
ROBE

LED Mapper for Media Fusion

***DT* SERIES**

Documentation

ROBE® lighting s.r.o. •Czech republic •www.robe.cz

Table of content

Table of content	1
Introduction	2
1. Concepts	3
2. Hardware setup	4
2.1. ArtNet, Nodes and Switches.....	4
2.2. e:cue butlers.....	5
2.3. Computer.....	5
3. Installation	6
4. LED Mapper presentation.....	7
5. Fixture library	8
5.1. Creating or modifying a LED Fixture	9
5.2. Exchanging the LED Fixture library	10
6. Creating the mapping	11
6.1. Creating the elements	11
6.2. Editing the element.....	12
6.3. Deleting an element	13
6.4. Duplicating an element.....	13
7. Mapping resolution	15
8. Project files	17
9. Enabling LED Output in Robe Media Fusion.....	18

Introduction

LED lighting has become very relevant for live entertainment and TV over the last few years. The LED Mapper extension for Robe Media Fusion is the answer to the market's request for an intuitive and flexible software solution to drive these LED panels or any lighting fixture from a media server.

Thanks to this extension, you can map the media server video output directly to LED devices using ArtNet (DMX over Ethernet protocol, which can easily be converted into a standard DMX signal using Ethernet-DMX nodes) or through e:cue butler devices.

From a single computer running Robe Media Fusion software, it is possible to control as many LED fixtures as you want (within the limit of 256 DMX universes!)

Since LED panel resolution is fairly small, a setup usually consists in quite a bit of panels, possibly with different characteristics and following a very specific layout. To create and edit the mapping of the video output to the panels, we provide an external application called the LED Mapper that allows you to manipulate both the spatial arrangement and DMX definitions of all the LED devices involved. After designing the setup in this application, it saves a "mapping file" that is read by Robe Media Fusion who sends its output to the LED displays based on your definition.

This document will give all details about the LED Mapper that enables LED mapping. For a short introduction and first hands on, you can also check the Quick Start PDF installed with the LED Mapper application.



Note on Licensing

In order to use the Robe LED Mapper, you will need a specific license called "QubeControl".

1. Concepts

The LED extension for Robe Media Fusion aims at driving LED fixtures through DMX addressing. Since there's a lot of different panels vendors, LED fixtures have very different properties when it comes to resolution, pixel type, channel mapping, etc...

Our software has been designed to handle any type of fixture as long as they are driven through DMX.

To drive the fixtures, Robe Media Fusion uses the ArtNet protocol (DMX over Ethernet) or e:cue butlers. If some of your panels don't directly support ArtNet, it can be easily converted into a classic DMX signal using so-called Ethernet nodes. ArtNet gives provision for up to 256 DMX universes, allowing the handling of a lot of elements. The e:cue butlers come with two DMX outputs by default, therefore you don't need additional hardware.

The principle of the LED Mapper extension is very simple: using the LED Mapper application, you describe which area of the video output will be sent to each LED devices along with their DMX addressing (universe and base channel). Once the configuration for a particular show has been defined, it is saved in a 'mapping' file that will be read by Robe Media Fusion to push the right pixels to the right LED Panels.

During the show, Robe Media Fusion is controlled in the usual way. The video output can still be used to control video projectors but pixel information will also be sent over ArtNet or e:cue butlers according to the definition created in the LED Mapper application.

2. Hardware setup

This part will give you an idea of the various hardware elements used to drive LED fixtures from Robe Media Fusion.

2.1. ArtNet, Nodes and Switches

As explained in the previous part, the Robe Media Fusion LED output extension (called QubeControl) aims at driving LED fixtures with a DMX input. Media Fusion will always send DMX information over ArtNet on a single Ethernet adapter that, depending on the type of fixture, might need to be converted into a DMX signal with Ethernet nodes.

