Q Light Controller+

Positions and EFX explained

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1. Introduction

When a QLC+ project includes several moving heads or scanners, it is necessary to have the possibility to position them in the desired direction, and more importantly, to be able to adjust the existing positions to a new stage layout.

This is indeed possible in QLC+ and it involves several functionalities such as **Scenes**, **EFX** and the Virtual Console **XY Pad** widget.

2. The basics

The ultimate goal of positioning is to correctly set the fixture DMX channels to some values representing specific positions.
DMX values range from 0 to 255, so actual Pan/Tilt degrees are always represented by 0-255 numbers.
It is clear that a 360° Pan channel has a different precision than a 540° Pan channel.
Some fixtures include also Pan Fine and Tilt Fine channels, precisely to improve the DMX channels granularity. This is also called 16-bit mode, and QLC+ can handle it.

It is worth to be mentioned also that not all the moving heads can smoothly handle position animations.
Depending on how they are actually built (basically which motors and which firmware they have), it is possible that they end up not to be smooth. If you use cheap chinese products, this could be the case. If you use professional heads like Martin's, animations are pretty smooth.

3. Static positions

The first thing that should be done in a QLC+ project, should be defining the basic positions that you will need to use during a light show.

Basically they should reflect their meaning like "Heads up" or

"Stage center" or "Face the audience". In this way, when you need to adjust them, you immediately know their purpose, and how to adjust them.

When using the same heads on different stages, you might need to install them upside down. In this case, many fixtures provide the "Invert Pan" and "Invert Tilt" features from their own setup menu.

Otherwise this can be done with QLC+ by using the so called "Channel modifiers", where you can find a ready made "Invert" preset. In this way your static position Scenes don't even need to be touched.

Position Scenes can be adjusted manually with the Scene Editor or via a sort of Live & Dump mechanism explained later.

4. Animations (EFX)

Once you have created a number of static positions, you might want to animate them during a live show.

This is what the EFX function is for.

Basically it has 2 usages, quite different one from the other.

Please note that a EFX can have 3 modes (Position, RGB, Dimmer) but in this document we'll talk exclusively about the Position mode.

4.1 Absolute animations

By default a newly created EFX works in absolute mode. This means that the graphics preview displays the whole range of degrees that the fixtures controlled by the EFX will cover.

The following picture can illustrates it better.
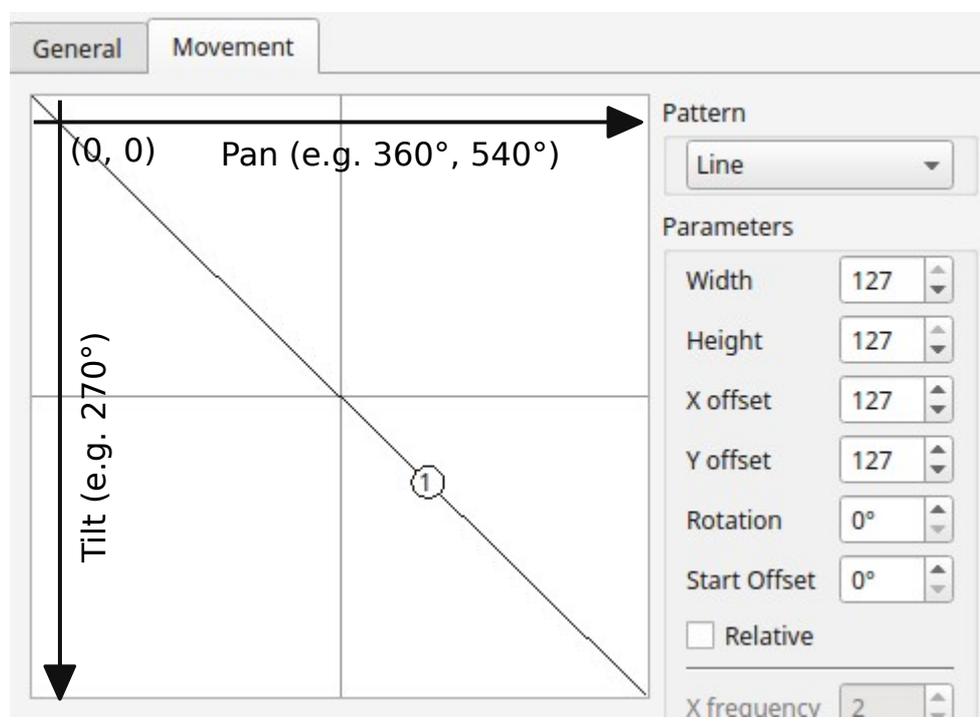
The above shows a linear animation from the minimum Pan/Tilt degrees, to the maximum of both.

