

MA VPU

Operating Manual

Version 7.81\_1

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Welcome to MA VPU

Thank you for placing your trust in this product.

This manual will provide all the necessary information for you to get the best out of your software.

The MA VPU is subject to continual development. It is therefore possible that the entire information printed in this manual is out-of-date.

Up-to-date information can always be found in the current readme.txt file on the CD or the downloaded program.

You can download the actual software version via: [www.malighting.de](http://www.malighting.de)

We need your help!

If you have wishes or suggestions please send us an e-mail [tech.support@malighting.de](mailto:tech.support@malighting.de).

Looking forward for a good cooperation

Your MA VPU team

Content

<b>1</b>	<b>What is MA VPU ?</b>	<b>7</b>
1.1	Main Features	7
1.2	Functions and Features	8
1.3	Comparison VPU plus / VPU basic / VPU light	9
1.4	Transition from grandMA video to MA VPU	10
<b>2</b>	<b>Installation and Maintenance</b>	<b>12</b>
2.1	Startup of VPU	12
2.2	Software Update	13
2.2.1	Service Packs	13
2.3	Update of Fixture Types	14
2.4	Backup	18
2.4.1	Handling backups with the VPU	18
2.4.2	Start Acronis on VPU's with serial Numbers up to # 86 on	19
2.4.3	Start Acronis on VPU's with serial Numbers from # 87	20
2.4.4	Restoring an image with Acronis	20
2.4.5	Storing an Image with Acronis	24
2.4.6	Backup the VPU content after shipment	28
2.5	Access VPU via Network	30
2.6	Version of grandMA desk or grandMA onPC (off-line)	31
2.7	IP Addresses	32
2.7.1	IP Address of the PC	32
2.7.2	Artnet IP Address	32
2.8	EDID Manager	33
<b>3</b>	<b>Communication with the grandMA Desk Series</b>	<b>35</b>
3.1	Connection with the grandMA desk	35
3.2	grandMA 1 or grandMA 2 mode	36

<b>3.3</b>	<b>Connection with the grandMA onPC (off-line) software</b> .....	<b>36</b>
<b>3.4</b>	<b>Connection States</b> .....	<b>37</b>
<b>3.5</b>	<b>Preferred Operation Mode (Screen Layout MA 1Series)</b> .....	<b>39</b>
<b>4</b>	<b>Data management</b> .....	<b>41</b>
<b>4.1</b>	<b>Master slave</b> .....	<b>41</b>
<b>4.2</b>	<b>Principle function diagram</b> .....	<b>42</b>
<b>4.3</b>	<b>Layer properties</b> .....	<b>44</b>
4.3.1	Layer Reference.....	48
4.3.2	Virtual Outputs .....	48
4.3.3	Virtual Output: Configuration of a TripleHead2Go Port .....	50
<b>4.4</b>	<b>Predefined Constellation</b> .....	<b>58</b>
<b>5</b>	<b>Several MA VPU applications in one grandMA show</b> .....	<b>59</b>
<b>6</b>	<b>Quick Guide</b> .....	<b>61</b>
<b>6.1</b>	<b>Quickstart with grandMA1</b> .....	<b>61</b>
<b>6.2</b>	<b>Quickstart with grandMA2</b> .....	<b>65</b>
<b>7</b>	<b>Program Surface</b> .....	<b>70</b>
<b>7.1</b>	<b>Internal Touch Screen VPU plus</b> .....	<b>71</b>
<b>7.2</b>	<b>Internal Screen VPU light</b> .....	<b>73</b>
<b>7.3</b>	<b>Menu bar</b> .....	<b>74</b>
7.3.1	File.....	74
7.3.2	View.....	82
7.3.3	Render.....	84
7.3.4	Help.....	84
<b>7.4</b>	<b>Toolbar</b> .....	<b>85</b>
<b>7.5</b>	<b>Status Bar</b> .....	<b>86</b>
<b>7.6</b>	<b>Preview</b> .....	<b>86</b>

<b>7.7</b>	<b>Multi Preview</b> .....	<b>87</b>
<b>7.8</b>	<b>Content Editor</b> .....	<b>88</b>
7.8.1	Content: Images (I-Pool) .....	89
7.8.2	Text Ticker .....	91
7.8.3	Content: 3D Objects .....	92
7.8.4	Content: Eff1 Type...Eff4 Type.....	93
<b>7.9</b>	<b>File Browser</b> .....	<b>94</b>
<b>7.10</b>	<b>Warper</b> .....	<b>95</b>
7.10.1	Warper Fullscreen View .....	95
7.10.2	Basic Operation .....	96
7.10.3	Warping .....	99
7.10.4	Use of Warper 3D Objects .....	102
<b>8</b>	<b>Features Attributes and Functions</b> .....	<b>103</b>
<b>8.1</b>	<b>Order of Effect Execution</b> .....	<b>120</b>
<b>9</b>	<b>Softedging</b> .....	<b>121</b>
<b>10</b>	<b>Keystoning</b> .....	<b>122</b>
<b>11</b>	<b>Pixelmapper</b> .....	<b>124</b>
<b>11.1</b>	<b>Pixelmapper Graphical View</b> .....	<b>125</b>
11.1.1	Pixelmapper Toolbar .....	126
11.1.2	Pixelmapper Editor.....	127
<b>11.2</b>	<b>Pixelmapper Grid View</b> .....	<b>129</b>
<b>11.3</b>	<b>Pixelmapper Panel Editor</b> .....	<b>131</b>
<b>11.4</b>	<b>Setup of an LED Wall</b> .....	<b>132</b>
<b>11.5</b>	<b>File Format of LED Panels</b> .....	<b>134</b>
11.5.1	LED Panel Examples .....	136
<b>12</b>	<b>Creation of customized 3D Objects</b> .....	<b>141</b>

<b>13</b>	<b>Content Specifications</b> .....	<b>146</b>
13.1	Rovi TotalCode Studio for converting your content into MPEG2 .....	150
<b>14</b>	<b>Warnings</b> .....	<b>157</b>
<b>15</b>	<b>Keyboard Shortcuts</b> .....	<b>158</b>
<b>16</b>	<b>FAQ and Troubleshooting</b> .....	<b>159</b>
16.1	Software Questions:.....	159
<b>17</b>	<b>Supplement MA Lighting</b> .....	<b>162</b>
17.1	Intended use .....	162
17.2	Data .....	163
17.3	Symbols and warning labels.....	163
17.4	LIMITATIONS .....	164
17.5	Transport.....	165
17.6	General Safety Instructions .....	166
17.7	IMPORTANT SAFETY INSTRUCTIONS.....	168
17.8	Electric shock warning on the rear of the <i>grandMA</i> .....	168
17.9	Safety and Environment.....	169
17.10	Quickstart Connect VPU plus .....	170
17.11	Quickstart Connect VPU light.....	171
17.12	Switching the apparatus On/Off .....	172
17.13	Maintenance.....	173
17.14	Conformity .....	173
<b>18</b>	<b>Index</b> .....	<b>174</b>

## 1 What is MA VPU ?

MA VPU, the **V**ideo **P**rocessing **U**nit is a media server, for both still and moving images, that is fully integrated into the grandMA lighting control system.

