

# USER'S MANUAL

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## LGControl

Version 2020/04/09



ISO 9001:2015

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## 1 Description

**LGControl** is a program for controlling one or more Lasergraph DSPs. Therefore, it can be used to control a big laser show with many Lasergraph DSPs.

This software allows to monitor important functions and adjust operating parameters of Lasergraph DSPs.

The program LGControl is available in the following versions:

1. Windows 7/8.1/10
2. Mac OS X 10.10 or newer

LGControl sends and receives data via the network protocol OSC (Open Sound Control).

**OSC** (Open Sound Control) is a protocol for real-time processing of sound and other media among computers, multimedia devices and electronic musical instruments. OSC is independent of transport protocol but usually uses UDP. The transmission rate of OSC is higher than that of MIDI. It uses the common network like internet or WLAN and the integrated network interfaces of a computer, making it easy to connect and control hardware via OSC.

For more information see: <http://opensoundcontrol.org>



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## 2 Configuration of LGControl

In the main window of LGControl general settings are provided.

### 2.1 General settings of LGControl

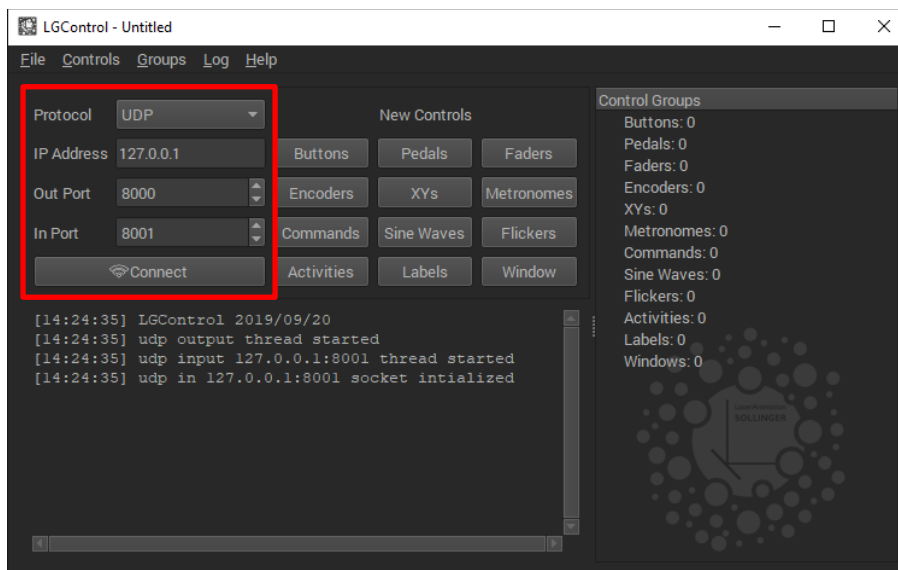


Figure 1: Settings in LGControl

Protocol	The Lasergraph DSP only supports UDP. Other devices can also be controlled by using TCP v1.0 or TCP v1.1.
IP Address	IP address of the device LGControl shall communicate with. or Limited Broadcast address (255.255.255.255) for controlling all devices within the local network. or Directed Broadcast address (e.g. 192.168.1.255) for controlling all devices within the subnet.
Out Port	Must match the UDP input port of the devices to be controlled.
In Port	The sending device(s) must use the port number entered here to send data to LGControl.
Connect	Establishes a network connection using the settings described above.

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### 2.2 Connecting LGControl with Lasergraph DSPs

1. Open the Setup of Lasergraph DSP by entering the command *setup* in the command line.
2. Open the *Net I/O* menu.

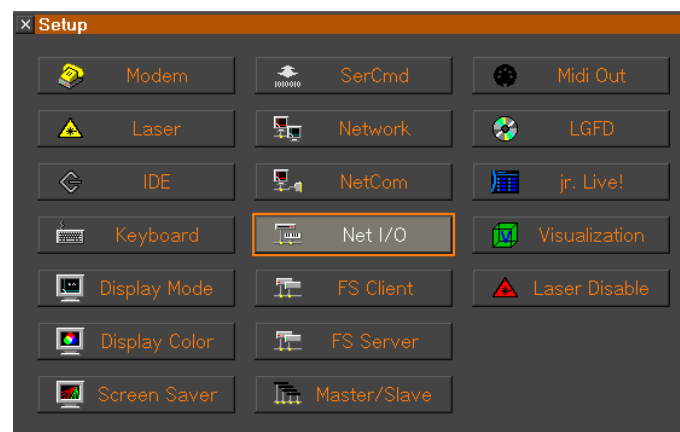


Figure 2: Setup of Lasergraph DSP

3. In the tab *OSC*, set the checkbox *Enable OSC*.  
Clear the *Prefix* text box.  
The *UDP Port* must correspond with the Out Port in LGControl (default: *8000*).  
Click *Save* for saving all settings.

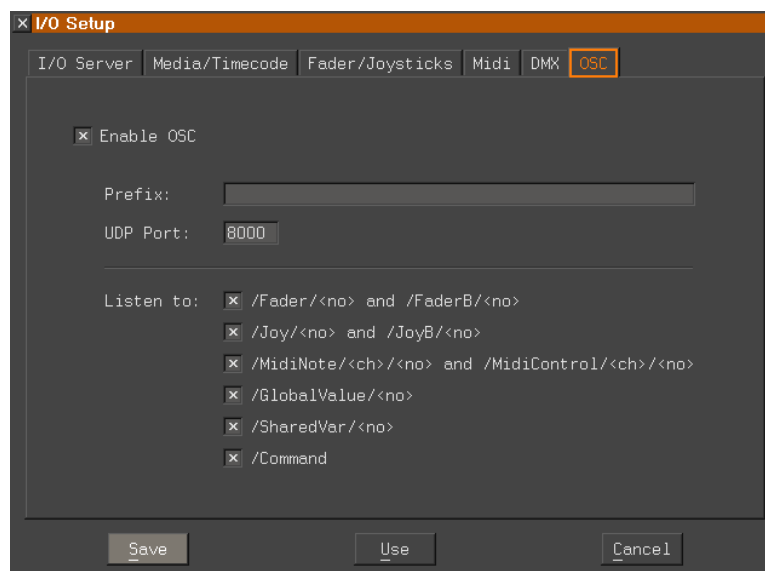


Figure 3: OSC tab within the I/O Setup of the Lasergraph DSP

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- In LGControl check the protocol setting. *UDP* must be selected and the *Out Port* must correspond to the UDP Port set in the Lasergraph DSP.

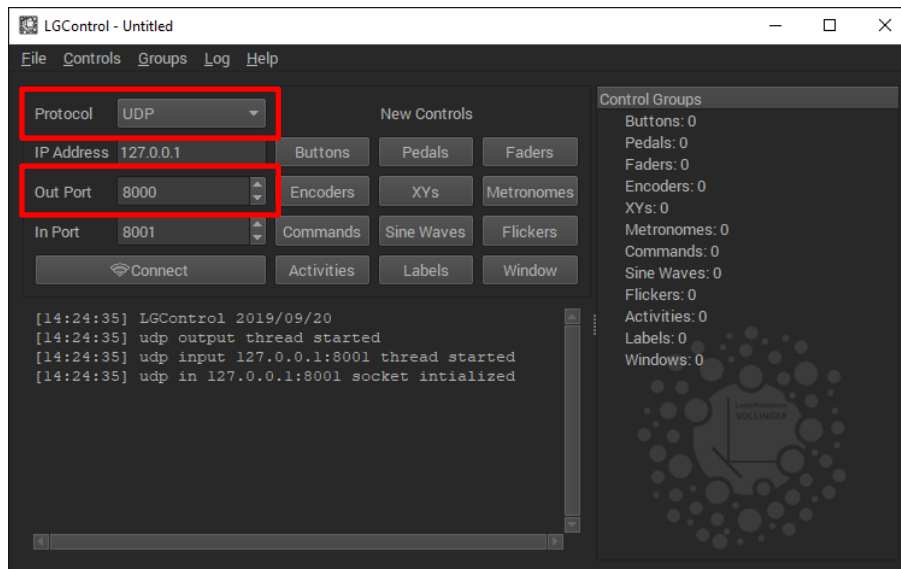


Figure 4: LGControl, setting of the *Protocol* and *Out Port*

- Changes in the network settings are applied after clicking on *Connect*. Network configuration is saved in the project file. After starting LGControl or opening a LGControl file the connection is made automatically.

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### Prefix-box:

The fixed addresses in the Lasergraph DSP can be extended by a prefix.

Lasergraph DSPs with the same prefix can be grouped and controlled individually.

In the following example (see Figure 5) all Lasergraph DSPs with the prefix "/beam" will react to the LGControl Fader 1. Other Lasergraph DSPs ignore commands with this prefix.

