain criteria.

Coordinates (All/Visible)

Can be used to select Conversions based on the Coordinate used. This is especially useful in larger rigs when used to selected Conversions for sACN Capture.

3.2 Conversions

Conversions are the key component in LightStrike's operation. They define the mapping between input and output. Each Conversion acts on a single parameter or attribute of a fixture for example Pan, Tilt, Zoom or Intensity.

To search for a Conversion, select Find from the Edit menu, or press ⌘+F. Enter text to search by label or notes. When 'Visible only' is checked, only Conversions which are not collapsed within Groups will be included in results. Use the arrows to cycle through the selection, or 'Select All' to select all Conversions which match the search.

You can add Conversions or Groups using the buttons below the table in the Display area.
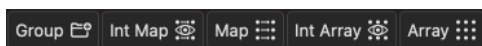
It is possible to edit multiple Conversions at a time by selecting a range and either changing a dropdown or checkbox, or by entering a text value for one of the selected items.

Types

There are four types of Conversion: Array, Array Intensity, Map and Map Intensity. All types share most properties, but Array Intensity and Map Intensity have additional functionality for dealing with intensity control of fixtures, see below.

3.2.1 Conversion Properties

It is possible to show and hide columns in the main window. Each mode (Edit and Show/Active) stores its own set of visible columns.
The 'Columns' button provides options for hiding all columns, showing all columns, or showing only the defaults, as well as showing/hiding individual columns. The Type and Enable columns cannot be hidden.

Column visibility is stored on a device basis, so will not be replicated to a Backup device.

Traffic Lights

Red   Disabled (manually or by sACN)
Amber   Enabled (manually or by sACN) and Output Disabled
Green   Enabled (manually or by sACN) and Output Enabled

Enable

When checked, this conversion is ready to output data. LightStrike licences operate based on enabled Conversions. LightStrike will inform you if you have more Conversions enabled than the limit on your licence.

Type

Displays the Conversion type.

- Array
- Array Intensity
- Map
- Map Intensity

Label

A useful reference for this Conversion, for example 'Channel 501 Pan'.

Chan/Param

Select the channel and parameter you wish this Conversion to use.

Coordinate

Select the Coordinate you wish this Conversion to use.

Coord(inate) Override

You can optionally change the Coordinate a Conversion is currently following using sACN. When an address is entered in this field the 16-bit value received via sACN indicates the Coordinate number the conversion will follow (1-65535). You can enter values using either Universe/Address or Address format e.g. 2/1 or 513. An sACN value of 0 means the Conversion will follow the Coordinate set in the Coordinate selection box. You can view the Coordinate ID in the Coordinate Monitoring window. To disable Coordinate Override, set the address to 0/0.

Active Coord(inate)

Displays the Coordinate which is currently being tracked by this Conversion. This is set by a combination of the previous two properties (Coordinate/Coord Override).

Desk Control

When checked, the Conversion can be enabled or disabled via sACN using the Control address (see next). If unchecked and the Conversion is enabled, data will always be output for this Conversion when output is active.

When Desk Control is enabled, any offset values entered in the Input/Output window (see below) will be ignored and sACN Input will be used instead.

Control

Enter an address to be used for enabling or disabling this Conversion. This is always an 8-bit property. Any level within the range chosen in 'Enable in Range' will enable the Conversion. You can enter values using either Universe/Address or Address format e.g. 2/1 or 513. Multiple conversions can share the same control address. This address is only used when Desk Control is checked.

Enable in Range

Select a level range used to enable this Conversion. This allows a single address to be used to exclusively enable up to 24 different conversions. These ranges are intended for use where a single light/layer is used to track different objects, and thus has multiple unrelated conversions.

Logic (Array/Map Intensity Conversions only)

Select the Logic Action to be applied to the Conversion. When the action is active, the selected result will be applied. See Logic.

Native

Under normal circumstances it is not possible to fade between two Conversions sharing the same output address. Whilst this is by design, there are circumstances when this may be desirable.

To allow Conversions to fade between each other, all Conversions using the same output address must meet the following conditions:

- Use desk control
- Share a control address
- Unique enable range
- 'Native' checked

When switching between Conversions meeting the conditions above, fades will occur over 1 second.

Note: This setting can have serious performance issues and is not intended to be used for all Conversions in a show file.

Sneak Entry

Sneak Entry can be used when either OSC or sACN is selected as the output system. Sneak Entry is currently only offered via OSC on Eos-family consoles, where a sneak command is sent to Eos when the Conversion is enabled via desk control.

When Sneak Entry is selected with sACN output LightStrike fades from the level currently being received for that address from another sACN source. If the level within LightStrike changes (either due to a moving Coordinate or because of a Logic Action) while the transition is in progress, LightStrike will fade towards the new level over the remaining time.

Sneak Exit

Sneak Exit can be used when either OSC or sACN is selected as the output system. Sneak Exit is currently only offered via OSC on Eos-family consoles, where a sneak command is sent to Eos when the Conversion is disabled via desk control.

When Sneak Exit is selected with sACN output LightStrike fades to the level currently being received for that address from another sACN source. If the level from the other sACN source changes while the transition is in progress, LightStrike will fade towards the new level over the remaining time.

Sneak Time

Defines the time used by Sneak Entry/Exit (see above). Values are entered in seconds from 0.0-60.0, for example 1.5 seconds.

Dimensions

Define the dimensions to be used for this conversion. The various 1D and 2D options define which of the 3 potential axis are used. See Calculations and Dimensions for more information.

Input/Output

Click to open the Input/Output window which defines the mapping of input and output information associated with this Conversion. See Input/Output for more information.

Output System

Choose the Output System which should be used by this Conversion, for example OSC or sACN.

Address

When sACN is selected as the output system for this Conversion, the address used for output is set here. You can enter values using either Universe/Address or Address format e.g. 2/1 or 513. If you wish to use sACN Capture for this Conversion, you must specify an address here, even if not using sACN for output.