- A solution for controlling, live-accessing and altering video, still images and 3D-objects in real-time

- All videos, still images and 3D-objects can be scaled, positioned, tiled, colored and manipulated directly from any grandMA console

- Several 3D Video Layers with full effects capabilities for high-resolution projections (e.g. 1920 x 1080 pixels, Note: VPU Basic max resolution is HD 1280 x 720)

- Several Cameras for Shaper, Iris, FX Effects, Scaling, Camera Positions, Keystone, Softedge and 3D Objects

- One Master for Shaper and Iris effects PC remote control functions

- Straightforward set-up and configuration that utilizes bi-directional communication with the grandMA console; MA VPU is an integrated part of the grandMA network session

- Instant live-access to any kind of image, 3D-object or video – including content-preview in your presets

- Video In feature to fade in live videos

- Synchronization of videos via MA network

- Blind Programming support

- Pixelmapper to control several LED walls via Artnet

- EDID Manager can simulate an output device if nothing is connected

- Warper mode to warp or straighten the projection

- DVI- and Pixelmapper output at the same time (not for Dongle version)

- Text Ticker for animated text messages

- Single Layer Transition effects

### 1.1 Main Features

MA VPU is the Video Processing Unit for the grandMA range of lighting control consoles. It uses a Windows PC to facilitate the control of video and still images directly from any grandMA console and runs on readily available PC hardware. As fully integrated part of the grandMA network system, MA VPU is not just triggered via DMX. This has many advantages. On the one hand a minimum of setup and configuration is required due to bi-directional communication between the console and the MA VPU. On the other hand the grandMA console allows for direct access to the server and previews the content as thumbnails in the preset.

The MA VPU enables a console operator to control and alter videos, still images and three-dimensional objects in real-time from a grandMA lighting console. Three-dimensional objects can be textured with video clips or animated images. Videos, still images and three-dimensional objects can be manipulated in multiple ways and in the same intuitive manner as a lighting fixture is manipulated from the grandMA console.

## 1.2 Functions and Features

At its most basic level, MA VPU allows for the control of several moving images and high-resolution images simultaneously. Videos and still images can be combined, mixed and controlled using any grandMA console like a regular multi-parameter fixture. For this, several 3D video layers are available plus one master layer for PC remote controlling, shaper, iris and scaling settings, layers for Shaper, Iris, Effects, Scaling, Camera Positions, Keystone and Softedge

In addition, MA VPU offers the possibility of choosing any three dimensional object as a surface for video or still images. Cubes, cylinders, spheres, extruded logos or any other three-dimensional shape can be “textured” with complimentary images or videos. The position and orientation of these three dimensional objects are fully controllable from the grandMA console. You could start with a cube rotating and progress to a three-dimensional logo flying around, but from then on, you are only limited by your imagination.

Each image or video that is used at the same time requires a layer. Since the brightness of each layer is controllable, it is possible to cross fade from one video image to another by cross fading from one layer to another. By controlling and mixing the output of the MA VPU, your grandMA console has become a video mixer.

### 1.3 Comparison VPU plus / VPU basic / VPU light

	MA VPU plus MK2	MA VPU basic MK2	MA VPU light
<b>DVI-Output with switchable EDID Manager (back panel)</b>	3 (1 x DVI-D dual link, 1 x DVI-D single link, 1 x DVI-I dual link)	3 (1 x DVI-D dual link, 1 x DVI-D single link, 1 x DVI-I dual link)	3 (1 x DVI-D dual link, 1 x DVI-D single link, 1 x VGA)
<b>Full-HD resolution (1080p/60Hz)</b>	6*	4*	2*
<b>SD resolution (576p/60Hz)</b>	12*	8*	6*
<b>Internal 7" Touch Screen (800 x 480 Pixel)</b>	x		
<b>2"-Color-TFT-Display providing status information</b>			X
<b>Power Up switch (front panel)</b>	x	x	x
<b>SDI IN</b>	2**	2**	
<b>powerCON IN (back panel)</b>	x	x	x
<b>powerCON OUT (back panel)</b>	x	x	
<b>Menu button (front panel)</b>			x
<b>RJ45 etherCON Gigabit network connector (back panel)</b>	2	2	2
<b>XLR-male balanced transformer isolated audio outputs at studio level (back panel)</b>	2	2	2
<b>S/PDIF-Cinch Connector - Digital Audio OUT</b>			1
<b>USB-Ports (front panel)</b>	2 x USB2.0	2 x USB2.0	2 x USB2.0
<b>USB-Ports (back panel)</b>	2 x USB3.0 1 x USB2.0	2 x USB3.0 1 x USB2.0	2 x USB3.0
<b>Connection for external harddrives, etc. (back panel)</b>	1 x eSATA 6G	1 x eSATA 6G	1 x eSATA V3.0
<b>Processor</b>	I7-Quad-Core-Processor	I5-Quad-Core-Processor	Quad-Core-Processor
<b>Dual Channel RAM</b>	8GB@2,4GHz	8GB@1,65GHz	8GB@2,1GHz
<b>Fast SATA – Solid State Drive</b>	240GB	120GB	120GB

\*layers simultaneously \*\*Option

## 1.4 Transition from grandMA video to MA VPU

This information conforms to grandMA video users changing to MA VPU. As a user of a grandMA video dongle version (either on MA mediaPC or self designed media server) you will encounter most likely the following situation: grandMA video software is installed on a computer (self designed or mediaPC) with some content likely the MA original content plus additional custom-made content. Mainly this will be any QuickTime coded content. The grandMA video software might be also installed on additional computers like laptops to use it as pre-visualization or control suite stations without any dongles in use.

Now, you can choose from one of the following options:

Leave everything as it is.

You can stay with the grandMA video software and your known content. Please be aware that the grandMA video software as known today will not be further developed nor be implemented in future grandMA software releases. The grandMA video software will only work with grandMA 'series 1' software 6.121 or lower.

Update your MA mediaPC or media server to MA VPU software and benefit from the features of MA VPU plus

Performance increased tremendously – at least 4+ layer of 1080p are possible with 60fps.

The VPU is more integrated into the network than grandMA video ever was  
Effects are added per layer and per output – each of them can handle 4 effects at the same time.

Colorkeying is built in now – even with a tolerance value for smooth transitions.

3D keystone is possible by adding a 3D model on the layer (real warping to come in one of the next releases)

Much easier Fixture handling by only 3 fixture types – the output fixture includes keystone, master, softedge and so on...

Prepared for Pixelmapping "in the console" – but still all other ways are available.

The VPU is able to run either with grandMA 'series 1' or grandMA2 – safe investment. The VPU software comes with a new decoder to ensure best content results. That means – however – that new content is needed and the new one is based on MPEG-2! Attention: All custom-made content needs to be rendered into MPEG-2. All old show-files are obsolete due to the fact that the new fixture types are not equal to the grandMA video fixture types!

Launching the MA Video Processing Units (VPU) there is no more split between software and hardware. The dongles are discontinued – only the full package including dedicated hardware is available, the dongle is "built-in". For sure, everybody who invested into dongles will benefit of the new VPU functionality by installing the latest VPU release software.

With the MA VPUs there is no “open” operating system with any kind of default driver – they are all improved to serve the best result for the VPU. Also the decoder has changed for best performance results. That means – however – that new content is needed and the new one is based on MPEG-2. With any MA VPU there is some Gigabyte of content pre-installed.

With the MA-Content-Package you'll get a discount compared to buying the clips individually. When ordering, you will receive a voucher code that enables you to download your selection of Showfootage's clips and pics from their website [www.showfootage.com](http://www.showfootage.com) Please check MA lighting homepage for further details.

**From grandMA video to VPU. How to update your system:**

After downloading the software from our webpage you just need to install it. The look & feel will be like the grandMA2 software. Then you need to download a new MPEG-2 decoder from Main Concept and actually pay for it.

Should be about 50\$. Attention: Keep the key number!!

From now on the software is fully functional. Please be aware of the fact that old shows from grandMA video cannot be loaded anymore. Therefore the new showfile is absolutely compatible to grandMA2. All custom-made content might need to be re-rendered into MPEG-2.

As a former user of grandMA video you will easily discover the new functionality of the MA VPU software. Some functionality has changed as well as some naming. Please refer to the documentation like the online manual to learn about it. If you use the VPU software with an external dongle (old grandMA video) you will have the same performance like a MA VPU plus – in other words: there are no restrictions!