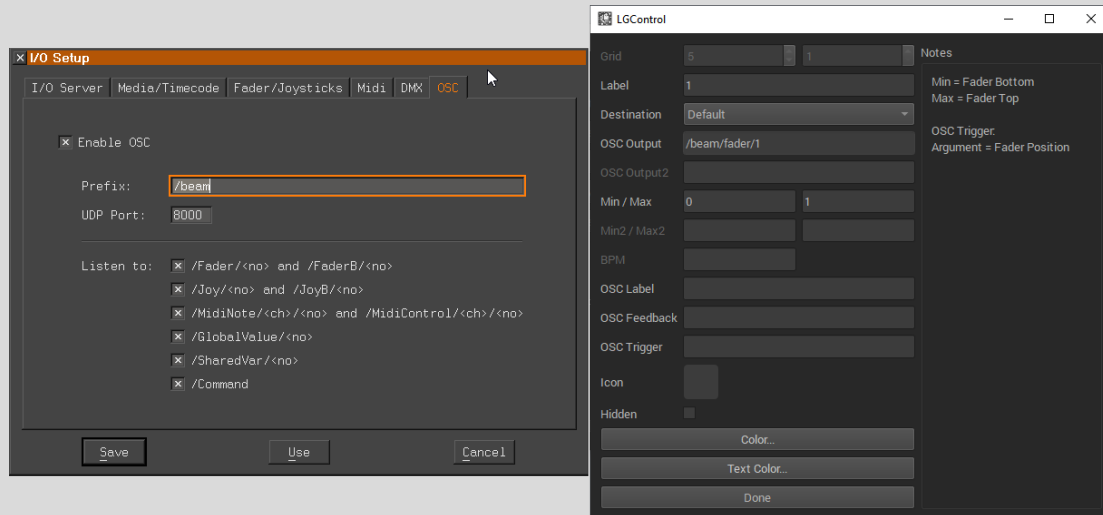


Figure 5:  
Lasergraph DSP with the prefix "/beam", Fader 1 with OSC Output address "/beam/fader/1"



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### 3 Controls

LGControl provides several kinds of controls. The right column named *Control Groups* displays the number of used controls.

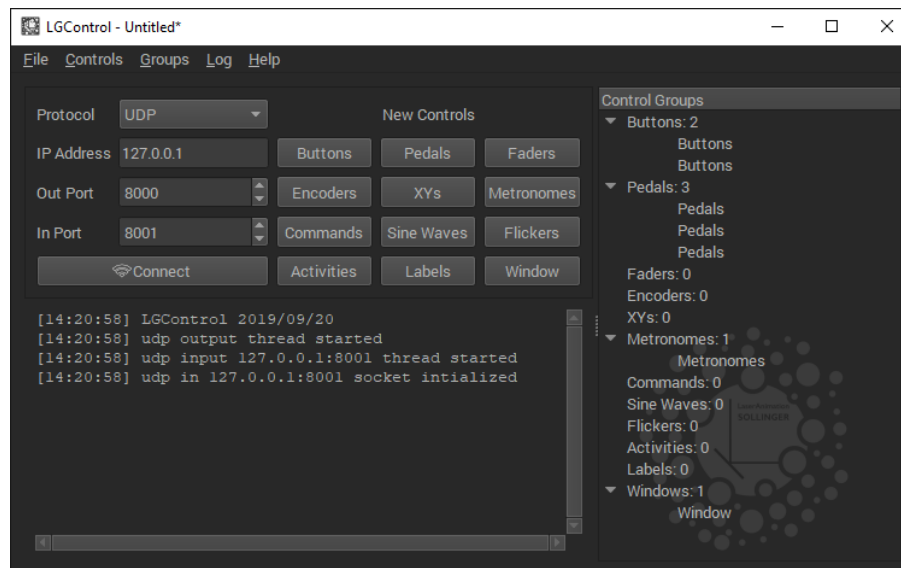


Figure 6: On the right side of the LGControl panel, the number of used controls is displayed

#### 3.1 Control Types

**Buttons** are simple push buttons sending a value on press and/or on release.

**Pedals** simulate the function of a physical pedal.

**Faders** are slider controls for the continuous control of signals.

**Encoders** are rotary controls.

**XYs** are controls that send two values for their X and Y position.

**Metronomes** are clock generating controls.

**Commands** provide the ability to send strings and values without creating a button.

**Sine Waves** are controls for producing a sine wave output.

**Flickers** send random values.

**Activities** give visual feedback of activities.

**Labels** display labels and send no commands.

**Window** provides a window to organize several controls in one window.

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### 3.2 Create a Control Group

By clicking on the respective button in the menu section New Controls you can choose the desired control type.

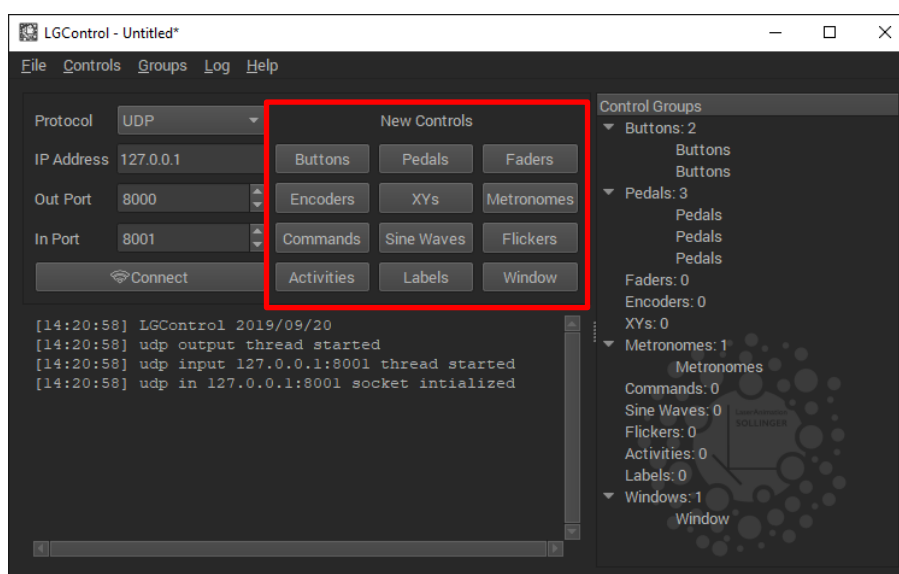


Figure 7: In section *New Controls* you can choose the desired control type

### 3.3 Control Settings

By clicking on one control with the right mouse button, a menu with different options opens.

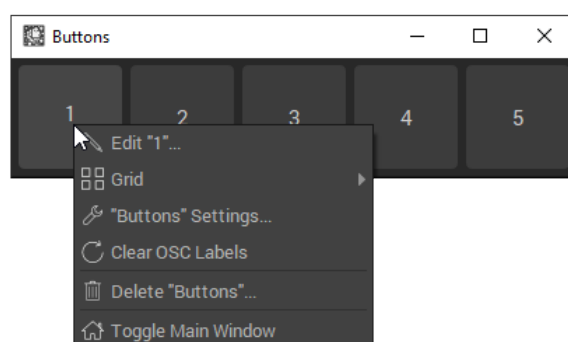


Figure 8: Right click on control opens menu with setup options

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## 3.3.1 Edit "Control"

Select this menu item to configure a single control.

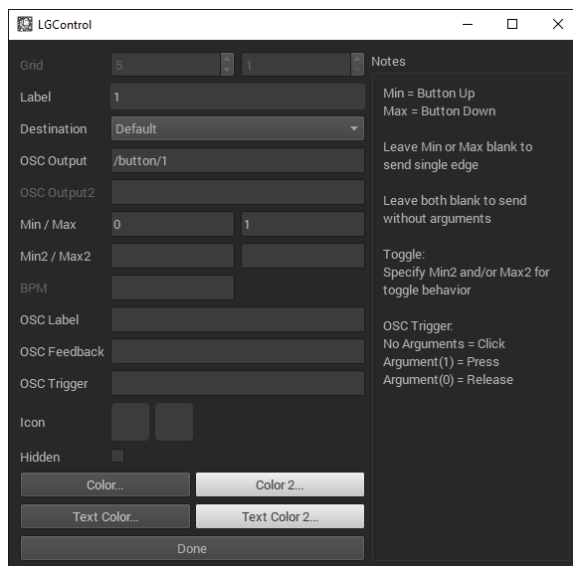


Figure 9: Edit window of the **Button** control

<i>Label:</i>	Control name.
<i>Destination:</i>	<p><b>Default:</b> The OSC Output is sent to the address specified in the main window.</p> <p><b>Local:</b> The OSC Output is sent back to LGControl.</p> <p><b>Limited Broadcast:</b> The OSC Output is sent as UDP packet to the limited broadcast address (255.255.255.255).</p> <p><b>Directed Broadcasts:</b> The OSC Output is sent as UDP packets to all available subnets (e.g. 192.168.1.255).</p> <p><b>Group:</b> The OSC Output is sent as UDP packets to all devices within the selected group (see Chapter 4 for more information on groups).</p>
<i>OSC Output:</i>	<p>This value specifies the OSC address to which the data should be sent (e.g. "/button/1").</p> <p>For <b>Activities</b> and <b>Labels</b>, <i>OSC Output</i> is not selectable.</p>
<i>OSC Output 2:</i>	<p>This value specifies a second OSC address for controls sending more than one value.</p> <p><i>OSC Output 2</i> is only selectable for <b>XYs</b>.</p>