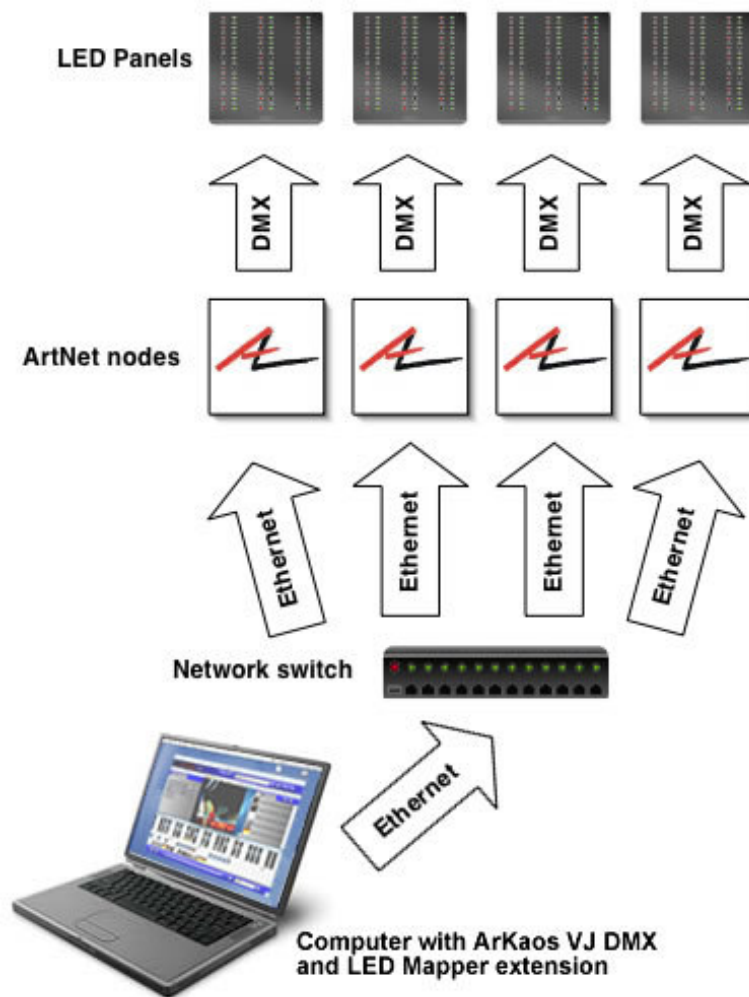
Most Ethernet nodes are ArtNet compatible, and a lot of them are dedicated to ArtNet protocol. The ArtNet protocol can transfer up to 256 DMX universes, allowing to control up to 131.072 DMX channels.

DMX universes in ArtNet are specified by means of two parameters: subnet and universe: there are 16 subnet and 16 universes (both ranging from 0 to 15). On each Ethernet nodes, you must select which subnet / universe they will be listening to transfer the signal onto their DMX output.

If you need to access more than 1 DMX universe, you will either need more nodes or use nodes that can cope more than one output/universe, providing several regular DMX outputs.

If you use multiple nodes, you will need network switches to connect the single ArtNet output from Robe Media Fusion to the various nodes. If you have to control a lot of universes, it is important to use a professional grade network switches to ensure a smooth transfer of the information.

Here is a schematic of a typical installation:



2.2. e:cue butlers

An installation with e:cue butlers will be similar as the one presented above; the computer is linked to an Ethernet switch with e:cue butlers connected. Each butler has two DMX outputs that can be connected to your devices.

2.3. Computer

The necessary computer setup varies depending on the size of the installation and the number of Panels involved. If you drive only a few panels and don't use the video output, a small computer or a laptop will be more than enough. However, in a setup with a lot of fixtures, you will need a powerful machine and a 1 GB/s network can improve performances a lot. Remember that all the pixel information has to be sent on the network so its performance is as important as the computer's.

For reference, we've done a few tests in house, driving 120 DMX universes using a P4 2.8 GHz and a 100Mb/s network and Robe Media Fusion was still running at a satisfying 30 FPS (frames per second).

3. Installation

Purchasing the LED extension (called QubeControl) for Robe Media Fusion gives you access to:

The LED Mapper application to create and save mapping files to be used in Robe Media Fusion.