Since the EFX function doesn't handle any range limiting of fixtures, when using mixed fixtures (e.g. some with 360° Pan and some with 540° Pan) the result will be out-of-sync positions.

It is therefore suggested to use EFX on fixtures of the same type. At least in terms of Pan/Tilt degrees.

Also, when dealing with absolute positions, you might not want to use the whole range of degrees. Normally you just need to use half of the Pan and half of the Tilt, since all the rest would point out of the stage.

This translates into positioning an EFX like this.
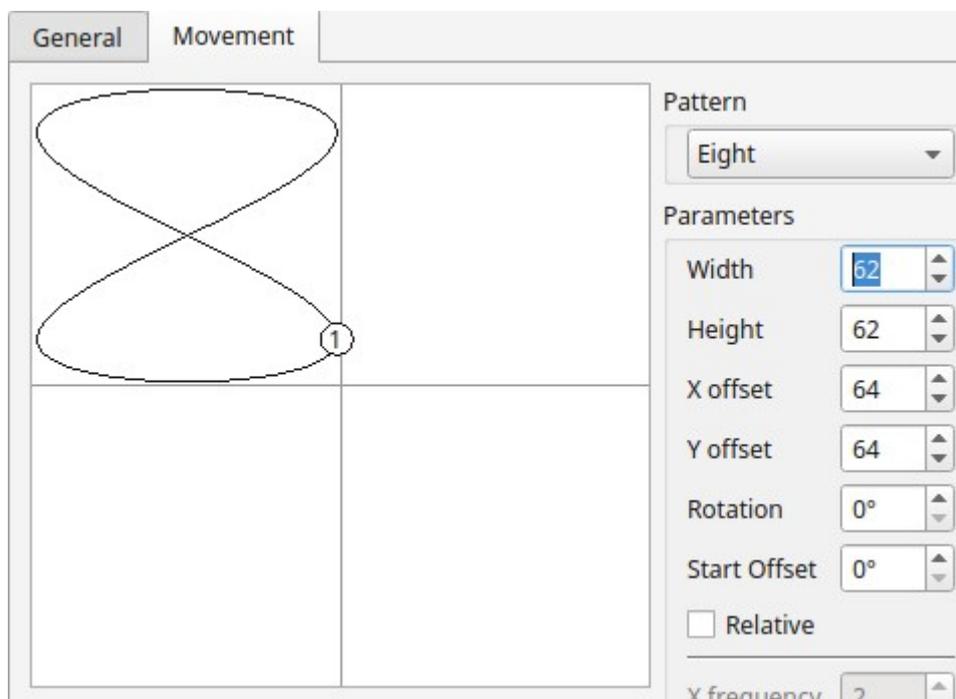
In this case we're using exactly half of the Pan and the Tilt range, starting from 0 degrees.

The resulting animation will therefore act on a limited range.

The position and the size of the animation depends on how the fixtures are installed on a stage and how a fixture position itself when turning it on. Some of them position the head forward, some backward, some halfway. Also, the Pan position depends on the maker.

In general, working with absolute positions makes sense when you don't have particular constraints. They can produce funny effects when the heads are free to move in many directions.