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<p><i>Min:</i></p>	<p><b>Buttons:</b> Value for released button. Leave Min or Max blank to send single edge.  <b>Pedals:</b> Value for released pedal.  <b>Fader:</b> Value for lowest fader position.  <b>Encoders:</b> Value for counter-clockwise movement.  <b>XYs:</b> Maximum negative value on the x-axis.  <b>Metronomes:</b> Sending value as ticking indicator at the left end of a tick.  <b>Commands:</b> Not selectable.  <b>Sine Waves:</b> Value for the sine trough.  <b>Flickers:</b> Minimum value up to which the Flickers moves.  <b>Activities:</b> Minimum value for flashing sequence.  <b>Labels:</b> Not selectable.</p>
<p><i>Max:</i></p>	<p><b>Buttons:</b> Value for pressed button. Leave Min or Max blank to send single edge.  <b>Pedals:</b> Value for pressed pedal.  <b>Fader:</b> Value for highest fader position.  <b>Encoders:</b> Value for moving control clockwise.  <b>XYs:</b> Maximum positive value on the x-axis.  <b>Metronomes:</b> Sending value as ticking indicator at the right end of a tick.  <b>Commands:</b> Not selectable.  <b>Sine Waves:</b> Value for the sine crest.  <b>Flickers:</b> Maximum value up to which the Flickers moves.  <b>Activities:</b> Maximum value for flashing.  <b>Labels:</b> Not selectable.</p>
<p><i>Min2:</i></p>	<p><b>Buttons:</b> Value when button is released a second time.  <b>Pedals:</b> Time in ms for pedal up duration.  <b>Faders:</b> Not selectable.  <b>Encoders:</b> Not selectable.  <b>XYs:</b> Maximum negative value on the y-axis.  <b>Metronomes:</b> Not selectable.  <b>Commands:</b> Not selectable.  <b>Sine Waves:</b> Not selectable.  <b>Flickers:</b> Minimum value of the randomized timing.  <b>Activities:</b> Time in ms for fade duration.  <b>Labels:</b> Not selectable.</p>
<p><i>Max2:</i></p>	<p><b>Buttons:</b> Value for button is pressed a second time.  <b>Pedals:</b> Time in ms for pedal down duration.  <b>Faders:</b> Not selectable.  <b>Encoders:</b> Not selectable.  <b>XYs:</b> Maximum positive value on the y-axis.  <b>Metronomes:</b> Not selectable.  <b>Commands:</b> Not selectable.  <b>Sine Waves:</b> Not selectable.  <b>Flickers:</b> Maximum value of the randomized timing.  <b>Activities:</b> Time in ms for hold duration.  <b>Labels:</b> Not selectable.</p>

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<i>BPM:</i>	<p><b>Metronomes:</b> Speed for ticking.  <b>Sine Waves:</b> Speed of switching between crest and trough.  <b>Flickers:</b> Speed of switching between Min and Max.</p> <p>Not selectable for <b>Buttons, Pedals, Faders, Encoders, XYs, Commands, Activities</b> and <b>Labels</b>.</p>
<i>OSC Label:</i>	<p>Data sent to the OSC address entered here will be used to label the Control.</p> <p>Not selectable for <b>Commands</b>.</p>
<i>OSC Feedback:</i>	<p>By using <i>OSC Feedback</i>, control x reacts to the <i>OSC Output</i> of control y. Control y gives the same visual feedback as control x (e.g. fader position) but sends no <i>OSC Output</i>.</p> <p>Selectable for <b>Buttons, Faders, XYs</b> and <b>Activities</b>.</p> <p>Not selectable for <b>Pedals, Encoders, Metronomes, Commands, Sine Waves, Flickers</b> and <b>Labels</b>.</p>
<i>OSC Trigger:</i>	<p>By using the <i>OSC Output</i> address of control x as <i>OSC Trigger</i> for control y, control y is triggered by control x sending the value of control y. For an example see chapter 3.8 Linking Controls.</p> <p>Not selectable for <b>Activities</b>.</p>
<i>Icon:</i>	<p>Choose an icon for the control.</p> <p>For <b>Buttons</b> you can choose one icon for <i>Min/Max</i> and one for <i>Min2/Max2</i>.</p>
<i>Hidden:</i>	<p>Hide the control by checking this checkbox.</p>
<i>Color...</i>	<p>Color of the control when no Icon is selected.</p> <p><b>Button:</b> Background color for function <i>Min/Max</i>.</p> <p><b>Activities:</b> Not selectable.</p>
<i>Color2...:</i>	<p>Function is only available for <b>Buttons</b>.</p> <p>Background color for function <i>Min2/Max2</i> when no icon is selected.</p>
<i>Text Color...:</i>	<p>The color of the text.</p>
<i>Text Color2...:</i>	<p>Only available for <b>Buttons</b>.</p> <p>The color of the text for the button function <i>Min2/Max2</i>.</p>

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### 3.3.2 Grid

For your individual use, choose the number of rows and columns for this group of controls.

### 3.3.3 "Control Group" Settings

Edit the settings for this control group.

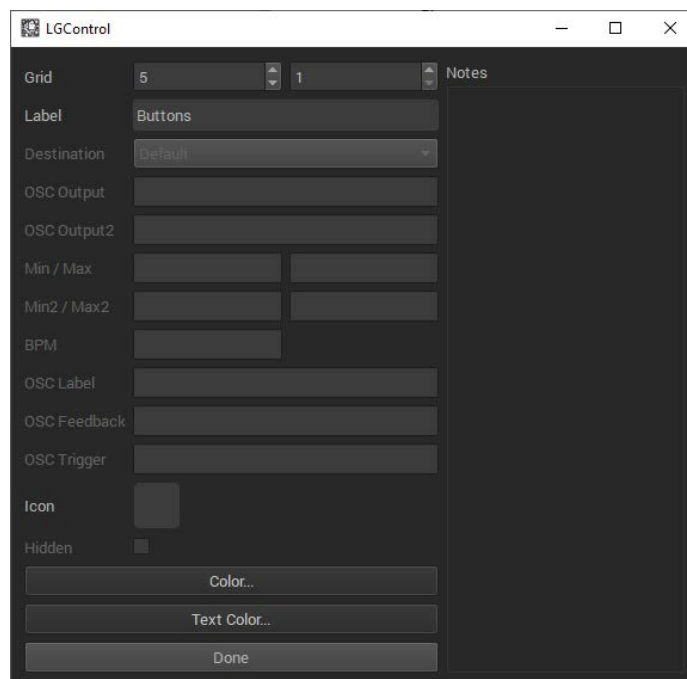


Figure 10: Edit window of the control group **Buttons**

<i>Grid:</i>	Choose the number of rows and columns for this control group.
<i>Label:</i>	Name of the control group.
<i>Icon:</i>	Choose an icon for the control group.
<i>Color...:</i>	Choose a background color for the control group.
<i>Text Color...:</i>	Not selectable.

### 3.3.4 Done Editing

Closes the edit window. This option is only available if the edit window is open.

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### 3.3.5 Clear OSC Labels

Clears all OSC Labels of the control.

### 3.3.6 Delete "Control Group"

Deletes the control group and all controls it contains.

### 3.3.7 Toggle Main Window

Toggles the visibility of the main window.



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### 3.4 Window Control

This control provides a window for organizing several control groups in one window and different tabs.