**Major changes in a rough overview:**

- Decoder and codec has changed! From QuickTime to MPEG-2! You need to buy it (with the VPU it is included)
- Old shows are obsolete
- Old content needs to be re-rendered
- New fixture types for VPU

We hope that this document provides what you need to know about the transition from grandMA video to the VPU software. The grandMA video software ends with the first release of the MA VPU Software. For any further information please get in contact with us – we are glad to assist you!

## 2 Installation and Maintenance

The actual version of the application can be downloaded from the MA Lighting support site:  
[www.malighting.de](http://www.malighting.de)

### Note (for Dongle Users only):

Please extract the downloaded file into a temporary folder and run the 'Setup' (gMA-VPU\_[n.nn][n.n]\_v-n.nn.exe) program.

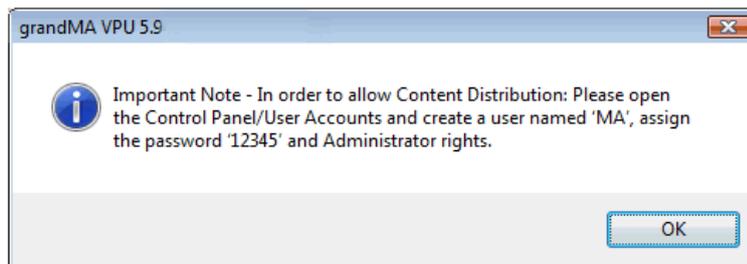
You should have administration rights to install the program.

To work with MA VPU without administration rights you have to arrange the administration rights by the administrator on the installation path e.g.:

C:\Program Files\MA Lighting Technologies\MA VPU Software

If you want to distribute the content you must create a user named 'MA' with the password '12345'. This user should have administration rights on the locale machine!

The installation shows an alert to remember to this fact:



### 2.1 Startup of VPU

This chapter describes the startup of the VPU application. MA VPU machines are already configured with this mechanism so the users don't have to take care about this.

### Note (for Dongle Users only):

To realize an auto start of the VPU application a startup software 'VPUShell.exe' is installed on the target machine at:

C:\Program Files\MA Lighting Technologies\MA VPU Loader

This program is called by the operating system (e.g. Windows Vista) in startup of the VPU target machines. It takes care of the right program location and paths.

## 2.2 Software Update

To install the software updates on the VPU choose File / Update Software or Setup-Update software in the touchscreen to open a dialog to select the wanted update file. When using the internal software update, then your file should have a “@” in the name and is called a “silent” installer version. An example could be gMA-VPU\_[1.3.0.0][6.1]\_v2.40@.exe.

Navigate to the wanted folder and select the file. Click OK to proceed. After the installation is finished, the VPU software will restart and the new version is automatically starting afterwards. Check the version number in the VPU itself to make sure that the installation was successful

### 2.2.1 Service Packs

The current version demands minimum Vista SP 2 and XP SP 3 (media PC/Dongle Users) and detects the SP when booting the VPU or starting the software. Follow the steps mentioned in this warning and please update your system!



## 2.3 Update of Fixture Types

If you want to use the new functionality of the fixture types in existing VPU shows this new fixture types have to be imported into the existing VPU show. Therefore you must perform the following steps:

**Attention:** Take care to select the right Layer types (VPU Camera, VPU Layer etc.).  
If the type doesn't fit the show will be damaged!

1. Connect the VPU to the desk and start the session.
2. Do a backup of the Function Blocks on the VPU:



Select the 'Content Editor' and 'Export Function Blocks' for the 'VPU Layer' and the 'Camera Layer'

----- **grandMA1:** -----

3. Import the new Fixture Types:  
On the desk (or on PC):  
Select 'Setup'-'Full Access':



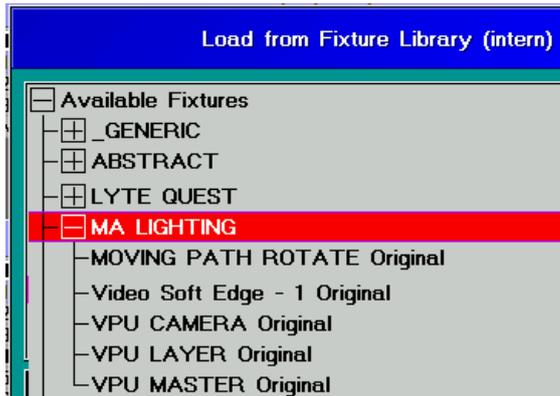
4. In 'Fixture Layer' click 'Fixture Types'



5. In 'Fixture Types' click 'Import'



6. Browse to ,MA LIGHTING' and select the VPU Layers:



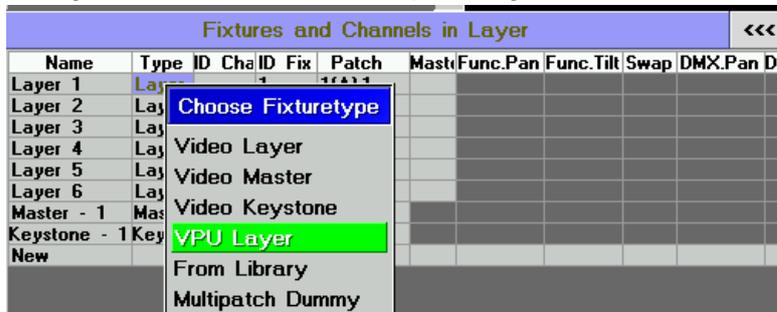
and leave the dialog.

7. The new Fixture Type appears in the overview with a 'Qty' entry of '0' and can be used now:

Fixture Types											<<<	>>>
No.	Qty	Name	ShortName	Manufacturer	Comment	Date	Type	Scale	MIB	Delay		
1	*	6 Video Layer	Layer	MA LIGHTING	Up to 32 L Origina		Video	1.00		0.00s		
2	*	1 Video Masti	Master	MA LIGHTING	Master Func Origina		Video	1.00		0.00s		
3	1	Video Keys	Keystone	MA LIGHTING	Perspective Origina		Video	1.00		0.00s		
4	0	VPU Layer	Layer	MA LIGHTING	VPU Layer:01-01-		Video	1.00		0.00s		
New												

Close the dialog.

8. In the window 'Fixtures and Channels in Layer' select the Fixture Type to exchange with the right mouse button. In the upcoming menu select the new fixture type:



**Attention:** Take care to select the right Layer type.  
If the type doesn't fit the show will be damaged!

9. Now the unused ('Qty' entry is '0') Layers can be deleted:

Fixture Types											<<<	>>>
No.	Qty	Name	ShortName	Manufacturer	Comment	Date	Type	Scale	MIB	Delay		
1	*	0 Video Layer	Layer	MA LIGHTING	Up to 32 L Origina		Video	1.00		0.00s		
2	*	1 Video Masti	Master	MA LIGHTING	Master Func Origina		Video	1.00		0.00s		
3	1	Video Keys	Keystone	MA LIGHTING	Perspective Origina		Video	1.00		0.00s		
4	6	VPU Layer	Layer	MA LIGHTING	VPU Layer:01-01-		Video	1.00		0.00s		
New												

10. Do the same exchange steps for VPU Master and VPU Camera Layers.

----- grandMA2: -----

3. Import the new Fixture Types:  
On the desk (or onPC):  
Select 'Setup' – 'Patch & Fixture Schedule':



4. Select 'Fixture Types':



5. Select the Fixture Type for VPU Camera, VPU Layer or VPU Master:

Fixture Types				
No.	LongName	ShortName	Manufacturer	ShortManu
1	Dimmer	Dim	Generic	Generic
2	VPU Camera	Camera	MA Lighting	MA
3	VPU Layer	Layer	MA Lighting	MA
4	VPU Master	Master	MA Lighting	MA
New				

and click on 'Import':