Otherwise you might need to work with relative positions.
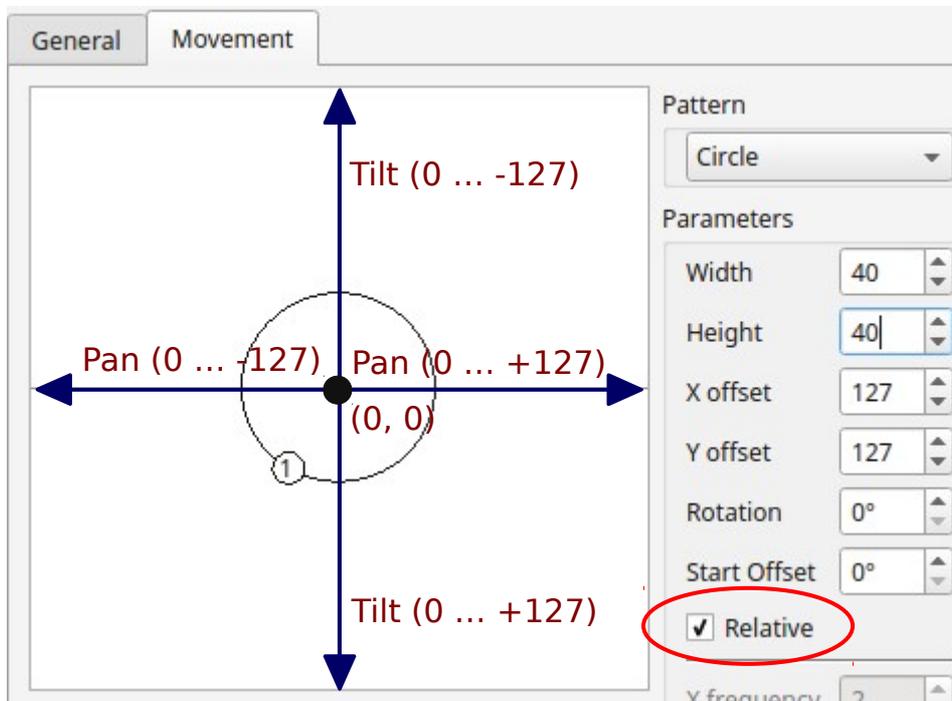
4.2 Relative animations

At the bottom of the pattern parameters, the EFX editor allows to enable a "Relative" check box.

Even though it might appear like a little thing, it totally changes how a EFX works.

When relative mode is enabled, the EFX will send relative DMX values **on top** of the current DMX values of a universe.

The origin of relative values is no more the upper-left corner of the EFX preview, but the center of it.

Again, here's a picture explaining this concept.

By default, all the EFX pattern are centered, so when working in relative mode, all you need to do is to set the desired width and height depending on how big the animation should be and how many degrees your fixture support.

As you can understand, a EFX in relative mode on its own is not that useful. That's why this document started by saying that you should create a few static position Scenes first of all.

When going live, you'll have to run a position Scene first, and the apply a EFX in relative mode on top of it.

In this way the EFX will animate the fixtures starting from their

original position, that the Scene is defining.

In this way you can have asymmetric animations, and most importantly, you will have to create your EFXs just once and then you can use them on every different stage.

All you'll need to do is adjust the position Scenes depending on how you installed the fixtures on the stage. There can be some tricks to do it quite quickly, and it will be described later in this document.

5.EFX patterns parameters

The EFX editor comes with a number of pre-defined patterns, which are mathematical functions calculated by the QLC+ engine.