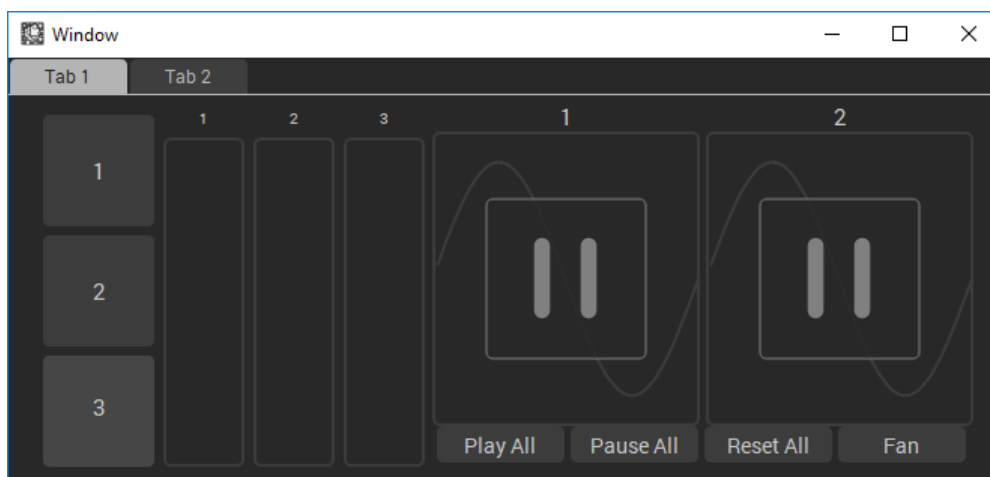


Figure 11: Window control for organizing several controls in one window

By right-clicking inside the window a menu with the following items opens:

- Add...*
- Tabs*
- Layout Mode...*
- Clear OSC Labels*
- Delete "Window"...*
- Toggle Main Window*

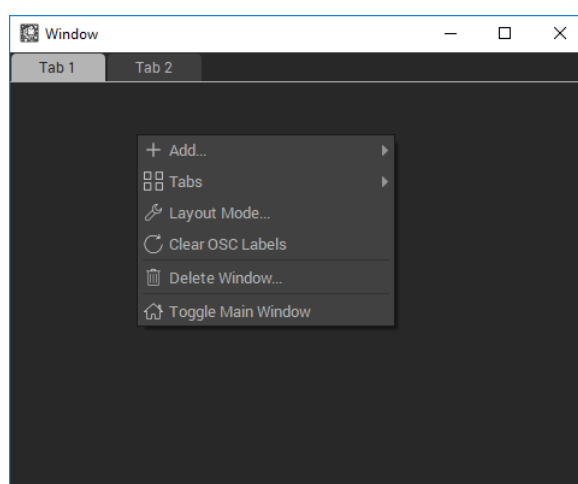


Figure 12: Setup menu of the Window control



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### 3.4.1 Add...

Choose the kind of controls for the window. You can choose the number and order of the controls.

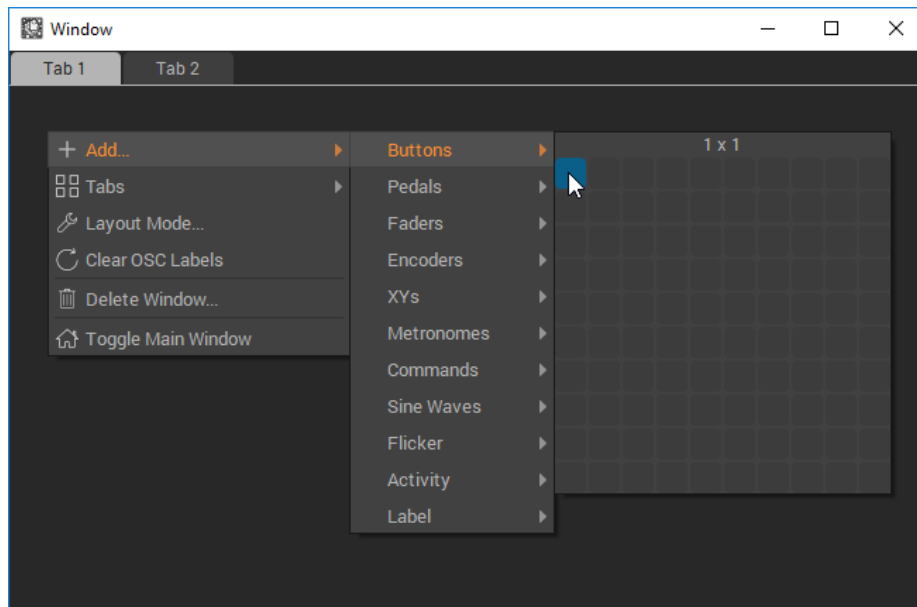


Figure 13: Add controls and choose number and order

### 3.4.2 Tabs

Choose the number of tabs in the window.

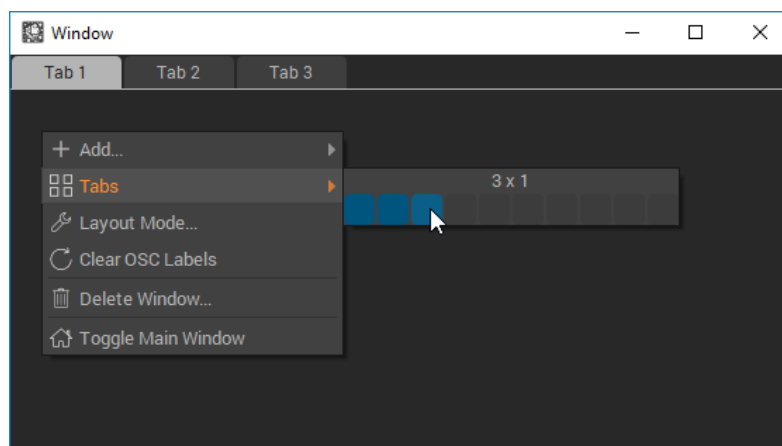


Figure 14: Choose the number of tabs

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### 3.4.3 Layout Mode...

Allows you to change the position and size of the controls in the window. You can adjust the controls using the mouse. Furthermore, a window opens where you can change the number of tabs, the name and the icon of the window (see Figure 16).

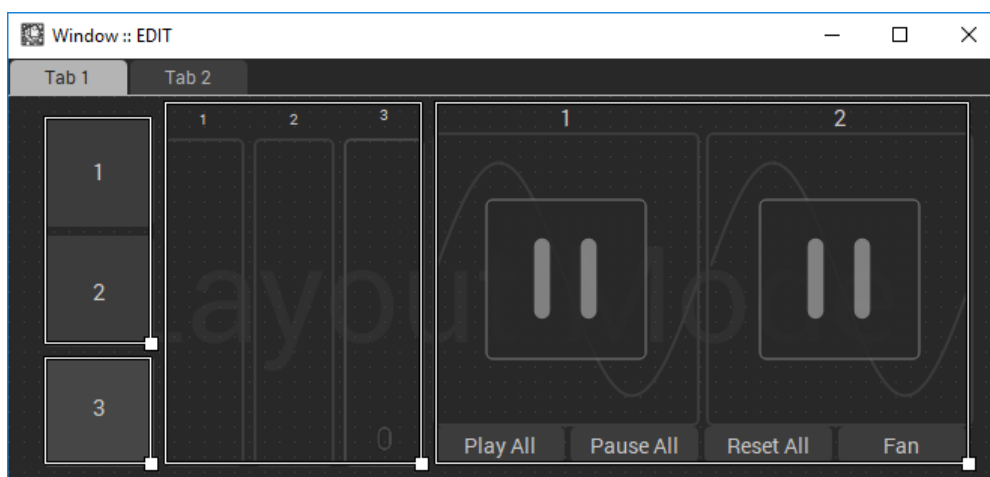


Figure 15: Adjusting controls using the mouse

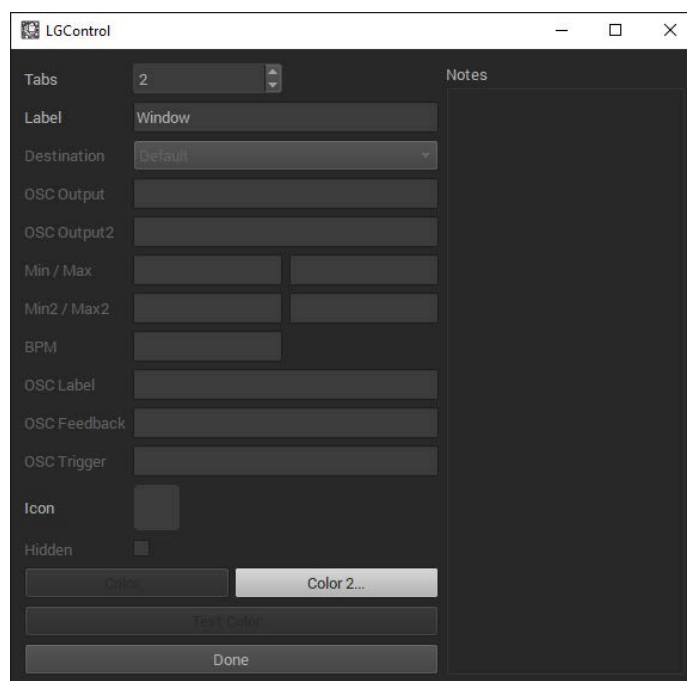


Figure 16: Edit window for changing the number of tabs, the name and the icon of the window

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<i>Tabs:</i>	Choose the number of tabs
<i>Label:</i>	Name of the window
<i>Icon:</i>	Choose an icon for the control panel
<i>Text Color...:</i>	Choose the color for the text of the tabs
<i>Color...:</i>	Choose a background color for the window
<i>Color 2...:</i>	Choose a background color for the tabs

### 3.4.4 Clear OSC Labels

Clears OSC Labels of all controls.