16 bit

When sACN is selected as the output system for this Conversion, this fields defines whether the Conversion is controlling a 16-bit parameter for example pan, tilt. If you wish to use sACN Capture for this Conversion, you must specify the correct size here, even if not using sACN for output.

Smoothing

LightStrike can optionally smooth Input System data in cases where it is irregular or jumpy. Smoothing ranges from 1 (low) to 14 (high), and will vary between systems. Higher smoothing will inherently cause a noticeable lag.

Output

Where OSC or UDP are used as the output system the string sent is defined here. Insert '=%@' at the point where the output value should be inserted. This will be replaced on output. See OSC Output for more information.

Notes

You can enter any notes here which may be useful.

3.2.2 Conversions Types

Array

The 'basic' Conversion type. Provides calibrated points in up to 3 dimensions using an array of values.

They are added using the Array button

Array Intensity

Uses the same array of points as Array Conversions.

Array Intensity Conversions have extended functionality to deal with intensity control of fixtures. They are added using the Int Array button.

Unlike Array Conversions, Array Intensity Conversions observe the sACN levels of their Address (see above) coming from another source and master it when enabled. This allows you to set a top level from a lighting console and LightStrike will master it as the object moves nearer and farther from the fixture.

Array Intensity Conversions can also have logic applied to them, which allows the fixtures intensity to be inhibited based on certain criteria e.g. when an object is higher than another object. See Logic.

Map

Map Conversions provide a user definable list of mapping points. Map Conversions support 1 dimension.

They are added using the Map button.

Map Intensity

Uses the same list of points as Map Conversions.

Map Intensity Conversions have extended functionality to deal with intensity control of fixtures. They are added using the Int Map button.
Unlike Map Conversions, Map Intensity Conversions observe the sACN levels of their Address (see above) coming from another source and master it when enabled. This allows you to set a top level from a lighting console and LightStrike will master it as the object moves nearer and farther from the fixture.

Map Intensity Conversions can also have logic applied to them, which allows the fixtures intensity to be inhibited based on certain criteria e.g. when an object is higher than another object. See Logic.

3.3 Display

The display area provides control for displaying what Conversions are visible, the current file information, and controls for adding or removing Conversions and Groups.

3.3.1 Display Mode

LightStrike has three display modes designed for different types of operation.

Edit Mode

Edit Mode is designed for use during setup and when regular editing is taking place. Data is displayed and edited in a large table, providing a good overview of data and allowing easy comparison between conversions.

Show Mode

Show Mode is primarily intended for use during Show Operation. Conversions cannot be added, removed, or reordered in this mode. When many conversions are being used, Show Mode helps the interface be more responsive.

Active Mode

Active Mode is primarily intended for use during Show Operation. Conversions cannot be added, removed, or reordered in this mode. Active Mode only displays Conversions which are currently active. When many conversions are being used, Active Mode helps the interface be more responsive.

3.3.2 File Information

Centred above the logging window is the current show file information. At the top is the name of the show, and below it the previous save date/time.

Unsaved changes since the last time LightStrike was launched are indicated by a * next to the show name.
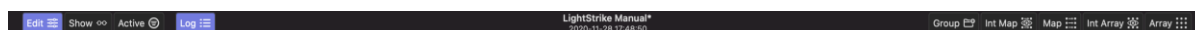
3.4 Logging

The logging area shows information about LightStrike, network status and errors. When Debug Logging is enabled, it may also show additional information such as when a Conversion has been enabled or disabled. See Logging for further information.
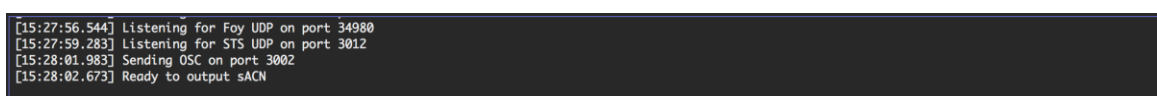
The logging pane can be shown or hidden using the 'Log' button directly above it.

3.4.1 Input/Output

If for some reason an error occurs binding to a port for example you will see 'FAILED' prior to the normal message. In addition, the Input/Output indicator lights will also show that failure has occurred, see Monitoring.

3.5 Monitoring

The Monitoring bar provides access to Input, Coordinate and Output monitoring windows, along with 'traffic light' status indicators.

Input Traffic Lights

Red   Error preparing to receive data e.g. the port cannot be opened.

Amber   Ready but no data is being received.

Green   Data is being received.

Output Traffic Lights

Red   Error preparing to send data e.g. the port is not available.

Amber   Ready to send, but output is disabled (e.g. a tracking backup)

Green   Output is enabled.

If an indicator is **red** the problem likely lies in LightStrike, or you have no network connected. **Amber** means LightStrike is ready to communicate, whilst **green** means everything is active.

3.6 Conversion Tools

The Conversion tools context menu (right-click) provides access to additional tools for modifying one or more Conversions, for example changing the output address for all conversions.

3.6.1 Create

Map Points

Creates up to 10 Map Points for the selected Map Conversions. 'Create up to' will add additional points until all selected Conversions have the number of Map Points selected, while 'Appending' will add that number of additional Map Points. No existing Map Points are modified during this operation.

Variables for Offsets

Creates sACN Variables for all selected Conversions and optionally assigns them to the offset fields of those Conversions.