Most of them allow basic parameters such as width, height, X/Y offset and rotation.
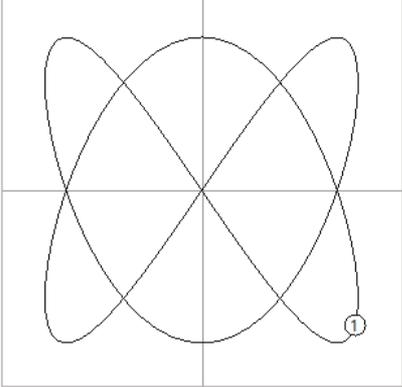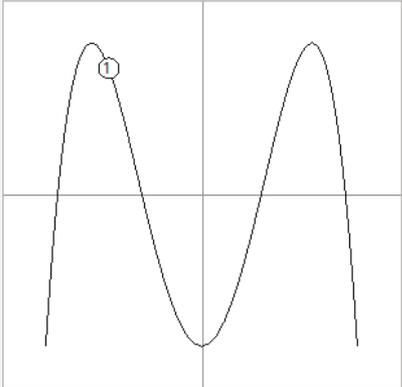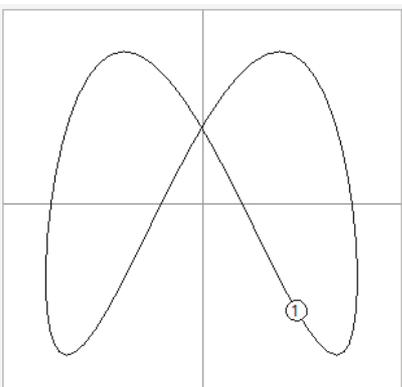
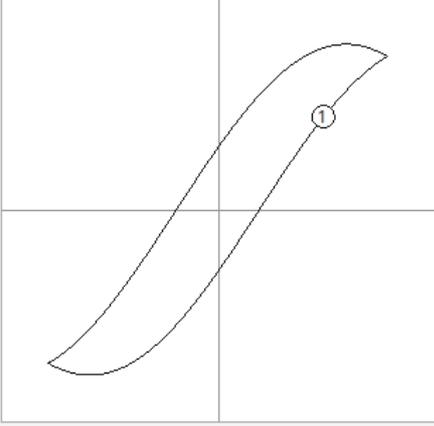For example, a vertical movement can easily be achieved by tweaking the Line pattern, like this:
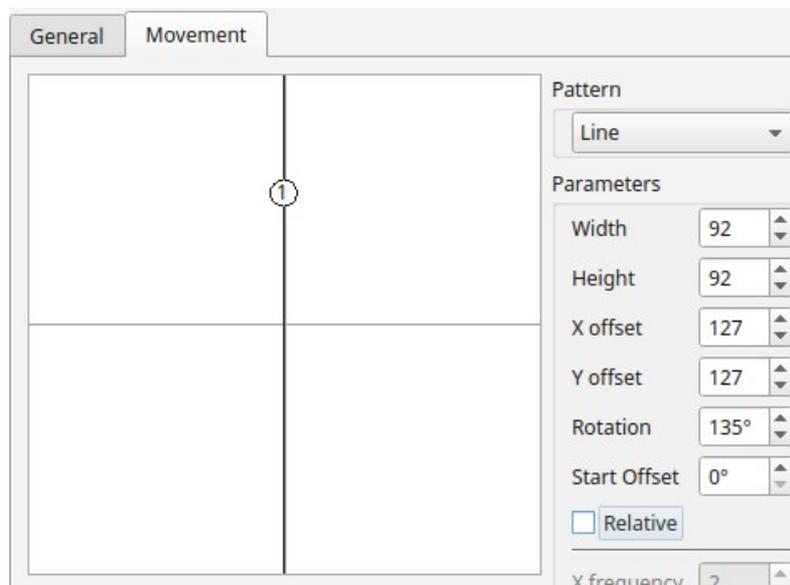
But the fun part comes when selecting with the Lissajous pattern.

Even more options are enabled, allowing you to obtain amazing results. Just have some time playing with it !

Here's some examples of what it can do.