### 3.4.5 Delete "Window"...

Deletes the window control and all control groups it contains.

### 3.4.6 Toggle Main Window

Toggles the visibility of the main window.

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### 3.5 Example “Faderboard + Laser Disable”

With the selection of the file “Faderboard + LaserDisable.lgco” a control panel with a fader board and a board with an emergency stop button is available as an example.

In tab 1 eight buttons, eight toggle buttons and eight faders are available for use. In tab 2 a Laser Disable button is available, disabling the laser projector output when clicking on it and enabling the laser projector output when clicking on it again.

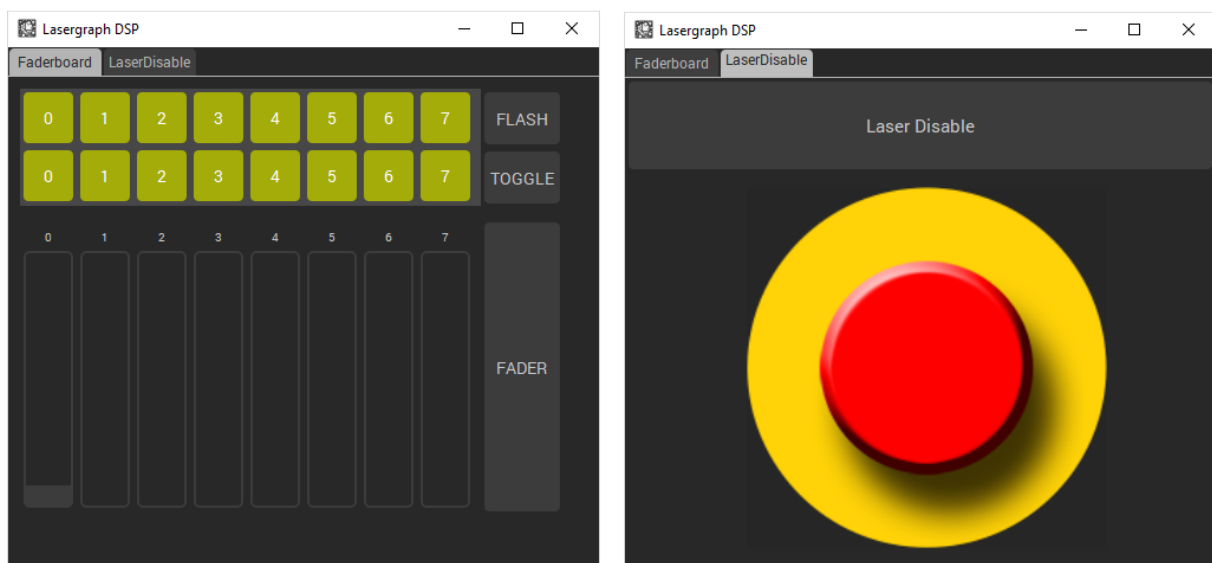


Figure 17: Example "Faderboard + LaserDisable.lgco"

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### 3.6 How to define Toggle Buttons

A Toggle Button changes its condition with every click. For this, the options *Min2* / *Max2* are available in the *Edit* menu of a button. To create a Toggle Button specify *Min2* and/or *Max2*.

Example: Laser Disable

The "Laser Disable" button is switch which disables laser projector output. For the toggle function *Max* is specified as "ENABLELASEROUTPUT No" and *Max2* as "ENABLELASEROUTPUT Yes".

Using the *Max/Max2* condition means the Toggle Button only sends commands when it is pressed, not when it is released. The condition "ENABLELASEROUTPUT No" is visualized with the icon "Laser disable, Push to enable" and the condition "ENABLELASEROUTPUT Yes" is visualized with a plain button.

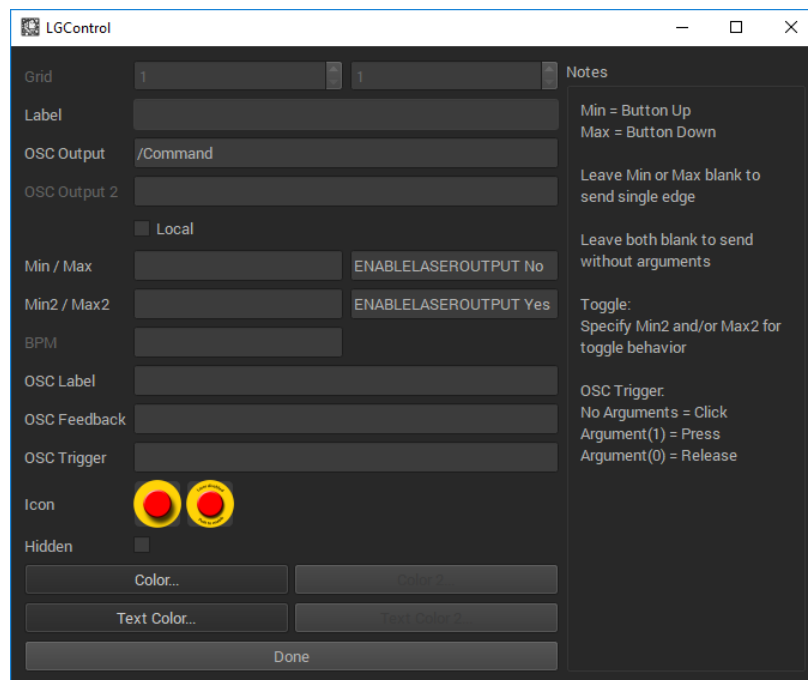


Figure 18: Specified *Max* and *Max2* with icons for both conditions

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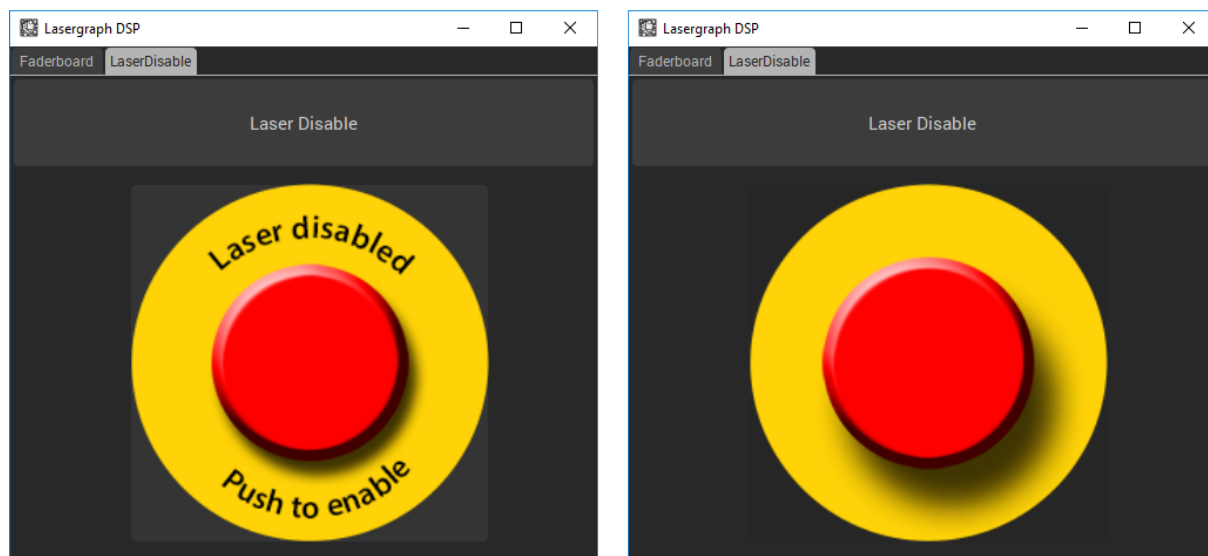


Figure 19: left: icon for disabled laser (condition *Max*), right: icon for enabled laser (condition *Max2*)

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### 3.7 Labelling Controls

Each control can show a label which can be defined by sending data to the OSC address *OSC Label*.

For example, provide the *OSC Label* address `/fader/label/1` for *fader 1*, the *OSC Label* address `/fader/label/2` for *fader 2* and the *OSC Label* address `/fader/label/3` for *fader 3*.