The “LED Output” tab in Robe Media Fusion preference dialog box, that allows to select which mapping file to use to drive LED devices or standard dimmers.

To install your setup, you will need to go through the following steps:

Install Robe Media Fusion.

Register the application with a Robe Media Fusion QubeControl serial number.

Install the Robe LED Mapper application. This application will only work if Robe Media Fusion has previously been registered on the machine with a QubeControl serial number.

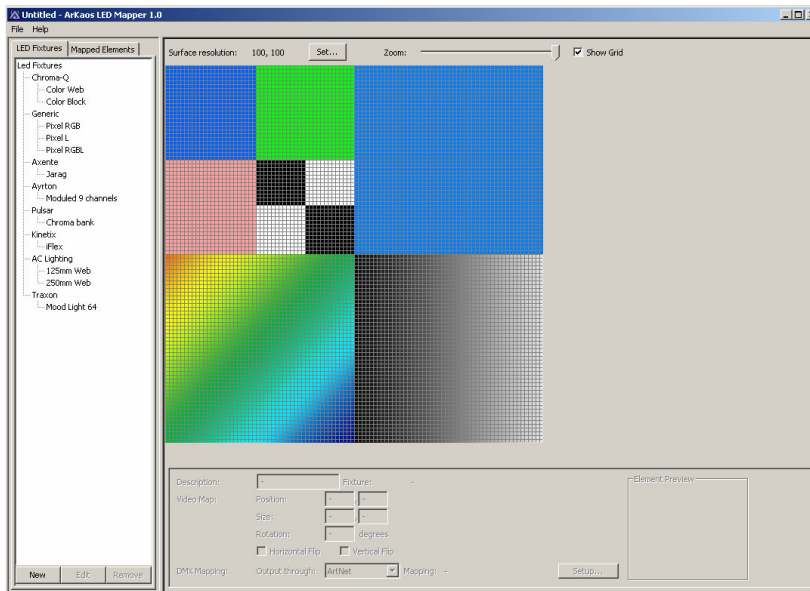
4. LED Mapper presentation

The LED Mapper is the application where you describe which parts of the video image (screen) should be sent to the different fixtures.

The application has been designed to be simple and easy to use. In order to monitor your work, the software also sends ArtNet output, which allows you to see the result of your work when creating the mapping in a WYSIWYG fashion. This is very handy because some setups can be very complex, driving many fixtures. It also makes sure the process of using the mapping in Robe Media Fusion is as seamless as possible.

The mapping application is solely on fixed images and does not support fancy movie playback and effects. It's solely targeted at getting an accurate mapping definition, not as a performance tool. Of course, once you've created your mapping, Media Fusion will use it and feed the LEDs with camera, movies, text using effects or whatever you want.

To select which image to use during the definition process, go in the File menu and select the item "Select Visual..." to choose any image residing on the computer's hard drive.

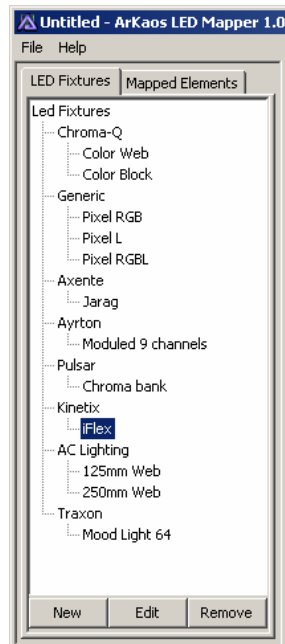


5. Fixture library

The mapping software is based on the concept of using a fixture library. This library contains the definition for various Fixtures, storing their intrinsic parameters such as the number of pixels they cover, the channel offset for each of pixel and so on.

Once you have defined the library elements, you are free to use them as many times as you wish in a given mapping setup. Each fixture element used for a particular configuration becomes a 'mapping element' that you can arrange interactively, specifying for each of them the universe and start channel to be used.