Parameters	Preview
All defaults	
X frequency = 1 Y frequency = 4 X phase=0 Y phase=0	
X frequency = 2 Y frequency = 4 X phase=150 Y phase=0	
X frequency = 10 Y frequency = 1 X phase=0 Y phase=0	
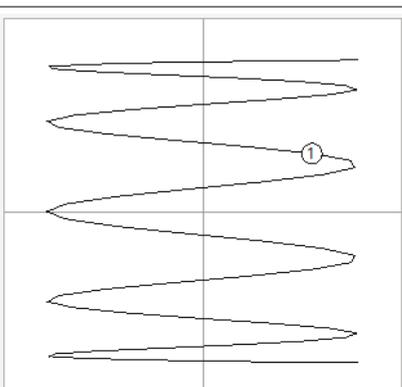
X frequency = 0 Y frequency = 1 X phase=0 Y phase=22	
X frequency = 1 Y frequency = 2 X phase=0 Y phase=0 (reverse upside down with Y phase = 180)	
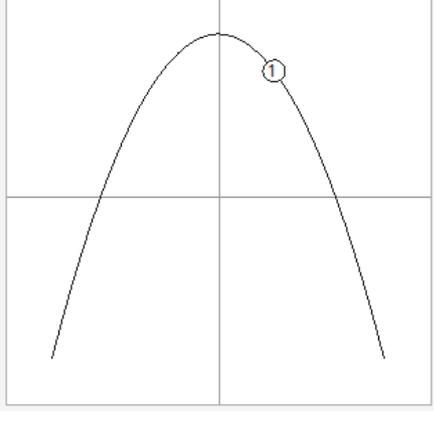
As you can see, just by playing with a few parameters, the EFX function can produce an incredible number of animations.

6. Virtual Console

When dealing with positions, the Virtual Console is not only an area to control your fixtures during a live show.
It can also help you to create or adjust the necessary position Scenes that you will use later during a live performance.
So, let's start to have a look of some possible solutions for positioning in a convenient way.

Let's assume for example you are working on a 8x6 meters stage, where the moving heads are placed on a square truss.
Imagine the following picture like a top view of the stage.
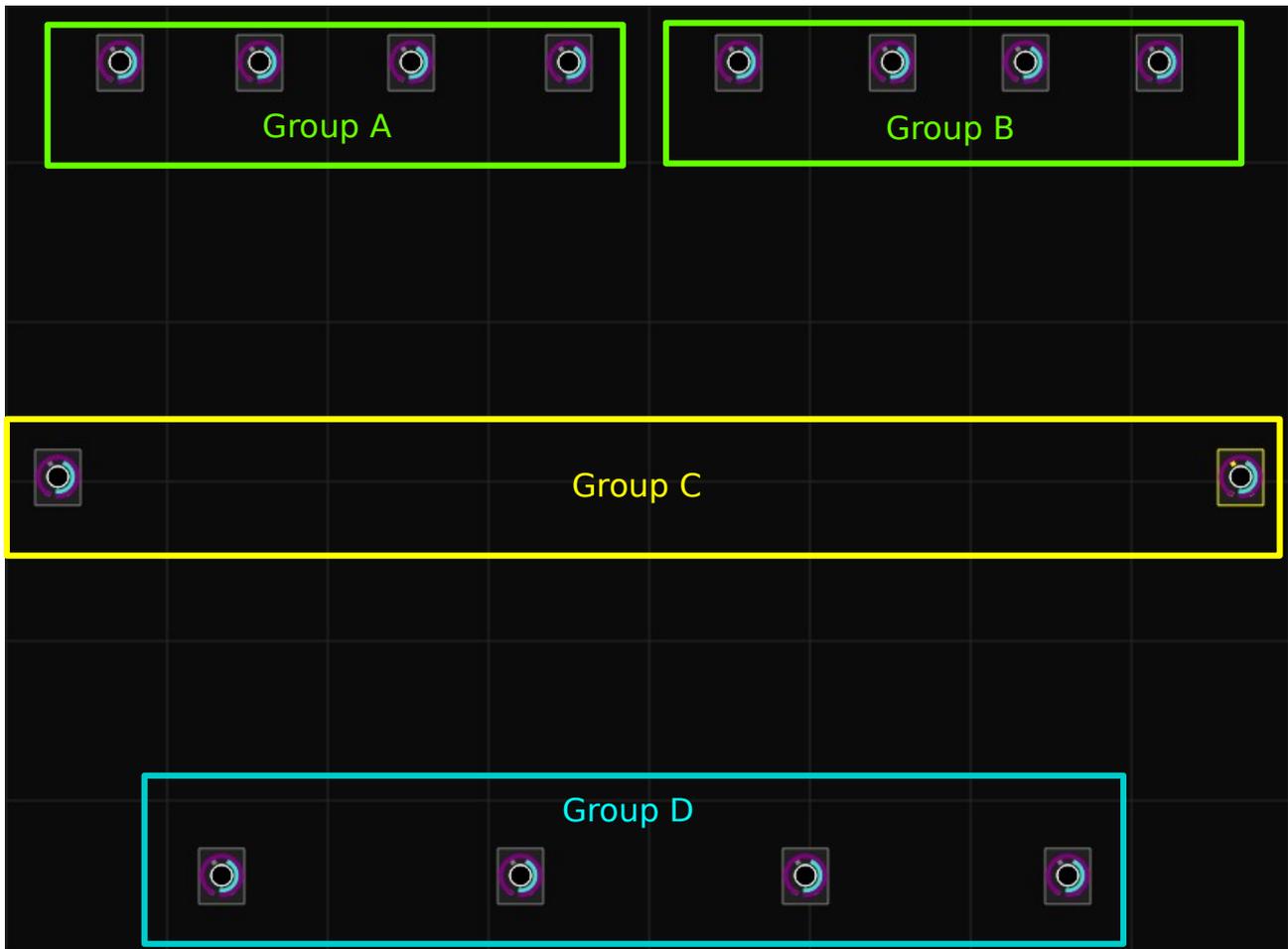
We have 14 fixtures and we logically grouped them in 4 groups, representing the front of the stage, the sides, the back-left and back-right.
Of course this logical grouping should be decided during the design phase, depending on which effects you want to obtain with your positions.