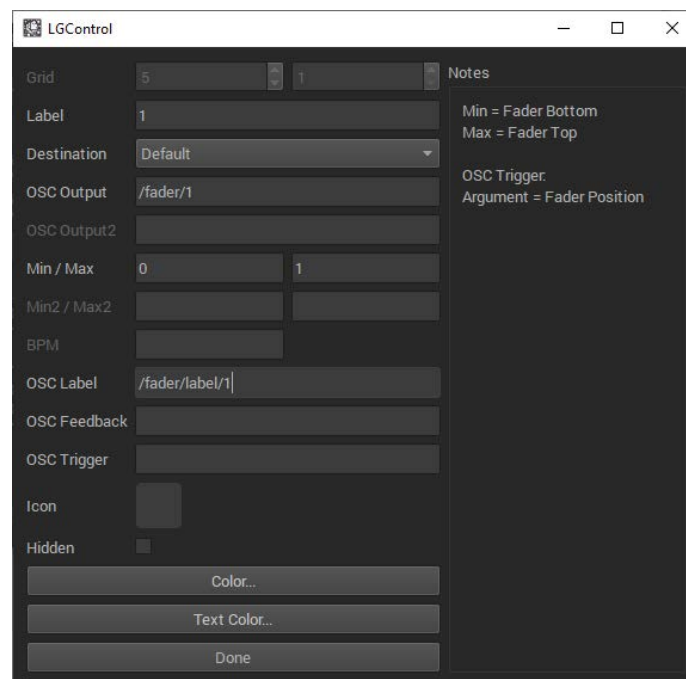


Figure 20: Fader 1 with OSC Label `/fader/label/1`

To label the faders from a Lasergraph DSP, use the following commands:

```
SENDstring osc://255.255.255.255:8001/fader/label/1\string\Size
SENDstring osc://255.255.255.255:8001/fader/label/2\string\Move-X
SENDstring osc://255.255.255.255:8001/fader/label/3\string\Move-Y
```

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The faders get the following labelling:



Figure 21: Labelled faders

## 3.8 Linking Controls

### 3.8.1 Providing Feedback

*OSC Feedback* is useful if a show is controlled by different computers.

For example, the position of *fader 1* which is controlled from computer 1 should be displayed by *fader A* on another computer. *Fader A* receives feedback from *fader 1*, only showing a visual feedback and sending no *OSC Output* address.

To connect faders open the *Edit* window of *fader A*. *Fader A* gets the *OSC Output* address of *fader 1* as *OSC Feedback* address. Select *Local* as Destination. *Fader 1* gets the *OSC Output* address of *fader A* as *OSC Feedback* address. Select *Local* as Destination.



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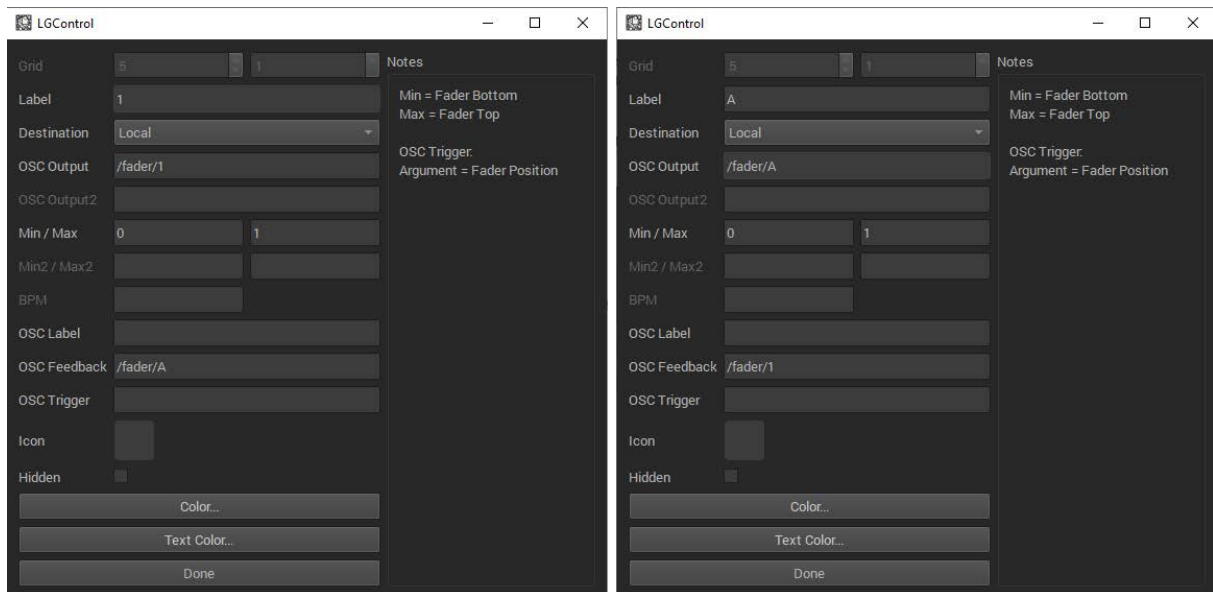


Figure 22  
left: *Fader 1* gets the *OSC Feedback* address *"/fader/A"*  
right: *Fader A* gets the *OSC Feedback* address *"/fader/1"*

If the position of *fader 1* is changed, *fader A* gets a feedback and shows the same *fader* position as *fader 1*.

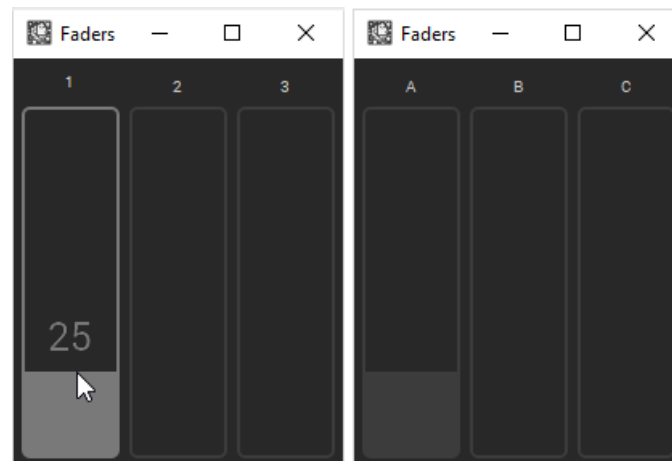


Figure 23: left: controlling *fader 1*, right: *Fader A* gives the same feedback but only visual

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### 3.8.2 Triggering

To connect controls use *OSC Output* and *OSC Trigger*. To control one or several other controls select *Local* in the drop-down menu of *Destination* and provide an *OSC Output* address. The control to be triggered receives a signal when providing the same address in *OSC Trigger*.

Example 1: Connecting buttons

*Buttons 1 to 3* can be pressed independently.  
*Button All* triggers *buttons 1 to 3*. Its *OSC Output* address is `"/myButtons"`. Select *Local* as *Destination*.

*Buttons 1 to 3* have *OSC Trigger* set to `"/myButtons"`.