Enter the first address, offset (how many addresses to jump between each creation) and grouping (how many conversions in a row should use the same offset). Choose the size (16 bit), min/max output, and which offsets to create.
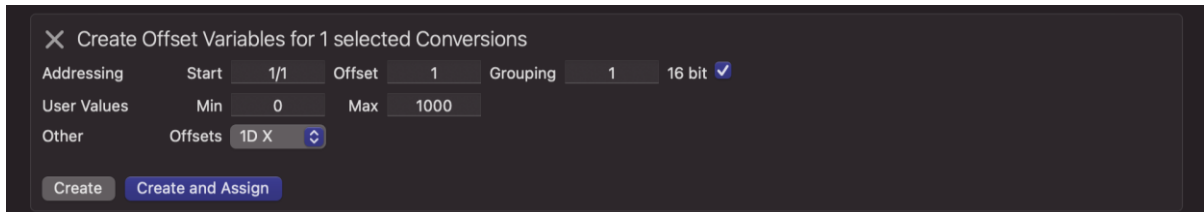
Example:
Conversions – Chan 1 Pan, Chan 1 Tilt, Chan 2 Pan, Chan 2 Tilt

Settings:
Start 101/1, Offset 10, Grouping 2
16 bit, Min Output -2000, Max Output 2000
Offsets 3D XYZ

Result:

Variable 1	101/1	Chan 1 X Offset
Variable 2	101/3	Chan 1 Y Offset
Variable 3	101/5	Chan 1 Z Offset
Variable 4	101/11	Chan 2 X Offset
Variable 5	101/13	Chan 2 Y Offset
Variable 6	101/15	Chan 2 Z Offset

Group from Selection

Creates a new Group containing the selected Conversions.

3.6.2 Select

Matching Control/Output Addresses (All/Visible)

Can be used to select all Conversions with either the same control or output address as any of the selected Conversions.

Matching Coordinate (All/Visible)

Can be used to select all Conversions with the same Coordinate as any of the selected Conversions.

Matching Channel/Channel & Parameter (All/Visible)
Can be used to select all Conversions with the same channel, or channel and parameter as any of the selected Conversions.

3.6.3 Paste Into
Input/Output
Pastes the input/output values from a single copied Conversion into the selected Conversions.

Input Extents (Array only)
Pastes the input extents (input min/max) from a single copied Conversion into the selected Conversions.

Offsets
Pastes the offset values and assigned variables from a single copied Conversion into the selected Conversions.

Logic Time
Pastes the logic fade time variable from a single copied Conversion into the selected Conversions.

Inhibit Level
Pastes the inhibit % level from a single copied Conversion into the selected Conversions.

3.6.4 Modify
Address (Control)
There are 2 options in this display: Replace and Modify.

Replace
Enter the existing control address you wish to replace. LightStrike will display the number of Conversions using this control address. Entering a new valid address and clicking 'Replace' will update all Conversions.

Modify
Entering a valid start address, offset and grouping, and then clicking 'Modify' will update the control addresses of all selected Conversions in the order displayed. Offsets may be any value up to 512, or a larger multiple of 512.

Example (6 Conversions selected):
Start Address 101/1
Offset 1
Grouping 2

New control addresses: 101/1, 101/1, 101/2, 101/2, 101/3, 101/3

Address (Output)
There are 2 options in this display: Replace and Modify.

Note: Conversions with channels/parameters assigned will not be altered by this tool.

Replace
Enter the existing output address you wish to replace. LightStrike will display the number of Conversions using this output address. Entering a new valid address and clicking 'Replace' will update all Conversions.

Modify
Entering a valid start address, offset and grouping, and then clicking 'Modify' will update the output addresses of all selected Conversions in the order displayed. Offsets may be any value up to 512, or a larger multiple of 512.

Example (6 Conversions selected):
Start Address 1/1
Offset 10
Grouping 2

New output addresses: 1/1, 1/1, 1/11, 1/11, 1/21, 1/22

Address (Coordinate Override)
There are 2 options in this display: Replace and Modify.

Replace
Enter the existing coordinate override address you wish to replace. LightStrike will display the number of Conversions using this coordinate override address. Entering a new valid address and clicking 'Replace' will update all Conversions.

Modify
Entering a valid start address, offset and grouping, and then clicking 'Modify' will update the coordinate override addresses of all selected Conversions in the order displayed. Offsets may be any value up to 512, or a larger multiple of 512.

Example (6 Conversions selected):
Start Address 101/1
Offset 1
Grouping 2

New coordinate override addresses: 101/1, 101/1, 101/2, 101/2, 101/3, 101/3

Output (Offset)
Modifies the output values for all selected Conversions by offsetting each value by the amount entered.
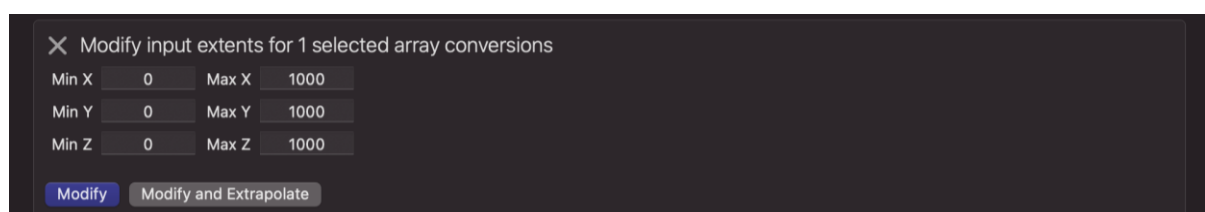
When a mixture of Conversion types are selected, any limits required (DMX, intensity etc) will be preserved. It is recommended a single type of Conversion is selected when using this tool.

Example: A fixture is replaced and as a quick fix, all pan values need to be adjusted by -50 DMX.

Output (Absolute)
Replaces the output values for all selected Conversions with the value entered.

When a mixture of Conversion types are selected, any limits required (DMX, intensity etc) will be preserved. It is recommended a single type of Conversion is selected when using this tool.

Input Extents
Replaces the input extents for all selected Array/Intensity Array Conversions and optionally extrapolates new output values. This tool is useful when the area to be tracked increases or decreases in size from the values captured.

Only edited/highlighted fields will be updated when either of the Modify buttons are pressed.

Modify will only change the input extents edited (Min/Max X, Y, Z), while **Modify & Extrapolate Output** will update input extents, and recalculate (extrapolate) output to match the new extents.

When a mixture of Conversion types are selected, any limits required (DMX, intensity etc) will be preserved. It is recommended a single type of Conversion is selected when using this tool.

Linear

Enables or disables linear calculations for the selected Conversions. See Calculations and Dimensions for more information.

Integer Output

Enables or disables integer (DMX) output for the selected Conversions. This will only impact Conversions not using sACN where this is always required to be enabled.