In the picture below, you can see a tabbed tree. The first tab contains all the fixtures available in the Fixture Library. The second contains all the mapping elements that have been already included into the current project.



Fixtures are organized by manufacturers.

Each fixture definition contains the following parameters:

Resolution (for instance 8x8 pixels)

Pixel Type (RGB, RGBL, or L)

Pixel addressing (DMX channel assigned for each pixel)

Resolution: the resolution expresses the width and the height of the pixel matrix.

Pixel type: the pixel type expresses the color and luminance capacity of the pixels.

Most often, the pixel type will be RGB, meaning 3 DMX channels define each pixel; giving respectively the red, green and blue levels.

Some devices have additional channel for luminance information and are of type RGBL. This is generally provided to make them easier to control from a lighting desk but is not useful when controlled from Robe Media Fusion. However it is important to choose the right pixel type or the values sent will not correspond to what the device is expecting. In the case of RGBL pixel type, Robe Media Fusion will simply always fill the "L" channel with a 100% value.

The last pixel type is "L" (Luminance only) and indicates a Fixture that contains dimmers. When selecting this pixel type, the software will compute

each of the pixel's luminosity and send it to the fixture. In this case each pixel uses only one DMX channel.

Pixel addressing:

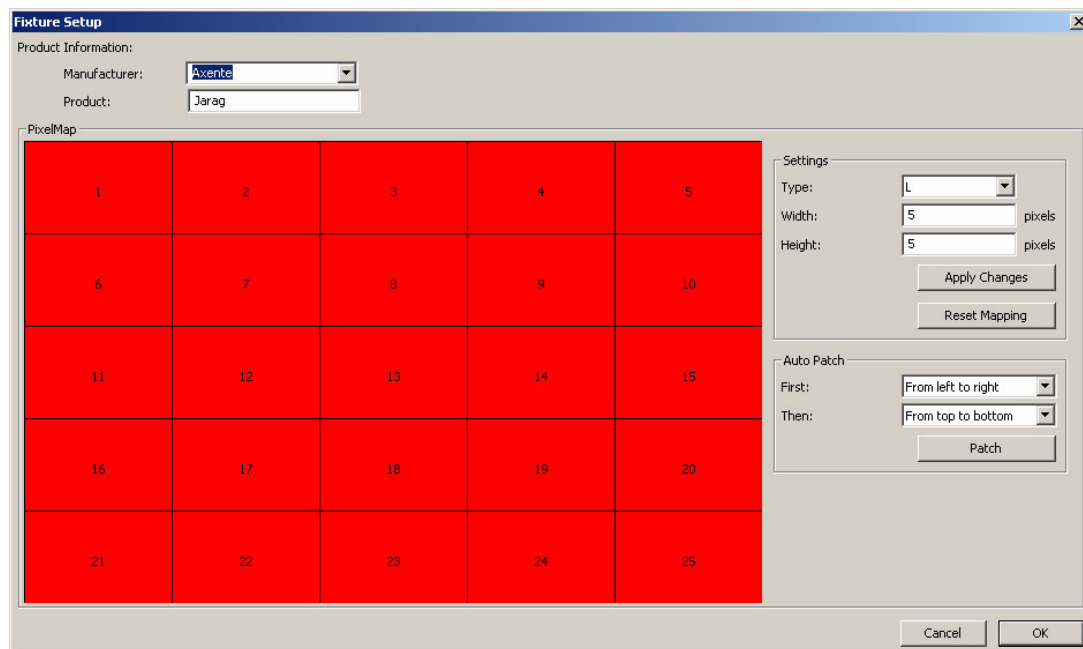
In order to drive each pixel inside the matrix, we need to define the channel offset of each pixel inside the fixture. Many fixtures map pixels from left to right and from top to bottom, but this is not always the case. In order to cope with all situations, the software allows pixels to be addressed freely or using an auto-map feature covering most of the cases.

5.1. Creating or modifying a LED Fixture

To edit an existing fixture, just select it in the fixture library tree and press the "Edit" button at the bottom of the list. Alternatively, you can also double-click the fixture.