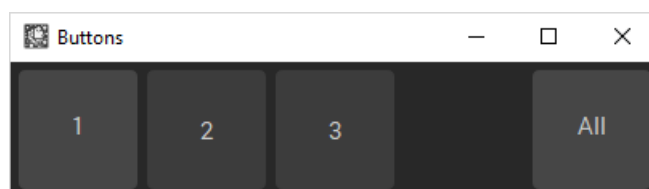


Figure 24: Connected buttons

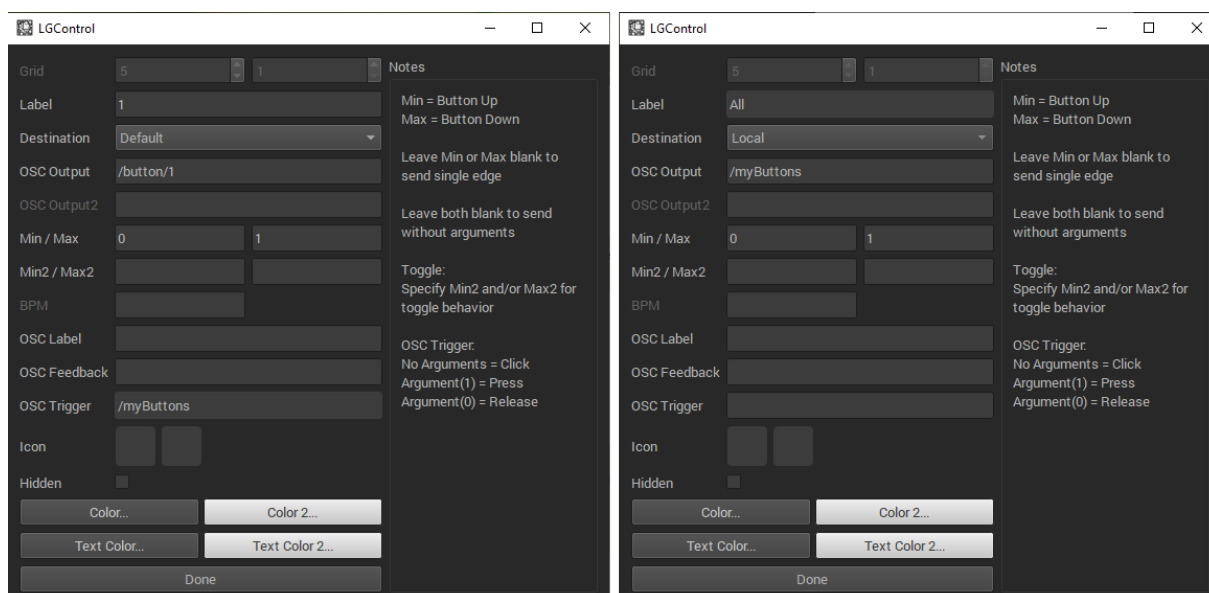


Figure 25: Setting for connecting buttons  
left: *OSC Trigger* `"/myButtons"`, right: Control for buttons with *OSC Output* address `"/myButtons"`

# USER'S MANUAL

## Example 2: Connecting faders

*Faders 1 to 3* are independently controllable.

*Fader All* triggers *faders 1 to 3*. Its *OSC Output* value is `/myFader`. Select *Local* as Destination.

*Faders 1 to 3* have the OSC address `/myFader` as *OSC Trigger*.

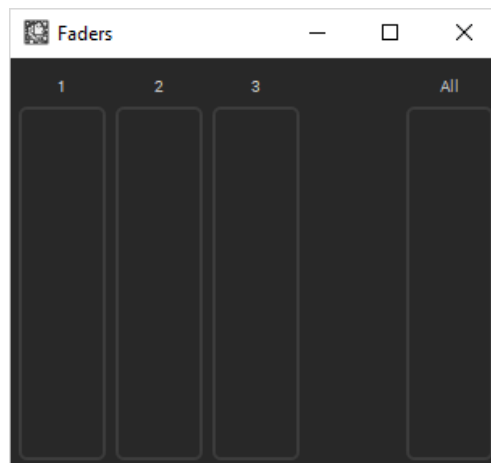


Figure 26: Connected faders

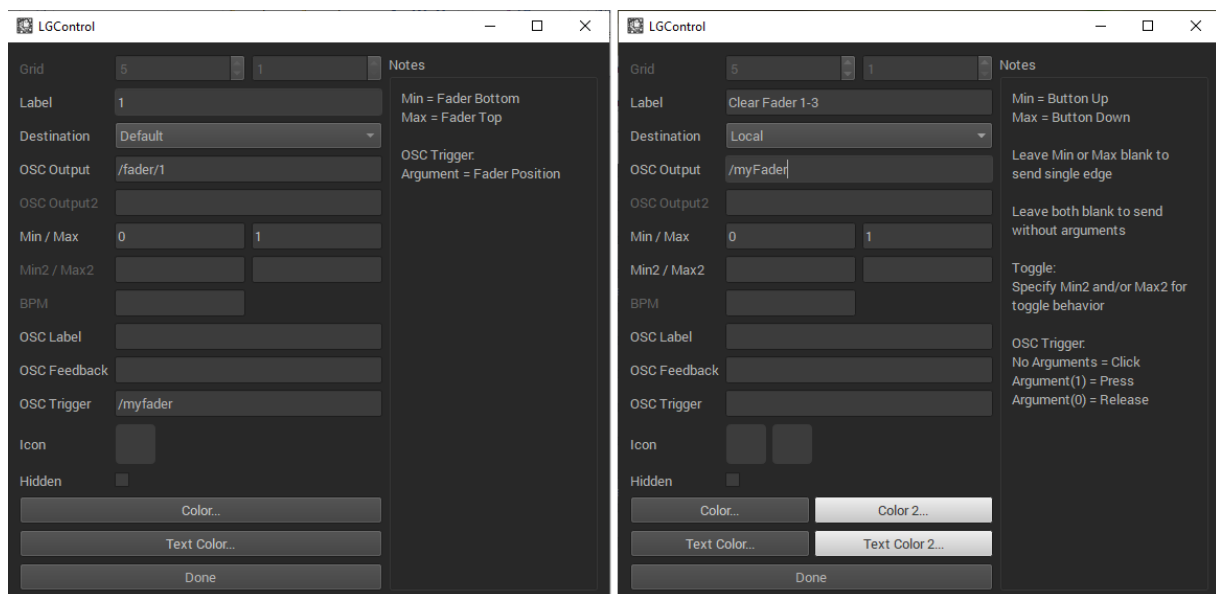


Figure 27: Setting for connecting faders  
left: *OSC Trigger* `/myFader`", right: control for fader with *OSC Output* address `/myFader`"

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### Example 3: Clear faders 1-3

Different controls can be connected with each other and can be triggered by another kind of control.

In this example, one *button* clears the values of *faders 1 to 3* in the example above.

When the *button* is pressed *fader 1 to 3* is set to zero.

The button has the *OSC Output* address “/myFader”. Select *Local* as Destination.

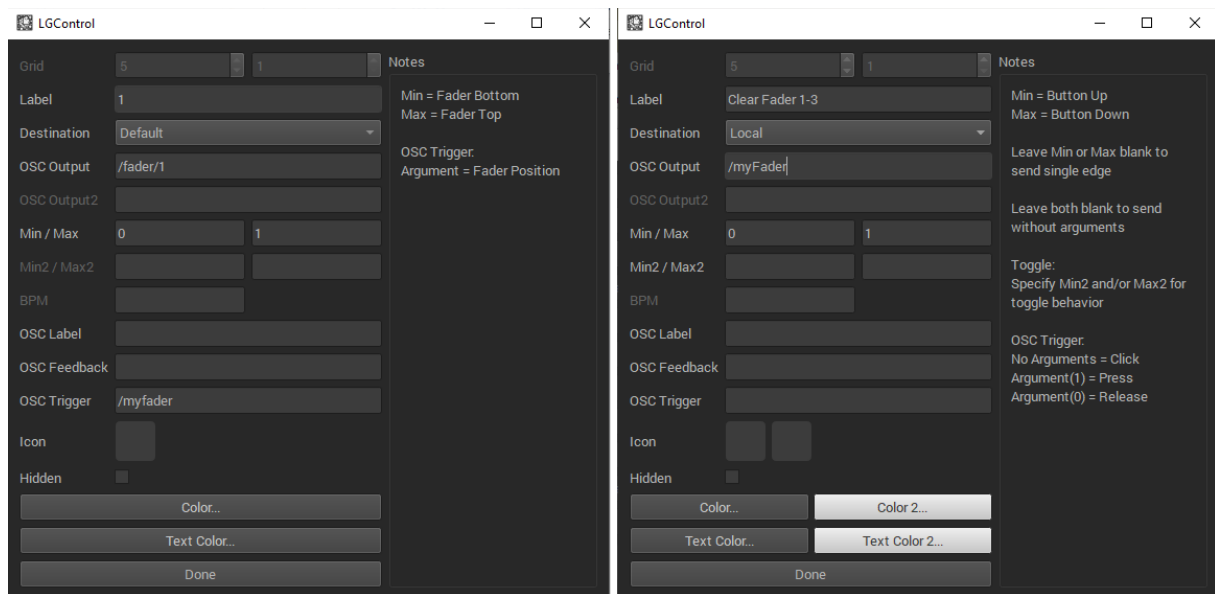


Figure 28: Setting for triggering faders  
left: Fader 1 triggered by Button, right: Setting for Trigger Button

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### 4 Grouping Devices

To control more than one device via LGControl you can setup device groups.

1. Click on Groups in the menu of LGControl and choose *Group Setup....*  
The Group Setup window opens.

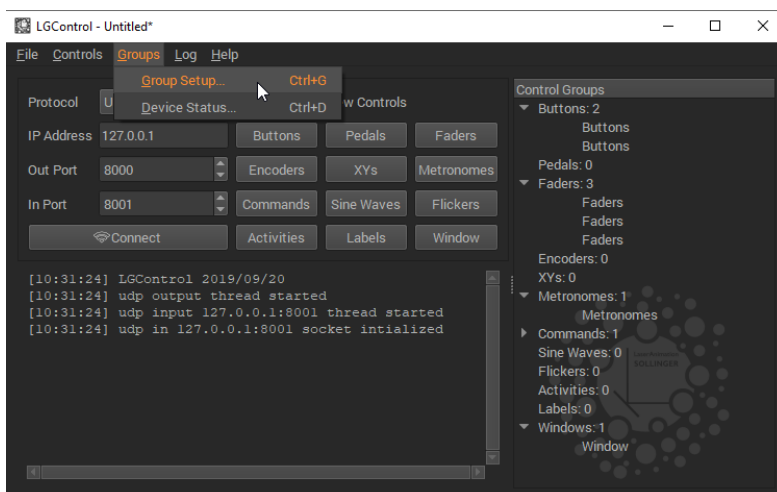


Figure 29: Opens the Group Setup window

2. In the Group Setup window you can add a new group by clicking on the + button or delete a group by clicking on the - button on the left-side.