Now you have two options:
  • create Sliders to manually control the Pan and Tilt channels of each group
  • use the XY Pad with some Fixture Group presets

**First option – Sliders in level mode**

Create a Virtual Console frame that you will use only during the creation and the adjustment of positions Scenes. In the frame, create a number of sliders to control the Pan/Tilt channels of your fixtures. Ideally you would need 28 sliders in this case, but since we group them in 4 groups, 8 sliders will do. If you need Fine adjustments, then you'll need more sliders.

Setup each slider in Level mode, and assign to it the Pan/Tilt channels you want to control. Do not mix Pan and Tilt, otherwise this will be all useless.
Eventually create another slider to turn the lights on, so you can see the projection of the lights when positioning them.
When you have set this all up, you're ready to start creating/adjusting your position Scenes.

It should look something like this:
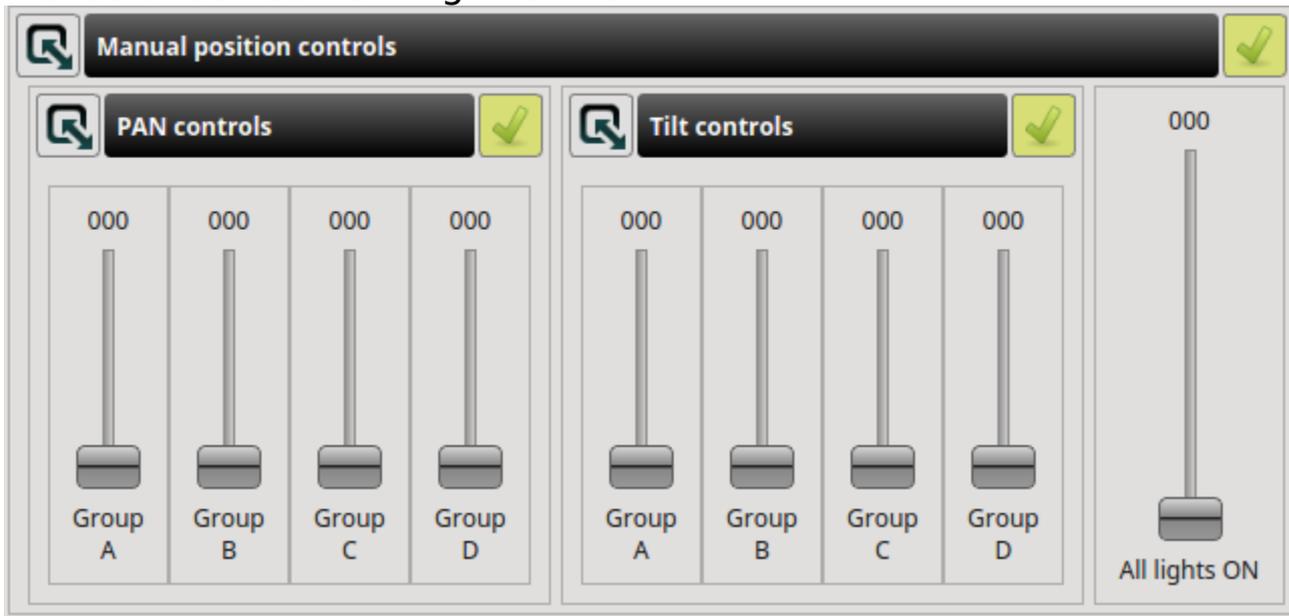
As mentioned before, let's say you need a "Face the audience" Scene. Go to Operate Mode and start moving your sliders to create such scene.