To create a new feature, press the "New" button below the fixture list.

This will open the LED Fixture dialog box:



This dialog allows you to define the manufacturer and product name of the fixture and choose its pixel type and resolution. Once those data have been defined, you need to press the "Apply Changes" button before you can patch the pixel addressing, either manually or using the auto-patch feature. The red squares indicate all pixels from the Fixture's matrix. If they have a number in them, it represents their DMX addressing; i.e, the DMX offset to be used to address that particular pixel. Pixels without numbers are not addressed, no pixel information will be sent to them

Auto-patching gives a simple way to define an addressing that follows a row/column pattern. Simply specify the rule to fill out the matrix and click 'patch'. You will see the resulting addressing displayed inside the pixels.

To Patch pixels address manually, you need to click red square one at a time in the correct order. Each time you click an unpatched pixel, it will be given the next available DMX channel. You can always use the "Reset" button to clear completely the mapping.

5.2. Exchanging the LED Fixture library

The fixture library is saved in a file called "LEDFixtureLib.lml" residing in the LED Mapper application folder. To share the library you created with someone else, or just to transfer your library from one computer to another, you can copy this file to the other computer (making sure you don't replace the original file on that installation) and import it in the application using the "Import Fixtures..." menu entry from the file menu. This action will allow you to merge the two library files. If some fixtures are already in the library a confirmation dialog will ask you if you want to overwrite the fixture in your library or if you want to skip this particular fixture and continue.

6. Creating the mapping

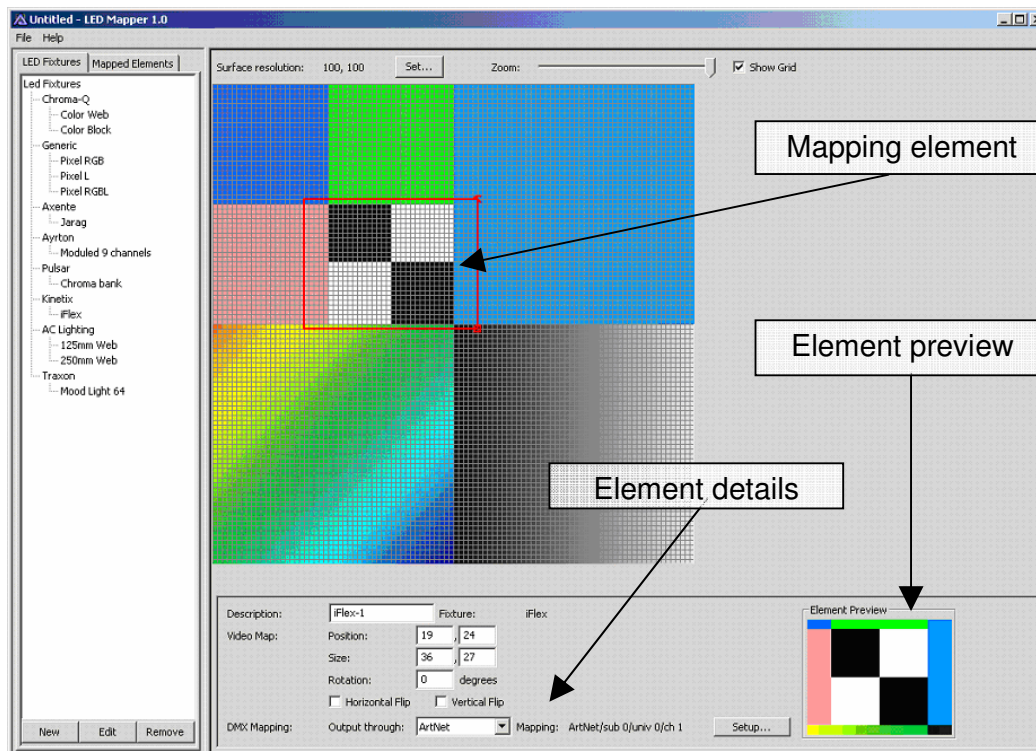
6.1. Creating the elements

When your set of fixtures is ready, you can start building a specific mapping, which can combine several fixtures into a mapping. To add a fixture, simply drag & drop it from the library onto the mapping area located on the right side of the screen. It will automatically create a 'mapping element' (an instance of a fixture in the mapping) and open the DMX patch window.