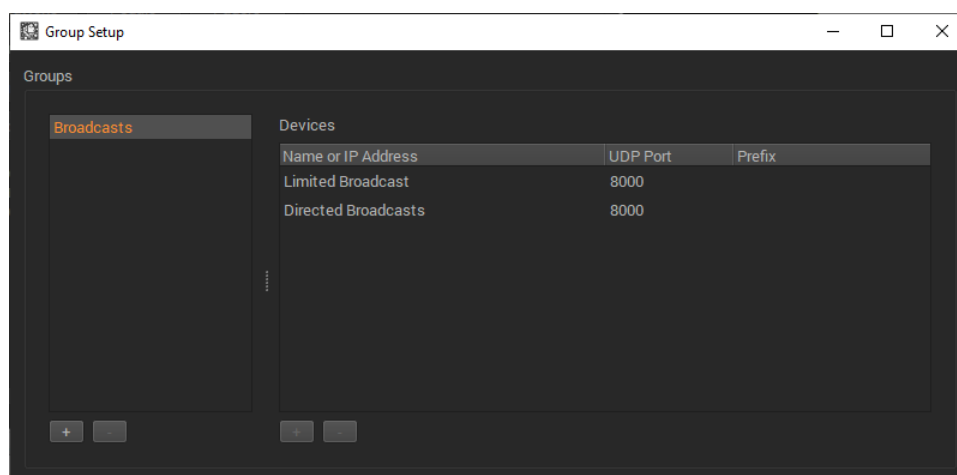


Figure 30: Group Setup window

## USER'S MANUAL

3. Double-click on *New Group* to rename the group. Each group needs a unique name.

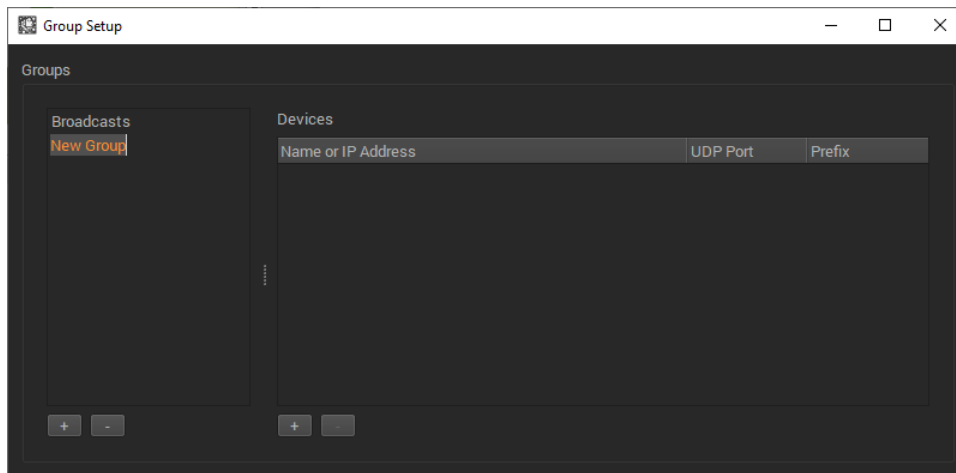


Figure 31: Rename group by double-clicking on its name

4. To add a new device to a group, press the *+* button on the right side and choose or type the name or IP address of the device you want to add.

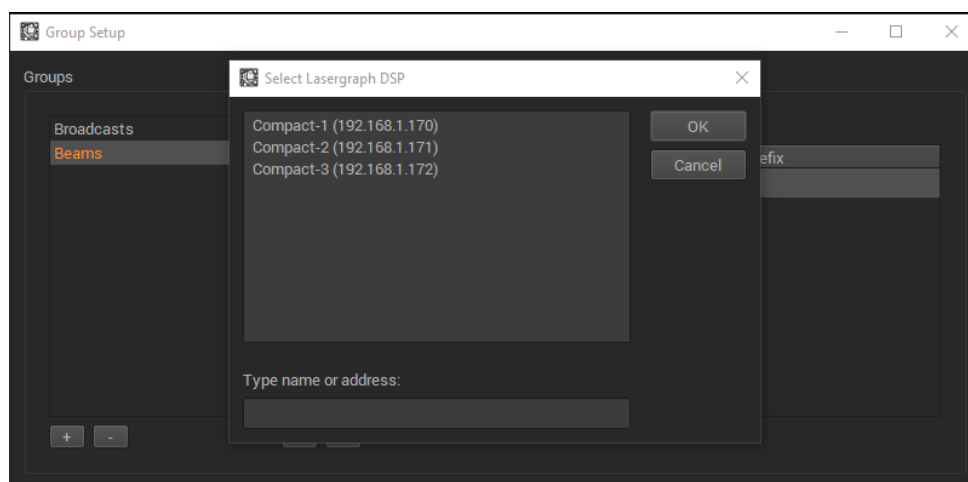


Figure 32: List for selecting devices

To delete the selected device, click on the *minus*-button.

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5. To change device settings, double-click on its name, port or prefix and enter a new value.

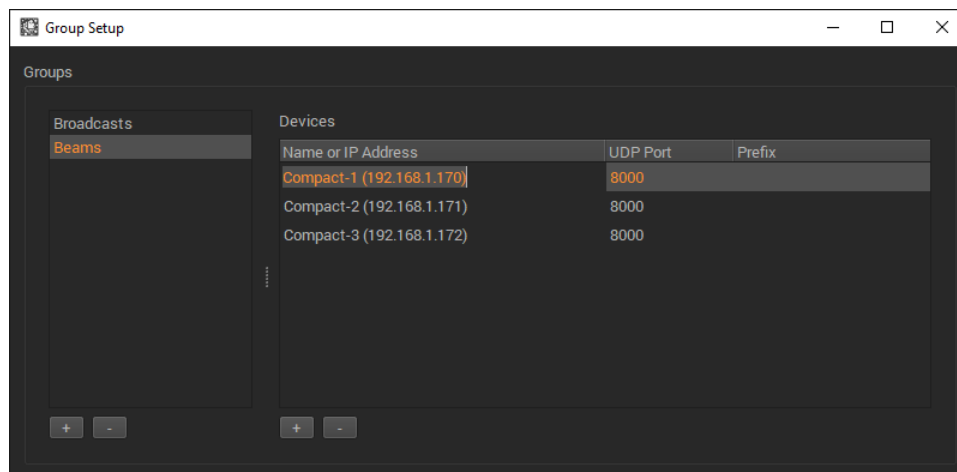


Figure 33: Change of device setting with a double-click

# USER'S MANUAL

## 5 Shortcuts

Shortcut	Description
<Ctrl>+<N>	Create a new project
<Ctrl>+<O>	Open an existing project
<Ctrl>+<S>	Save the current project
<Ctrl>+<Shift>+<S>	Save the current project with a new name
<Ctrl>+<Q>	Quit the application
<Ctrl>+<T>	Toggle "Always On Top"
<Alt>+<Return> <Alt>+<Enter>	Toggle between window and full screen mode for the currently active Control Group
<Ctrl>+<E>	Open the edit window for the currently active Control Group
<Ctrl>+<M>	Show or hide the Main Window
<Ctrl>+<G>	Open the Group Setup



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### 6 Troubleshooting

If LGControl does not receive any commands from the Lasergraph DSP:

- LGControl is based on OSC. The Lasergraph DSP only supports the protocol UDP when communicating via OSC.
- Check the port value. The UDP Port of the Lasergraph DSP has to be the same as the Out Port of LGControl. Also check the Group setting for correct ports for each device.
- Check the IP address. LGControl only receives commands from the Lasergraph DSP when it uses the IP address of one Lasergraph DSP or the Directed Broadcast address.
- If too much data is sent too fast from LGControl to the Lasergraph DSP, data may get lost.
- Depending on the IP address set in the main window, LGControl may be unable to receive data via the limited broadcast address (255.255.255.255).

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### 7 Credits

We thank Electronic Theatre Controls for providing the open-source project OSCWidgets on which the software LGControl is based.

<http://www.etccconnect.com>



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