4. Auxiliary Displays

4.1 Input Monitoring

Input Monitoring allows you to quickly view all incoming positional information. The window is split into two sections, Input Systems and Inputs.

Select an Input System on the left of the window and any incoming positions will be displayed in the panel on the right. You can highlight one or more inputs by selecting them.
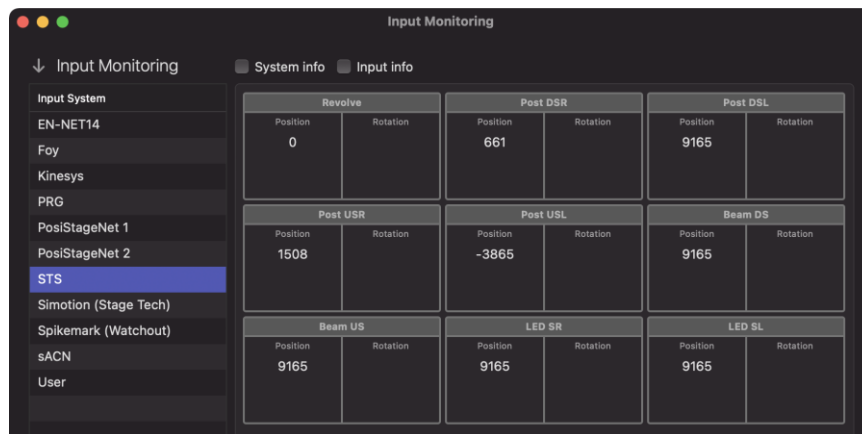
4.2 Coordinate Monitoring

Coordinate Monitoring allows you to quickly view all Coordinate positions. It also provides Coordinate Capture functionality.
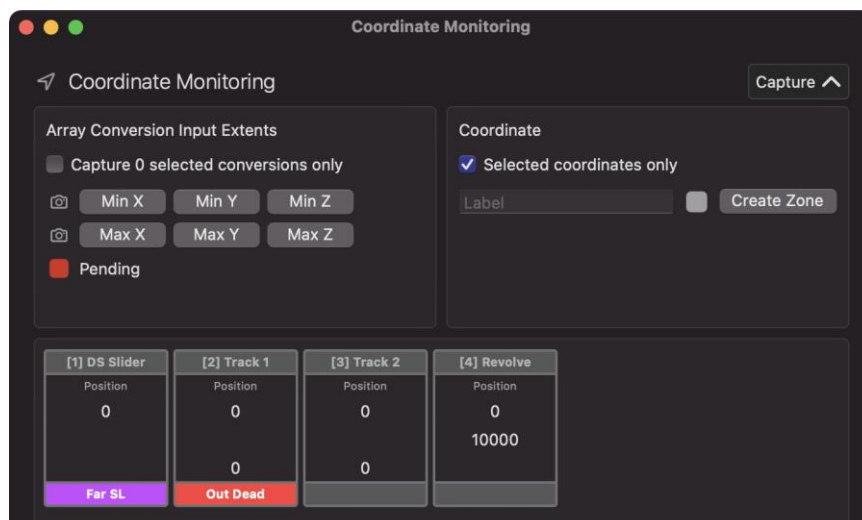
4.2.1 Coordinate Capture

Coordinate Capture quickly and easily captures Coordinate positional information and updates Conversions which reference it. You capture data by clicking on any of the min/max capture (camera) buttons.

There are two options for capturing information, selected Conversions, or selected Coordinates.

When a capture button is pressed, a progress bar will appear and on completion the 'Pending' indicator will change to **green**.

Selected Conversions
When 'Capture X selected conversions only' is checked, only conversions which are highlighted in the main window will be updated. Sometimes you may choose to use different min/max positions for conversions which reference the same Coordinate e.g. to allow a unit to track further off stage.

Selected Coordinates
When 'Capture X selected conversions only' is unchecked, you can select one or more coordinates from the pane below. All conversions referenced by the selected Coordinate(s) will be updated.

4.2.1 Coordinate Zone Creation

From the Coordinate Monitoring display, it is possible to quickly create a Zone for either all Coordinates, or only the selected Coordinate(s). Enter a label, choose a colour, and select 'Create Zone'. The Zone will be created with a range of 0.2, centred on each current axis value.

Example: XY Coordinate, where X = 25 and Y = 16. Resulting Zone X = 24.9 > 25.1, Y = 15.9 > 16.1.

4.3 Output Monitoring

Output Monitoring allows you to quickly view all outgoing positional information. The window is split into four sections, Output Systems, Outputs, Universes and Universe Output.
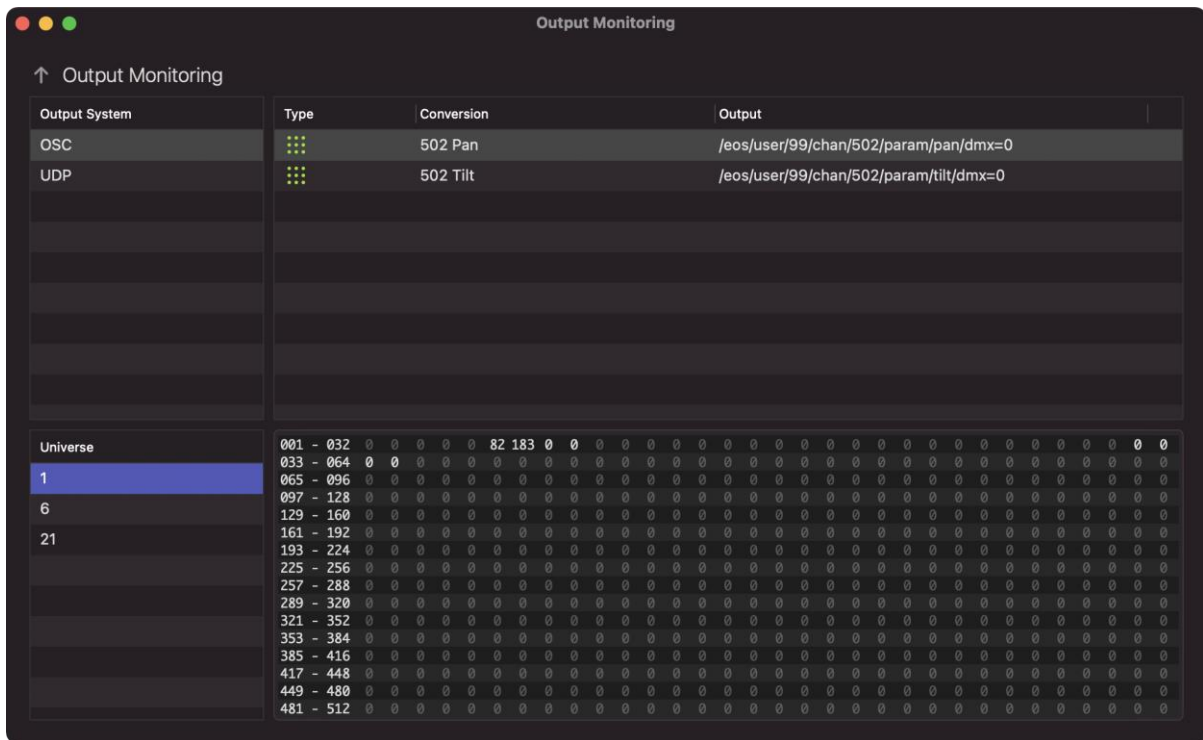
Select an Output System on the top left of the window and any outgoing conversions in that system will be displayed in the panel on the right. The traffic light output indicator on the left shows whether data output is currently enabled and the output value is displayed and updated in real time (when enabled).