Second option – XY Pad (recommended)

The XY Pad is very useful not only for live control, but also to set precise positions during the design phase.
It is recommended to control the XY Pad via an external controller (e.g. MIDI controller) because a mouse doesn't have the same precision and might waste your time.

First of all you need to add to the XT Pad all the fixtures you intend to control and then set the degrees range in a way so the lights will never point outside the stage.

When you're done, your list should look like this:
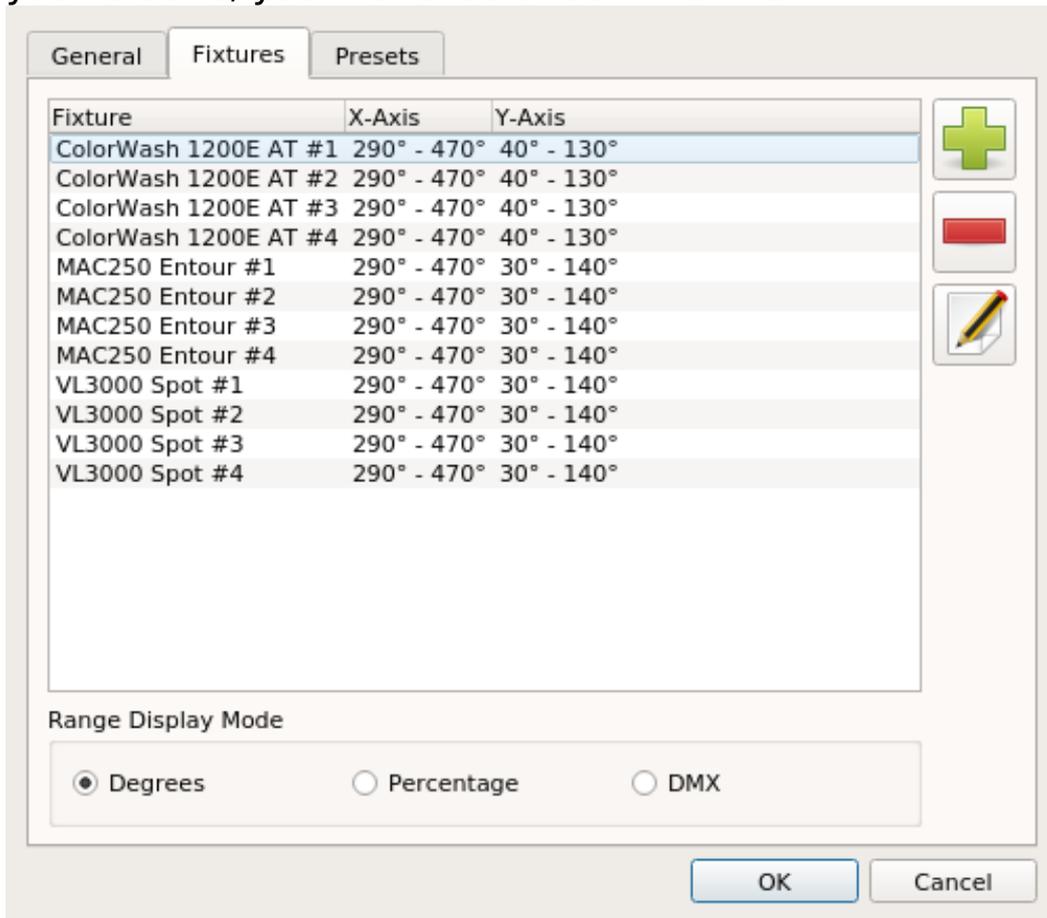
After that, create a preset for each fixture group, like this:
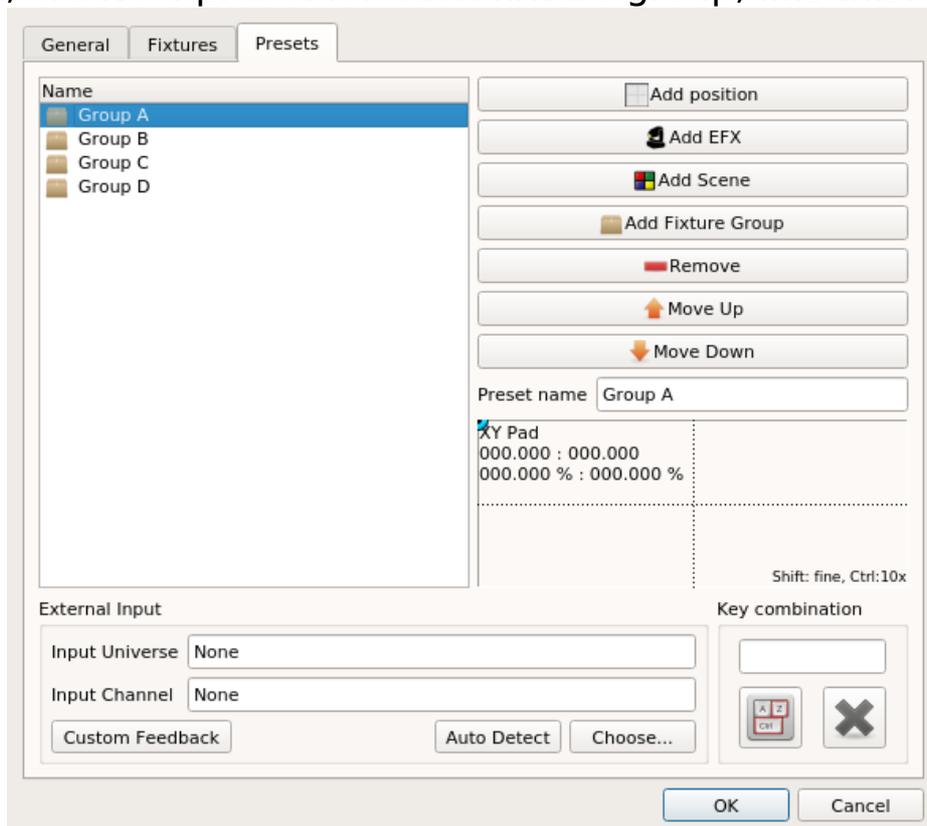
This initial setup allows you to use the XY Pad to set a precise position for a specific group of fixtures.
Experiment with ranges and presets to obtain the controls that might save you most of the design phase time.

Dumping positions to Scenes

When you're happy about positioning, either via Sliders or XY Pad, all you need to do is to dump the current DMX Pan/Tilt values into a Scene, using the QLC+ DMX Dump functionality.
Remember to shut the lights off first to keep the new Scene clean from non-position channels.

You can either create a new Scene or overwrite values of an existing Scene, very useful when adapting a workspace to a new stage layout.

You can also assign the new dump function to an existing Virtual Console button, so the position Scene can be easily recalled during live operations.

If you work with Scenes + relative EFX you might want to have a number of Buttons in your Virtual Console, to recall the base positions and a number of EFX that you can apply on top of those Scenes.

Otherwise you can use Collections and attach them to Virtual Console Buttons, but then you would loose the possibility to decouple Scenes from EFX.