6. In the upcoming window select the layer to import:



Leave the dialog with 'Ok'

7. The new Fixture Type appears in the overview with a 'used' entry of '0' and can be used now:

Fixture Types								
No.	LongName	ShortName	Manufacturer	Shor	Mode	ModelSca	ModelKey	Used
2	VPU Camera	Camera	MA Lighting	MA		0.00		6
3	VPU Layer	Layer	MA Lighting	MA		0.00		12
4	VPU Master	Master	MA Lighting	MA		0.00		2
5	VPU Video Layer	Layer	MA Lighting	MA		0.00		0
New								

8. Select the Fixture in the Layer window with the right mouse button and select the new fixture type from the upcoming dialog:



**Attention:** Take care to select the right Layer type.  
If the type doesn't fit the show will be damaged!

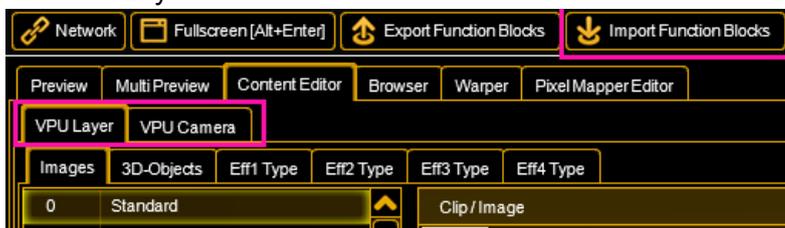
9. Now the unused ('Used' entry is '0') Layers can be deleted:

No.	LongName	ShortName	Manufacturer	ShortMa	Mode	ModelSca	ModelKey	Used
1	Dimmer	Dim	Generic	Generic	00	1.00		0
2	VPU Camera	Camera	MA Lighting	MA		0.00		6
3	VPU Layer	Layer	MA Lighting	MA		0.00		0
4	VPU Master	Master	MA Lighting	MA		0.00		2
5	VPU Video Layer	Layer	MA Lighting	MA		0.00		12

10. Do the same exchange steps for VPU Master and VPU Camera Layers.

### VPU

11. On the VPU import your Function Block backups:  
Select the 'Content Editor' and 'Import Function Blocks' for the 'VPU Layer' and the 'Camera Layer':



Now you can use new functionalities of the imported layers in your VPU.

## 2.4 Backup

MA VPU is equipped with Acronis® backup software (Not for dongle users of former grandMA video).

**Note:** This manual describes Acronis 2010.

VPUs basic with serial numbers < 2 and VPU plus with serial numbers < 45 are equipped with Acronis 2009. Basically the use of Acronis 2009 is the same as Acronis 2010. Backup with Acronis 2009 is described in Manual\_gMAVPU3.40.

Machines from Serial Number #87 on operate Windows 7. They are equipped with an USB stick at the VPU backplane to start Acronis. You can do this via pressing F12 during startup.

### 2.4.1 Handling backups with the VPU

MA Lighting keeps the factory settings of the Windows operating system with all factory default settings on a hidden part of the hard disk of the VPU. This is useful for you to recall this data whenever you encounter problems in the VPU software that cannot be solved by a software update. You can use Acronis as well to store and recover your own backups.

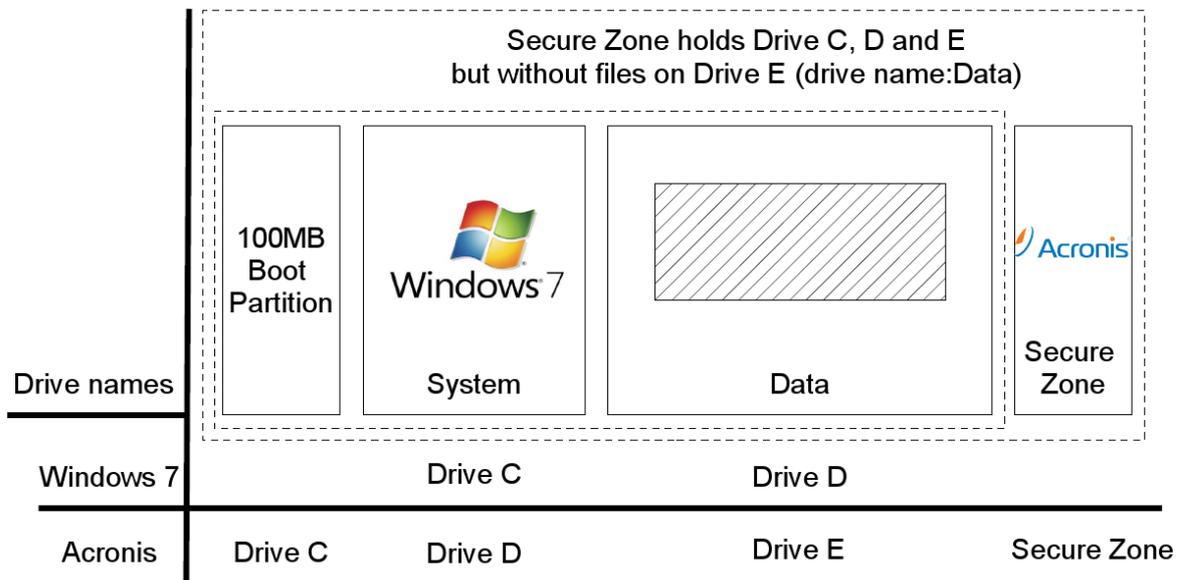
**Note:** Do not store or delete any files in the Acronis Secure Zone!

This is your lifesaver whenever it gets serious! The Secure Zone shall only be used to store 1 factory default file!

Your images can be stored on Drive D of the internal hard disk or on any external storage device that holds enough space to store your data. You should start Acronis from the Acronis Startup Recovery Manager. This means that you should restart the machine and press F11 (or F12 on VPUs > #87) during boot.

In Windows 7 (VPUs with serial numbers from #87) the partitioning of the harddisk changed. This is shown in the following image:

# Windows 7 based VPU



## 2.4.2 Start Acronis on VPUs with serial Numbers up to # 86 on

VPUs with serial numbers below # 86 are based on Windows Vista. Restart the machine and press F11 during Boot. This will lead you to the Acronis Start Menu. Press F11 again to open up a “Boot Menu” window to enter parameters:



Stood in January 2010, you have to force the graphic card to do 800x600 to work correct with the internal screen on a VPU Plus. Otherwise you will see graphical artefacts and not readable fonts!

On a VPU Basic it is not intended to put any Boot menu parameters into this line. If you pressed F11 and the Boot menu window comes up:



Enter this complete line (also written identical!) (only in Acronis 2010):  
**vga=0x315 quiet** and press OK.

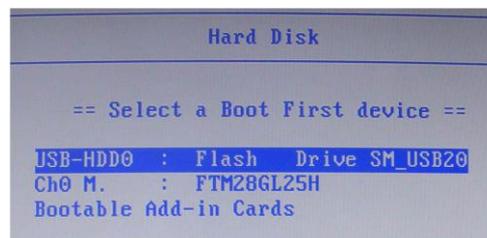
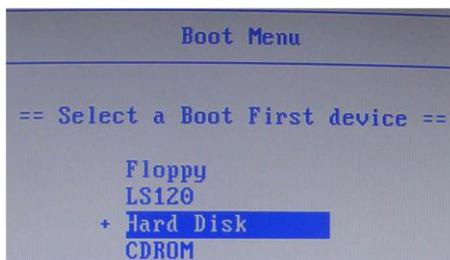
You will then be at the start screen of Acronis. Choose “Acronis True Image home” to proceed:



### 2.4.3 Start Acronis on VPUs with serial Numbers from # 87

VPUs with serial numbers from # 87 on are based on Windows7.