Selecting a Universe in the bottom left pane will populate the bottom right pane with a grid displaying the sACN output for that universe. White numbers indicate that the addresses are currently 'active', that is they have a per-address (DD) priority higher than zero.
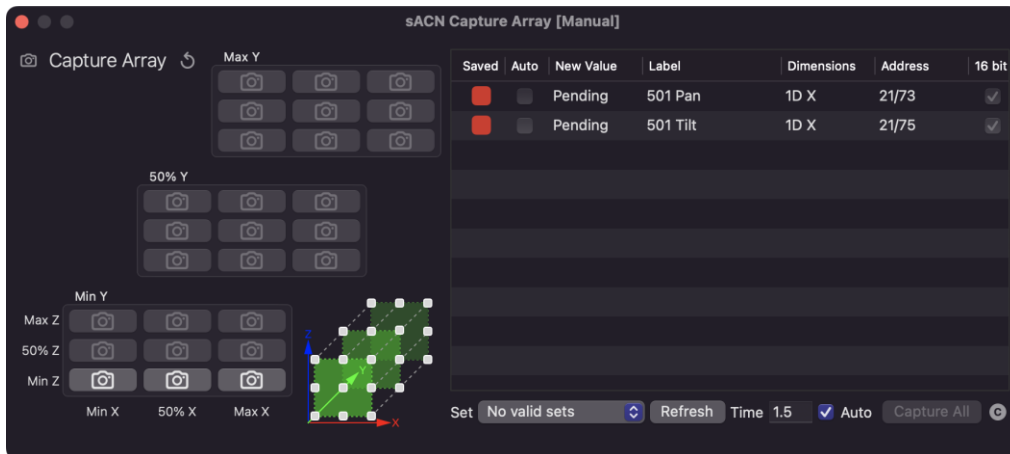
4.4 sACN Capture

sACN Capture quickly and easily captures the values being output by another sACN system such as a lighting console and updates any Conversion which references them.

Capture can be completed manually or automatically. When using manual capture, the sACN source being captured must be set to the appropriate value by the user (for example by interacting with a lighting console), before then using the capture buttons to snapshot the information. When using automatic capture supported consoles can be controlled by LightStrike to make the process faster.

sACN Capture observes the same address and 16-bit value used for Conversion output. If you are not using sACN as the Output System for a Conversion, entering an address and setting the 16-bit mode will allow you to use sACN Capture.
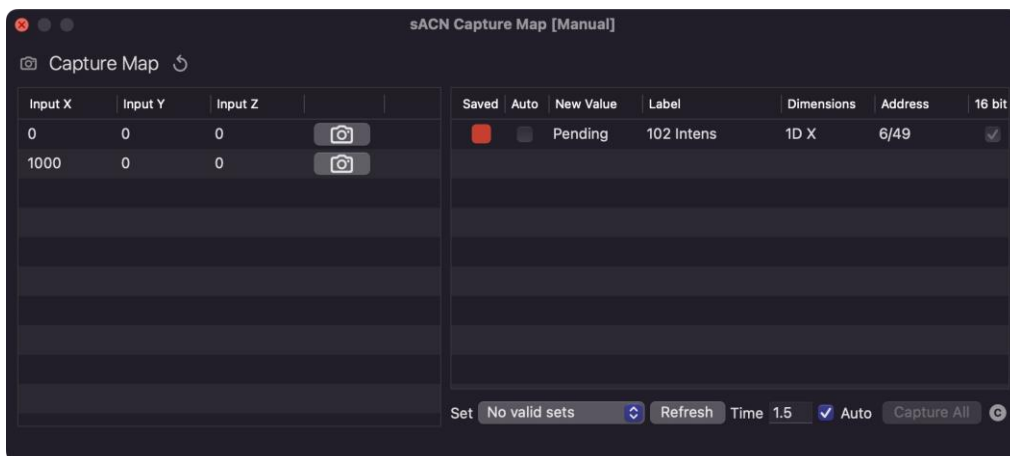
4.4.1 Manual Capture

Select the Conversions you wish to update in the main window. This selection will be replicated in the sACN Capture window. Click a capture (camera) button to capture the current values and update the Conversion output value for that field. See Input/Output.

As you capture the buttons will highlight. These can be reset using the reset (rotating arrow) button top left.