If you use ArtNet, the Patch window will let you set the ArtNet subnet / universe and start channel for that particular element. If you want to patch the element to an e:cue butler output, you can select it in the element details area at the bottom of the screen. Once you patched one device, the next ones will use the same output type by default, but you are free to change it and mix ArtNet and e:cue butler outputs.

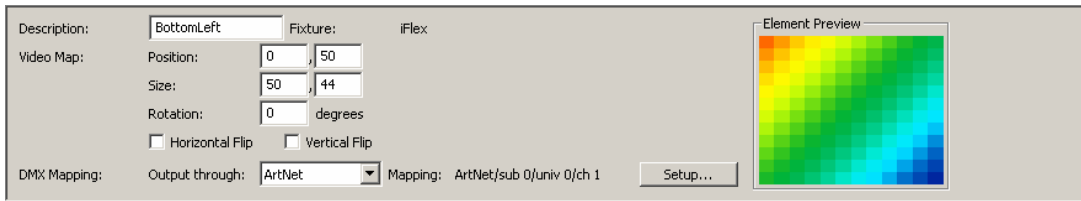
At this point, the LED Mapper will start sending DMX to the fixture. If your panels are properly connected, they should display the part of the image held inside the element's area. If the panel doesn't show any image, check the fixture definition, the DMX patching of the element as well as your hardware connections. The images sent for this particular element is also displayed in the element detail window located under the mapping area.

The element will be displayed on the mapping area as illustrated below:



6.2. Editing the element

When a mapping element has been added, it is possible to edit several properties in the element detail area as shown below:



The available parameters are:

Description: a description of the element to be displayed in the “Mapped elements” list.

Position: the position in pixel of the top left corner of the element.

Size: the number of pixels of the screen area that will feed this element. If you want a pixel perfect mapping, this value should match the exact size of the Fixture pixel matrix. This is the default setting after adding element. If the element size differs from the fixture size, Robe Media Fusion will perform averaging on the screen area to compute the pixel color information sent to the fixture.

Rotation: rotates the element of the specified number of degrees.

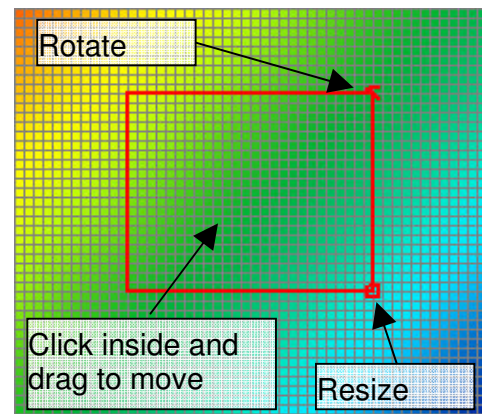
Horizontal flip: allows flipping the element upside/down

Vertical flip: allows flipping the element left/right

DMX Mapping setup: Allows modifying the DMX patching defined when the element was created.

The element’s position, size and rotation can also be edited graphically. If you press the left mouse button inside the element’s area, moving the mouse will move the element. Clicking on the top right corner of the element allow changing the rotation, while the bottom right corner allows to modify the element’s size.

The DMX Mapping setup can also be recalled by double-clicking on the element.