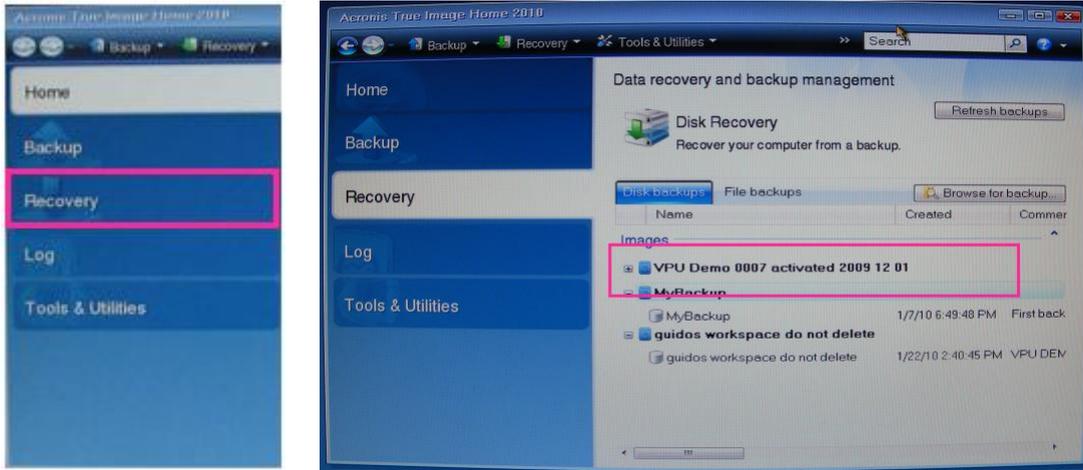
They are equipped with an external USB stick that you will find at the backplane of the VPU. To boot from USB media press F12 during startup. This leads to the Boot menu. Select the boot device ‘Hard Disk’ and then the USB flash drive as shown:



You will then be at the start screen of Acronis.

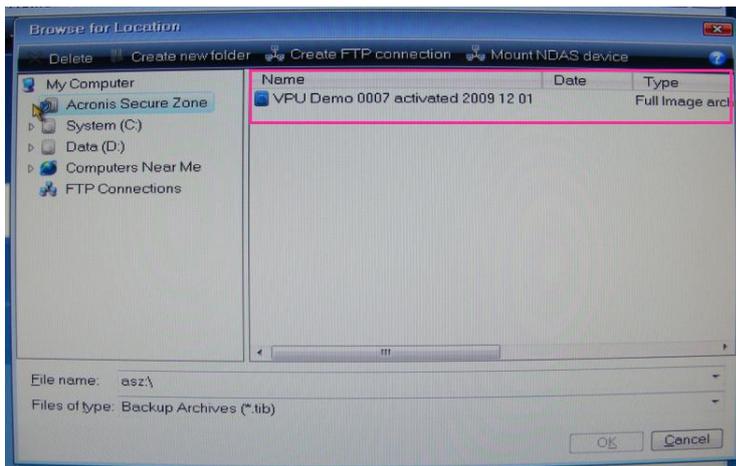
### 2.4.4 Restoring an image with Acronis

In Acronis click on “Recovery”. This will list you all available backups:



If you are restoring an Image from an external memory, click browse for backup to select the image from your memory. In some cases the Secure Zone image is not listed here automatically. You can rather click the „Refresh Backups“ button or recall the image out of the Secure Zone again if necessary.

Select your drive and image and click OK:

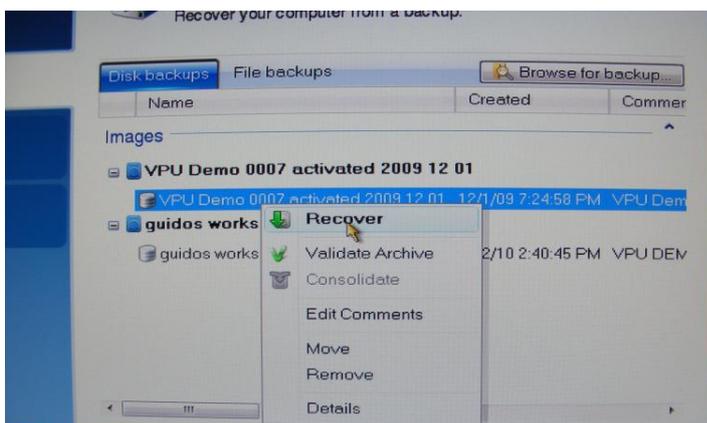


If you are restoring from Acronis Secure Zone do the same as described above, your Secure Zone is listed in the location tree as well. Select the file and click OK.

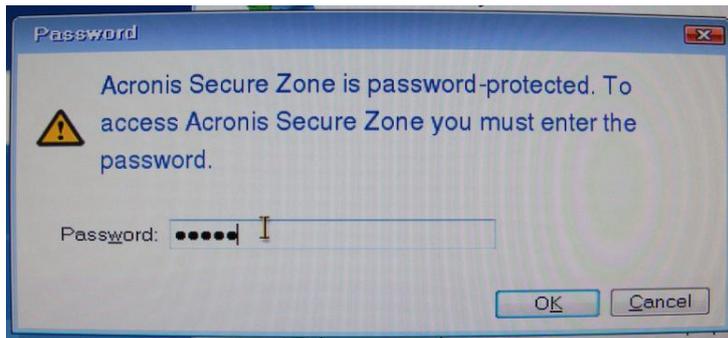
Now you see the wanted image listed.

A right click with the mouse on the image will give you several options.

Choose recover to proceed:

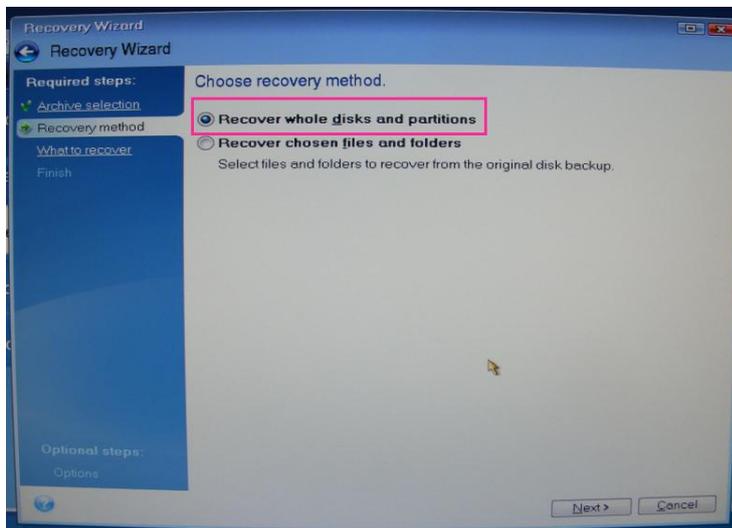


If you are recovering from a secure zone file, then you will be prompted with a new window:

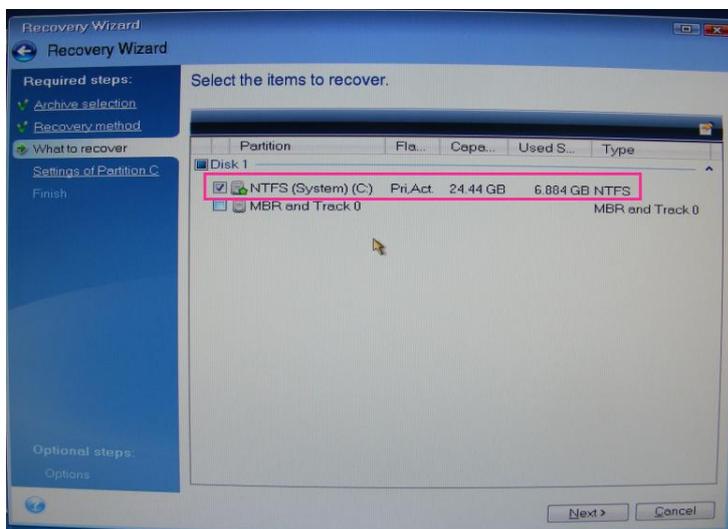


Enter: "12345" as the password and proceed by clicking on Ok.