Map Conversions

A variation of the sACN Capture display exists for Map Conversions. This display uses a list of points from the selected Conversions and provides capture (camera) buttons for each.
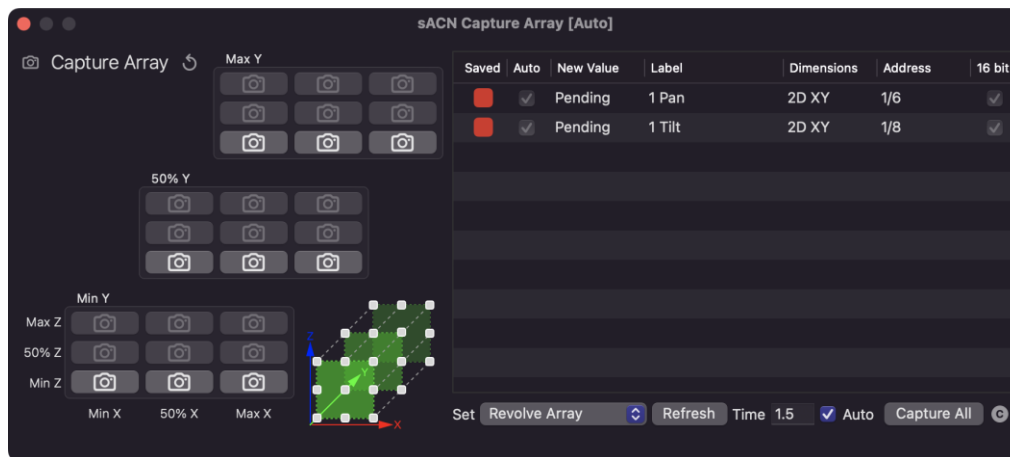

As you capture the buttons will highlight. These can be reset using the reset (rotating arrow) button top left.

4.4.2 Auto Capture

Select the Conversions you wish to update in the main window. This selection will be replicated in the sACN Capture window. If your entire selection has channels assigned, and the channels are found within one or more capture sets, these capture sets will be available for selection and auto capture will then be made available.

To use auto capture, select a capture set from the dropdown, and ensure 'Auto' is checked.

Click a capture (camera) button to communicate with the console specified in Settings to set the channels to the associated target from the selected capture set. The values are then captured, and the Conversion output value is updated. See Input/Output.

As you capture the buttons will highlight. These can be reset using the reset (rotating arrow) button top left.

Refresh

Initialises a connection to the console specified in Settings (See Console). If 'Subscribe' is checked, as soon as a connection is established any channel and capture set target information is immediately synchronised with the console and will then be updated automatically when changes occur on the console. In 'Subscribe' is not checked, only capture set target information will be synchronised.

When a connection has been established the console connection indicator is displayed in green:

Time
Enter a value to use when automatically sending channels to a target on a supported console.

**Note: The value entered here is also used as the default Sneak Time (See Console).**

Auto
When checked and a valid capture set is selected, auto capture will be used.

Capture All
Steps through each array location (or map point) and communicates with the console specified in Settings to set the channels to the associated target from the selected capture set. The values are then captured, and the Conversion output value is updated. See Input/Output.

Map Conversions
A variation of the sACN Capture display exists for Map Conversions. This display uses a list of points from the selected Conversions and provides capture (camera) buttons for each.
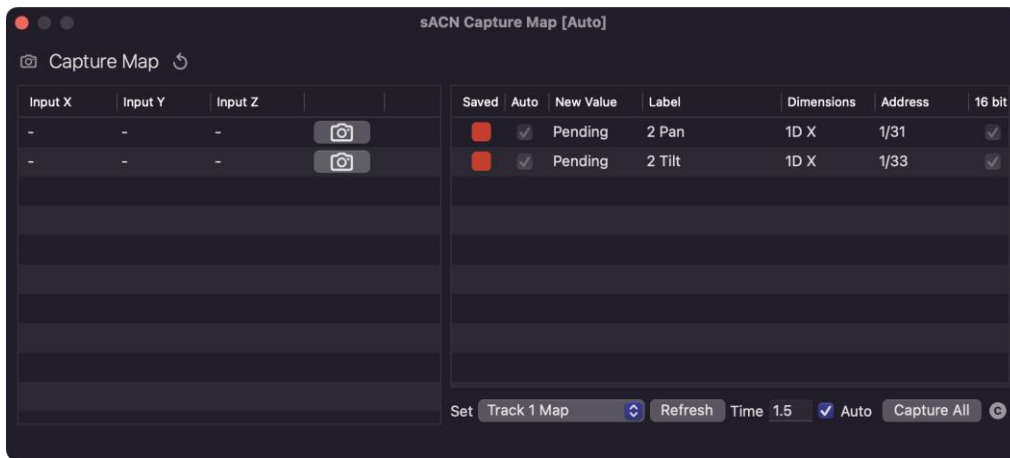
As you capture the buttons will highlight. These can be reset using the reset (rotating arrow) button top left.

4.5 Input/Output
The Input/Output display is where the calibration information for each Conversion is entered.

There are two types of display, Array and Map.

4.5.1 Array

For each Conversion, you are required to enter at least the minimum/maximum input and minimum/maximum output for each axis to be tracked. For accurate calculations, a 50% (middle) output value is required. This is the required output when the Coordinate is at the 50% Input position indicated in the display.

The Up/Down arrow keys can be used to increment/decrement values by the Nudge Coarse value when a field is selected. Shift + Up/Down increments/decrements by the Nudge Fine value where permitted. You can also use ++ or - - to add or subtract from the previously stored value.

Example: If the current value is 10, selecting the field and typing '++10' would make the value 20.