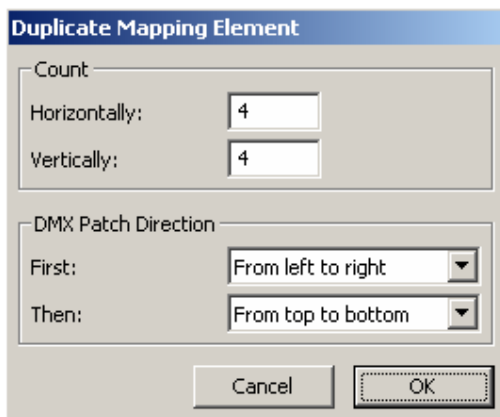
6.3. Deleting an element

To delete an element, simply select it and press the “Delete” key, a dialog will show up to confirm the deletion. Alternatively, you can right click on the element, and select the “Remove” entry in the contextual menu or select the element in the mapping element list on the left side of the application and press the “Remove” button below the list.

6.4. Duplicating an element

To earn time when creating a big setup with many similar fixtures (for instance 16x10 = 160 fixtures), it is possible to duplicate elements. To duplicate an element, right click on it and select “Duplicate...” from the contextual menu.

The following dialog will be shown:



In most cases, the elements will be organized according to a matrix. For example, using 16 elements in a 4x4 grid. Using this dialog, you can specify the width and height of the grid you would like to create, specifying the number of elements you want horizontally and vertically. If you want to create a grid of 4x4 elements, you will enter these parameters.

The Patch direction will define where the new elements will be added and in which order. The order is important because the software has an intelligent DMX patching algorithm explain below. The direction is also important: if you select to patch first “From left to right” then “From top to bottom”, the element you are duplicating will be the top left element of the grid. So the new element will be added on the right and at the bottom of the original one.

Since all the resulting elements need to be assigned to an ArtNet universe and DMX channel (if not patched to e:cue butlers), the software will pre-patch the duplicated element using the most logical way: if there are enough channels left in the current ArtNet universe, it will set the start channel to the next unused channel in the universe. If there is not enough space left it will patch the duplicated element on the first channel of the next universe.

To verify or modify the pre-patching of the duplicated elements once you've created them, you can select them individually and use the 'Setup' button in the element detail panel as explained in 'Editing the element' section above.

7. Mapping resolution

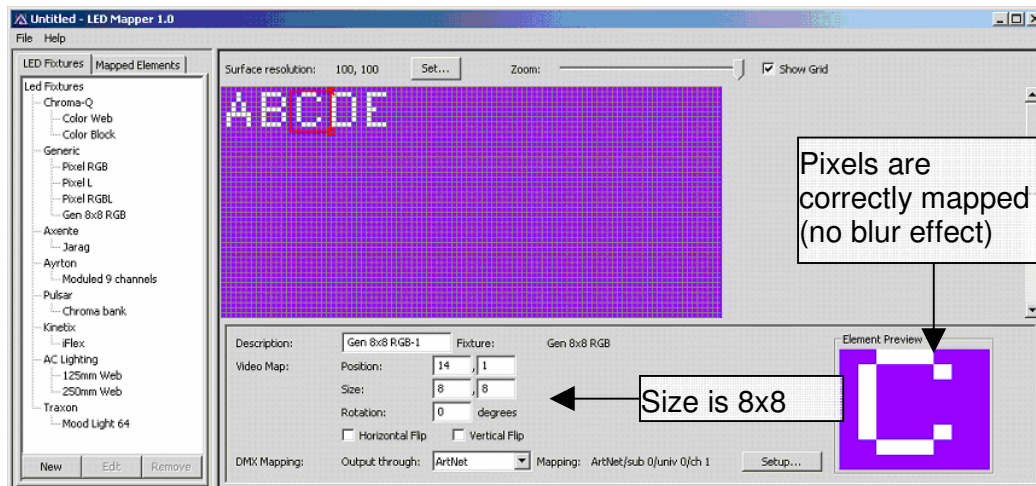
When positioning the mapping elements, everything is done with respect to a pixel grid. The grid resolution is per default 100x100 but can be changed to any resolution. The range for horizontal or vertical resolution is from 8 pixels to 2000 pixels.

Before explaining the interest of this setting, it is important to understand what happens in the LED engine: for each element mapped, the LED engine will need to compute the pixel values to be sent through ArtNet. These values are computed from the pixel color of the original image.