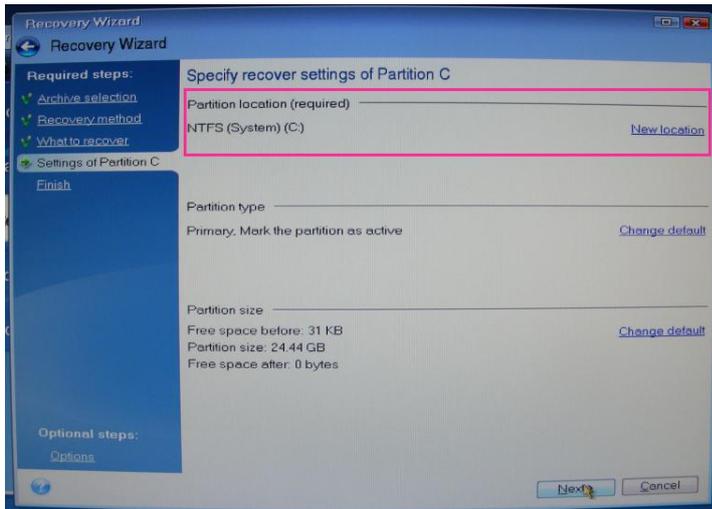
The next option is to choose whether to restore the whole partition / drive that may be stored in the file or only some files of it. In our case you may only want to restore the whole disk / partitions:



If your image does only contain one partition, you may see a picture like this in the next step. You should only choose to restore the partition, not the master boot record:



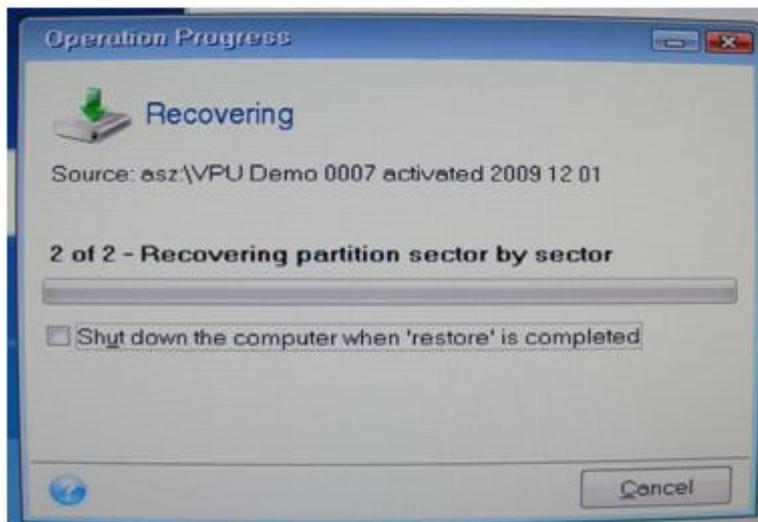
If you restore a complete hard disk, make sure that you select the whole disk including the Acronis Secure Zone:



Make sure to choose the right location (e.g. a secure zone file has always be recovered to System drive C:). If it is not the wanted one click on new location and choose the right place.

If you want to restore a complete disk, make sure to choose the right hard disk if your VPU does have more than one hard disk drives. Also check the right connection and naming of any external connected hard drive. If you are unsure, please contact MA Lighting to avoid any damage of your system.

In the next step you will see an overview of what you will restore. Click on proceed and start the recovery of the image:

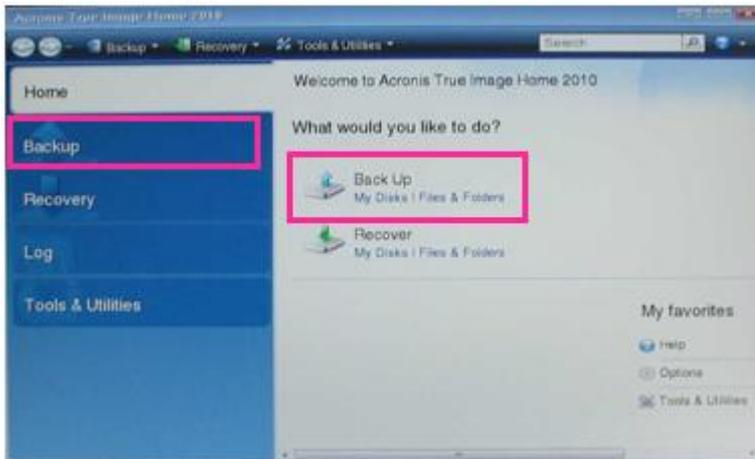


## 2.4.5 Storing an Image with Acronis

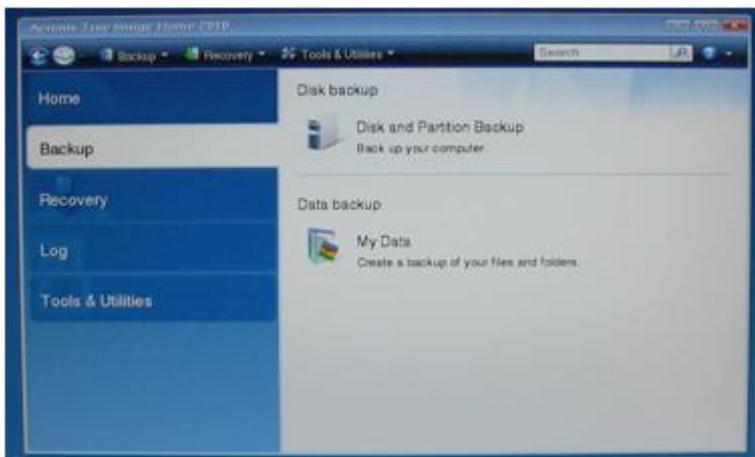
Since MA Lighting wants to give you the factory settings for trouble shooting never delete, change or store files in the Acronis Secure Zone.

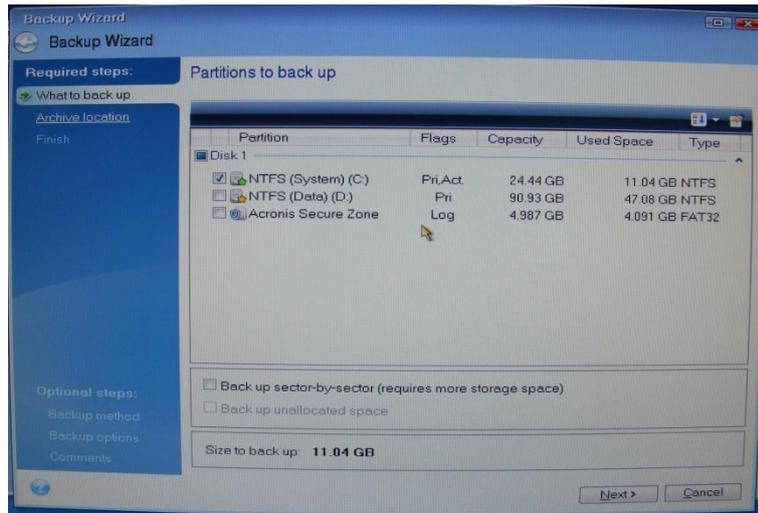
Keep in mind that a FAT32 formatted USB stick or hard disk can only handle files up to 4Gbyte. Otherwise you will have to reformat that device with the NTFS file system.