The 3x3x3 grid of output values represents 3D space, the bottom left of the 3 boxes being the near Y positions and the top right the far Y positions.
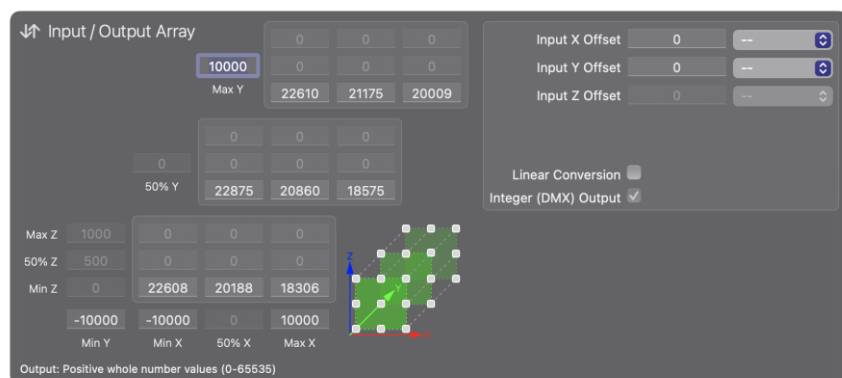
Information entered falls into 3 categories: Inputs, Outputs and Offsets. Some fields may be disabled depending on the Dimension configuration for each Conversion.

Inputs
Enter the minimum and maximum Input values from the Coordinate this Conversion is tracking. You may enter any combination of X, Y and Z. These values can also be captured from the Coordinate Monitoring display.

Offsets
An Offset is used to modify the incoming location of a Coordinate. Entering a value into the text field (negative/positive) permanently offsets the value received. Alternatively, choose an sACN Input to allow desk control using the specified range. This feature is useful to follow different parts of an object, e.g. the head vs torso of a person.

Note: When Desk Control is enabled for a Conversion it will ignore any entered values and always look for sACN Input.

Logic Fade Time (Array/Map Intensity Conversions only)
Select an Input System Variable to allow desk control of the time in which Logic Actions are applied.

Creating an Input System Variable with a range of 0-10 and mapping it here will allow the time to be varied between 0.0 to 10.0 seconds for example.

Logic Inhibit % (Array/Map Intensity Conversions only)
Enter a proportion between 0-100 (%) to be used when inhibited by a Logic Action.

Outputs
Enter the minimum, maximum and optionally 50% (not required when using Linear) output values to be used for calculations. Depending on the Output System, you may choose to use whole Integer output (required for sACN/DMX output) or decimal output. These values can also be captured from the sACN Capture display.

Array Intensity Conversions require input in percentage (0-100). This proportion will then be applied to the level received from another sACN source such as a lighting console.

Linear
If you wish to use the simplest linear calculations for this Conversion this field should be checked. Linear calculations are not offered for 3D conversions. See Calculations and Dimensions for more information.

4.5.2 Map
For each Conversion, you are required to create at least two Map Points. Additional points will increase accuracy for unusual tracking scenarios.

The Up/Down arrow keys can be used to increment/decrement values by the Nudge Coarse value when a field is selected. Shift + Up/Down increments/decrements by the Nudge Fine value where permitted. You can also use ++ or - - to add or subtract from the previously stored value.

Example: If the current value is 10, selecting the field and typing '++10' would make the value 20.
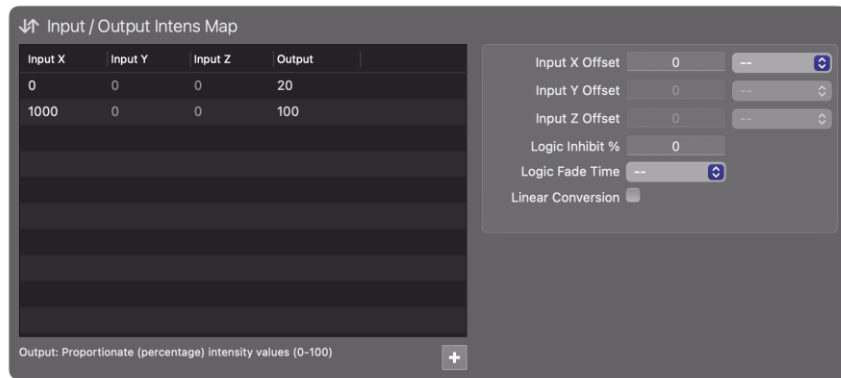
Information entered falls into 3 categories: Inputs, Outputs and Offsets.

Input (X, Y, Z)

Enter input values to be evaluated against the Coordinate this Conversion is tracking. You may enter either X, Y or Z depending on the dimension selected.

Offsets

An Offset is used to modify the incoming location of a Coordinate. Entering a value into the text field (negative/positive) permanently offsets the value received. Alternatively, choose an sACN Input to allow desk control using the specified range. This feature is useful to follow different parts of an object, e.g. the head vs torso of a person.

Note: When Desk Control is enabled for a Conversion it will ignore any entered values and always look for sACN Input.

Logic Time (Map Intensity Conversions only)

Select an sACN Input to allow desk control of the time in which Logic Actions are applied.

Inhibit % (Map Intensity Conversions only)

Enter a proportion between 0-100 (%) to be used when inhibited by a Logic Action.

Outputs

Enter output values to be used for output calculations. Depending on the Output System, you may choose to use whole Integer output (required for sACN/DMX output) or decimal output. These values can also be captured from the sACN Capture display.
Map Intensity Conversions require input in percentage (0-100). This proportion will then be applied to the level received from another sACN source such as a lighting console.

Linear

If you wish to use the simplest linear calculations for this Conversion this field should be checked. See Calculations and Dimensions for more information.
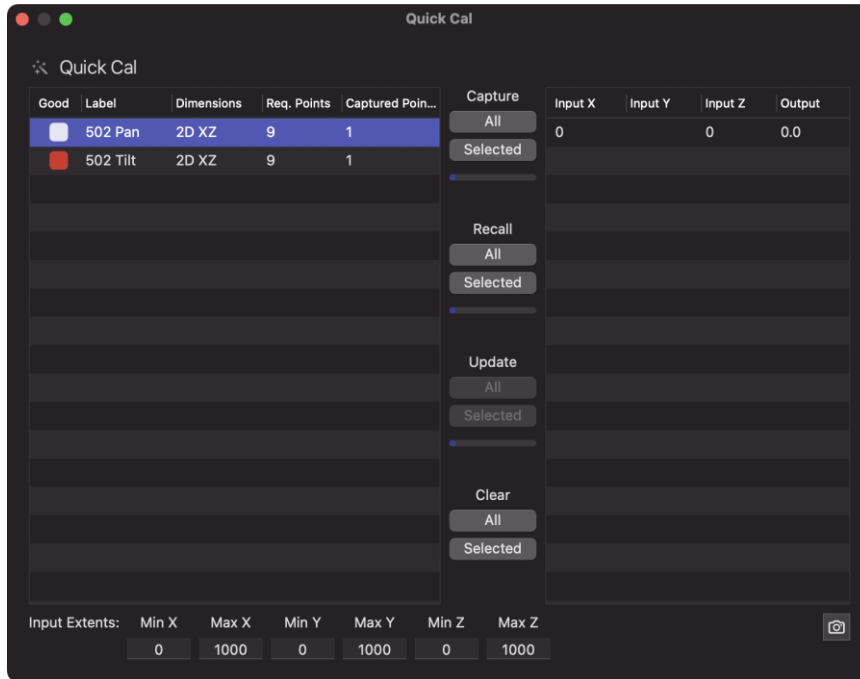
4.6 Quick Cal