Let's examine two different examples:

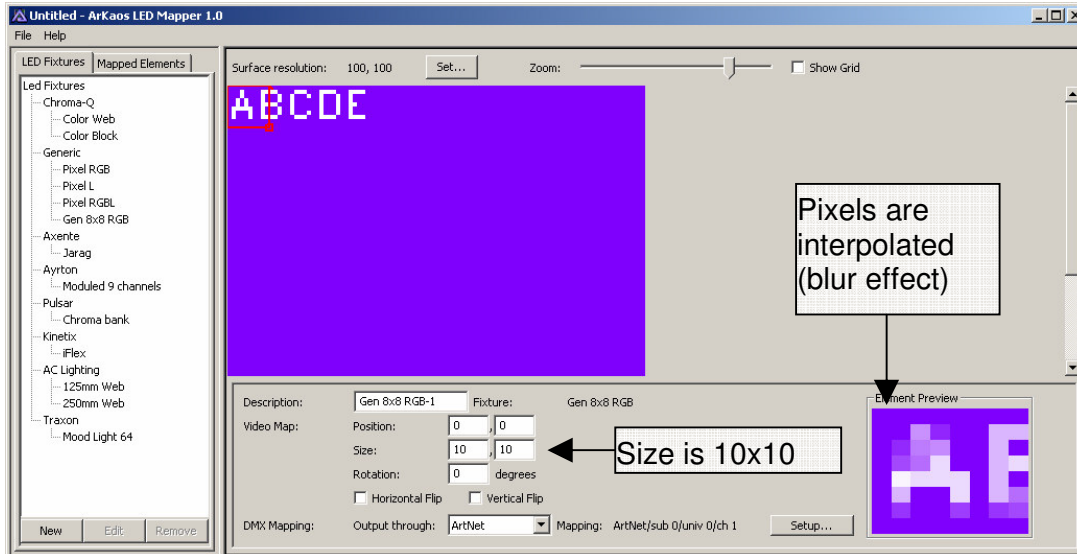
Example 1:

We are driving an 8x8 RGB fixture. The fixture has been mapped on the screen and the size of the element is 8x8. In this case, each pixel of the element will receive exactly the value of one pixel of the video engine.



Example 2:

We are still driving the same fixture (8x8 RGB) but now we send a larger area of the screen to the element (10x10). When computing pixel color, the software will need to interpolate the pixels in the source image to produce the pixels color sent through DMX.



As you can see, to have a clear result on your output, it is very important to define properly your elements and make sure they map correctly pixel on the screen.

The 'mapping resolution' defines the size of the computation area inside Robe Media Fusion prior to send the image to the LED panels or, so to speak, the size of what it thinks the full screen is. If you plan on using panels for a total of 48x48 pixels, you need to setup the resolution accordingly. You could also use any other valid ratio (like 96x96 for example) but it would mean you would run internally at a higher resolution to then downscale the image to the LED size, which would lead to unnecessary processing and a blurring effect. Only in the case of huge installations or if you plan to use the video output on a projector, you should set the resolution to regular video standard settings like 640x480.



Note about values:

The values for position and size element settings are stored as percentage values. This means that if you change the grid resolution, your elements will still cover the same area of the whole visual.

8. Project files

When you have mapped all the fixtures for your show, you have to save the mapping file before leaving the application. The File menu offers all common entries:

New: creates an empty project

Save: saves the current project

Save As: saves the project under another file name

The file extension is “.Imp” which stands for LED Mapper Project. It includes the mapping (mapped elements and their properties) as well as the fixtures used in this mapping, so that you can open the file on another computer even if the fixture is not available on that computer’s fixture library.

9. Enabling LED Output in Robe Media Fusion

When Robe Media Fusion has been registered with a “Robe Media Fusion QubeControl” serial number, you will have access to the LED Output tab of the preference dialog box. From this window, you can activate LED output and select the mapping file. For more information about that, please refer to Robe Media Fusion documentation.

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