Quick Cal is designed for situations where it is difficult or impossible to locate the calibration points required to create a rectangle (2D) or cuboid (3D). This is particularly common in theatrical spaces where the stage or auditorium may have an unusual shape.

As LightStrike requires parallel sides for calibration Quick Cal overcomes this by interpolating a given set of points to calculate the points required. Whilst you still need to get the same number of calibration points (3, 9 or 27), they can be distributed unevenly.
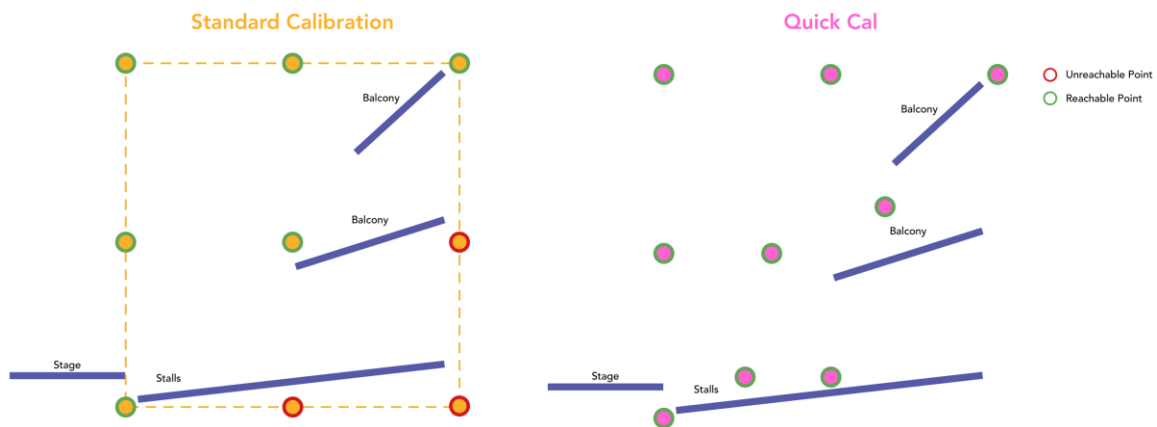
Note: The closer together the points are, the less accurate the final result will be. It is recommended to capture points at the greatest possible extents.

Using Quick Cal

Select the Conversions you wish to capture or update in the main window. This selection will be replicated in the Quick Cal window.

Quick Cal observes the same address and 16-bit value used for Conversion output. If you are not using sACN as the Output System for a Conversion, entering an address and setting the 16-bit mode will allow you to use Quick Cal.

Capture

Captures the current Coordinate position and sACN level for either all Conversions visible in the Quick Cal window or the selected Conversion.

The main table tells you how many points have been captured for each Conversion and how many points are required (based on dimensions). Once sufficient points have been captured the 'Good' indicator turns green. This does not signify that the points are able to be interpolated merely that an attempt might be made when you select Update.

Recall

Recalls the existing input/output information stored for either all Conversions visible in the Quick Cal window or the selected Conversion. This will generate either 3, 9 or 27 calibration points (depending on dimensions) and will overwrite any existing points captured.

Update

Attempt to update the output values (see Input/Output) for either all Conversions visible in the Quick Cal window or the selected Conversion.

Clear

Removes existing calibration points for either all Conversions visible in the Quick Cal window or the selected Conversion.

Remove Point

It is possible to remove one or more calibration points by selecting them and using the ⌫ key.

Capture Output

It is possible to recapture only the output for one or more calibration points by selecting them and clicking the capture (camera) button. The input will not be affected.

Min/Max Input

The min/max text fields allow you to update the input min/max values for all Conversions visible in the Quick Cal window. It is important that the min/max values are outside or equal to the possible area you wish to track.

5 Additional Information

5.1 OSC

You can send commands to LightStrike from an OSC output device to control certain basic functions.

Input

Quit LightStrike	/lightstrike/system/quit/primary
Shutdown Mac	/lightstrike/system/shutdown/primary
Start Output	/lightstrike/output/start/primary
Stop Output	/lightstrike/output/stop/primary

Note: Replace Primary with Backup to perform the action on the backup device. If using a standalone system, also use Primary.

Output

LightStrike outputs OSC over UDP to the specified port. The syntax depends on which device you are sending to.

For Eos-family consoles you may wish to use the syntax below:

/eos/user/99/chan/1000/param/pan/dmx=%@
/eos/user/99/chan/1000/param/tilt/dmx=%@

You should always target a user which is not being actively used as LightStrike sends values at a high rate. This user must also 'exist' in the show file, so ensure you have created it in Eos Desk Setup.

5.2 Logging

LightStrike keeps comprehensive logs of user and system actions. In the unlikely event of show file issues, or systems crashes, full logs can be exported from the File menu.

To aid troubleshooting, enable Debug Logging using the Support > Debug Logging menu item. This will log significantly more actions, such as when Conversions are enabled and disabled and when Zone Actions are transmitted. This setting does not persist through restarts of LightStrike.

Note: Enabling Debug Logging during performance operation is not recommended.

Please email logs to lightstrike@kinesys.com