In Acronis choose the Backup option:

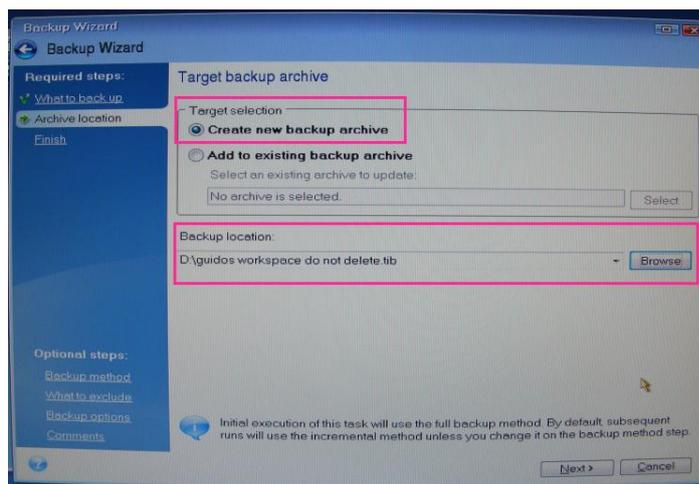


Normally you want to backup a complete partition so the next selection shall be "Disk and Partition" Backup:





The next step is to define which partition or part of the disk you want to backup. If you want to write a backup of a single partition, then select the corresponding partition without the Secure Zone. If you want to do a complete System Backup, also include the Acronis Secure Zone. When everything has been set right, choose next to proceed:



To write your image onto any memory you can choose the place to store.

Click on Browse to do so.

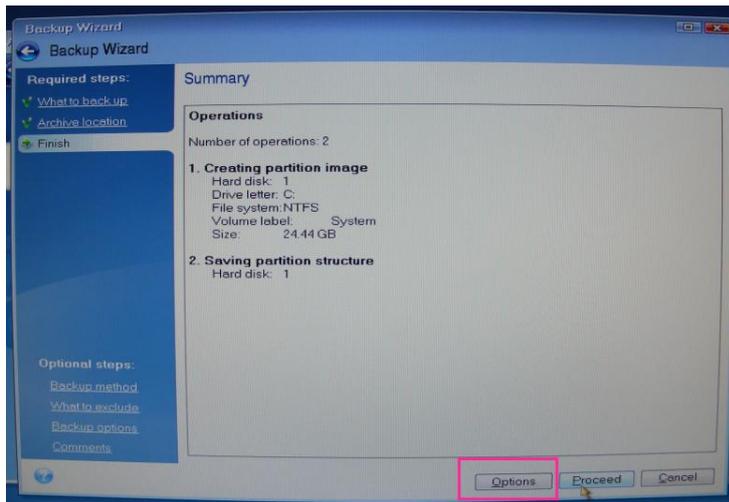
The file name should be conform with these definitions:

Name: "VPU XXX SN activated DD MM YYYY"

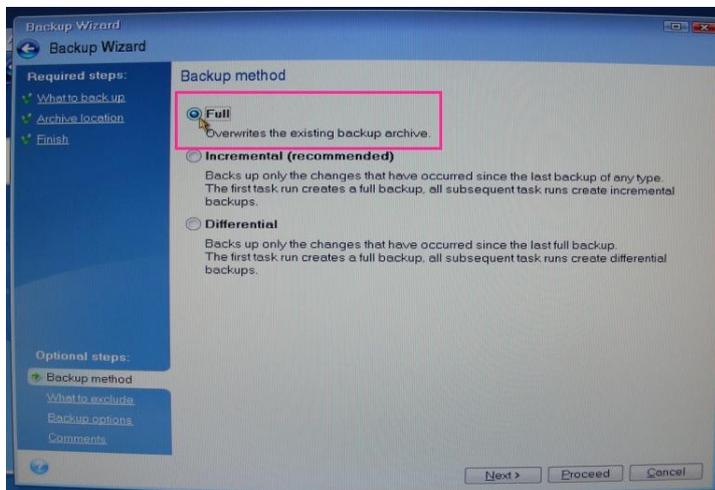
where XXX is the Type (BASIC / PLUS / PRO) | SN is the Serial Number e.g. 0004 for number 4.

Click on next to proceed.

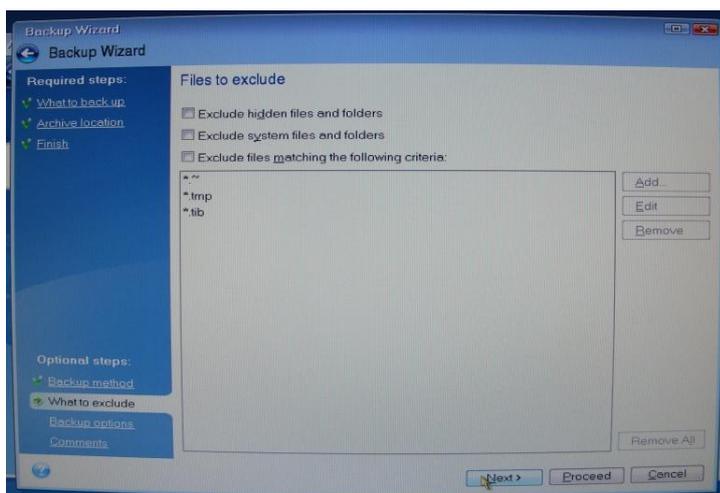
In Acronis 2010 you could now directly proceed to write the image. However, it is necessary to choose "Options" to do further settings before writing the image:



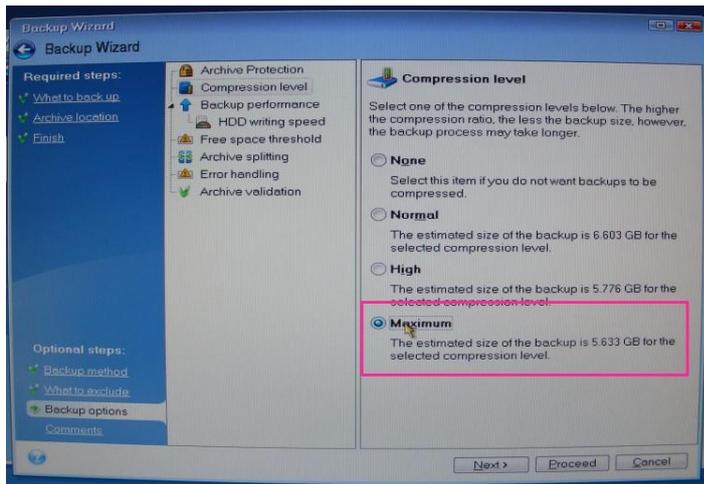
You have to choose "Full" as backup method:



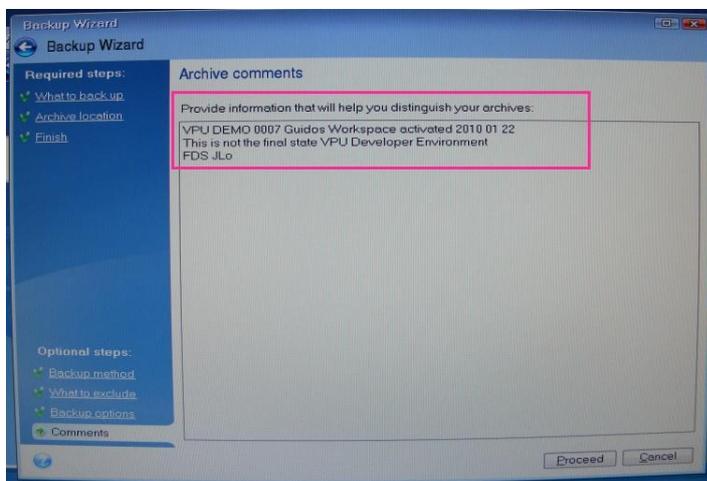
No files shall be excluded in the image so do not click any of these options in the next step:



Choose the maximum compression level. When storing images for your own purpose or in a normal backup situation you can lower the compression level to normal to speed up the process:



In the last step before actually writing the image make sure to add some comments:



VPU XXX SN activated DD MM YYYY

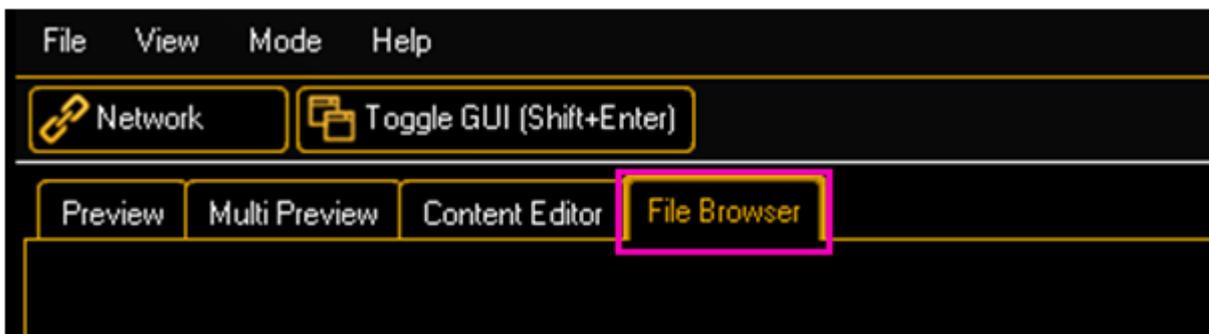
where XXX is the Type (BASIC / PLUS / PRO) | SN is the Serial Number e.g. 0004 for number 4. This is identical with the file name for the created backup.

After inserting these entire information click on proceed to start the backup. You should always get a positive message at the end of the process. If not you should definitely check what went wrong.

## 2.4.6 Backup the VPU content after shipment

After unpacking the VPU Unit, the first thing you should do is to make a copy of the delivered content onto any type of USB storage device. This can be a USB stick or a USB hard disk with minimum 18 GByte free space.

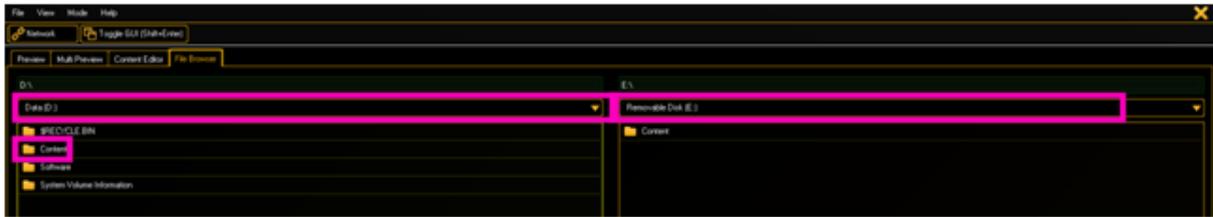
This should be done by opening the file browser in the VPU software and by copying the complete content folder of drive D to your USB device. Just make sure that you connect your storage device before you switch to the internal file browser of the VPU because otherwise it may not be listed as a possible option. In the application click on the file browser tab.



If you are connected to a session (this may happen automatically if you are in grandMA2 mode and have a valid MA-Net2 connection to a console) a popup window will warn you that you will lose your session connection when entering the file browser. Click yes to proceed.



In the file browser window you can choose between two storage locations and drives. You can choose your storage device / hard disk partition by clicking on the dropdown menu to get a list of all available drives.



In our case we want to copy the folder “Content” from drive D to your USB storage device. So on the left side you choose drive D and on the right side you choose your USB device, in this case drive E with the name “RemoveableDisk”.

To do so, click on the folder on the left side and Drag&Drop it with a mouse to your drive on the right.

A new dialog will prompt you before you start. If the folder already exists, you can enable the option “Overwrite”. The actual copy process begins when you click the “Start Copy” soft button.



After the copy process is finished the copy process window will close and you will be returned to the file browser window.

You can now disconnect the external storage device by unplugging the USB cable.

To make sure that you really copied all of the data, connect your storage device to an external computer and check the size of the “Content” folder on it.

It should look like this:

Type:	File Folder
Location:	D:\
Size:	17.3 GB (18,643,731,842 bytes)
Size on disk:	17.3 GB (18,644,258,816 bytes)
Contains:	231 Files, 6 Folders

## 2.5 Access VPU via Network

To access the VPU over the Network, make sure your computer is in the same range as the IP address that is assigned to the Ether 1 device in the VPU.

You can use the 192.168.0.xxx range since this is also necessary for a valid MA-Net connection.

In your computer open a windows explorer window and type the IP address of your VPU as shown below:



A popup will show up and ask you to enter the user and password necessary to access the VPU.

User / Benutzername: "MA"

Password / Kennwort: "12345"

Then you can transfer data to the content or the software folder.



You have access to the complete partition d:\.

The default folder for content is d:\content.

The software folder is used to transfer software updates to the unit via Ethernet connections.

## 2.6 Version of grandMA desk or grandMA onPC (off-line)

You can determine by means of the version number of MA VPU if the software version fits to the software version of the desk or off-line.

MA VPU version number can be determined via:

Filename of the setup:

gMA-VPU\_{**GMA2-Streaming**}[**GMA1-Streaming**]}\_v{VPU-Version}

Splash screen (appears while startup)

Info box (Menu – Help – Info)

Example: grandMAVPU\_**[0.900]****[6.1]**\_v1.34

0.900	GMA2-Streaming Version	This number should <b>correspond to</b> the <b>grandMA 2</b> onPC streaming version
6.1	GMA1-Streaming Version	This number should <b>correspond to</b> the <b>grandMA 1</b> onPC streaming version
V1.34	Version of MA VPU	

## 2.7 IP Addresses

IP addresses are what allow the internet and most modern networks to work. It's a way of identifying a computer by a unique set of numbers (an IP address). An IP address is made up of a set of four numbers. Each number can have a value between 0 and 255.

IP addresses can be set via the network settings of the Windows system settings.

MA VPU has to be restarted if the settings are changed. New addresses are read with the restart of MA VPU.

Your PC and the console must have their respective IP addresses set up correctly. The first three sets of numbers must be the same and the last set must be different.

For example:

GrandMA console IP address:       **192.168.0.5**

PC with MA VPU IP address:       **192.168.0.10**

To setup the IP address of the desk, please refer to the desk user's manual.

### Note:

The default IP address of MA VPU is 127.0.0.1 (the local host address of the PC).

In this case MA VPU application can be connected only with the onPC application running on the same PC.

To work within the external network choose the network address e.g. 192.168.0.x.

The actual IP address  
is shown within the Status Bar:.



You can change the IP address via the menu entry: 'File – Settings – Network'.

### 2.7.1 IP Address of the PC

Please note if you are already part of a network please check with your network administrator before changing your IP settings.

IP settings can be found at:

START – CONTROL PANEL – NETWORK CONNECTIONS (Windows XP)

START – CONTROL PANEL – NETWORK AND SHARING CENTER (Windows Vista)

### 2.7.2 Artnet IP Address

The Artnet Standard needs a class A IP address beginning with 2. for example 2.2.2.2 and a subnet mask 255.0.0.0.

This address can be added via the Windows dialog Advanced TCP/IP Settings.

Further information about the Artnet protocol under:

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## 2.8 EDID Manager

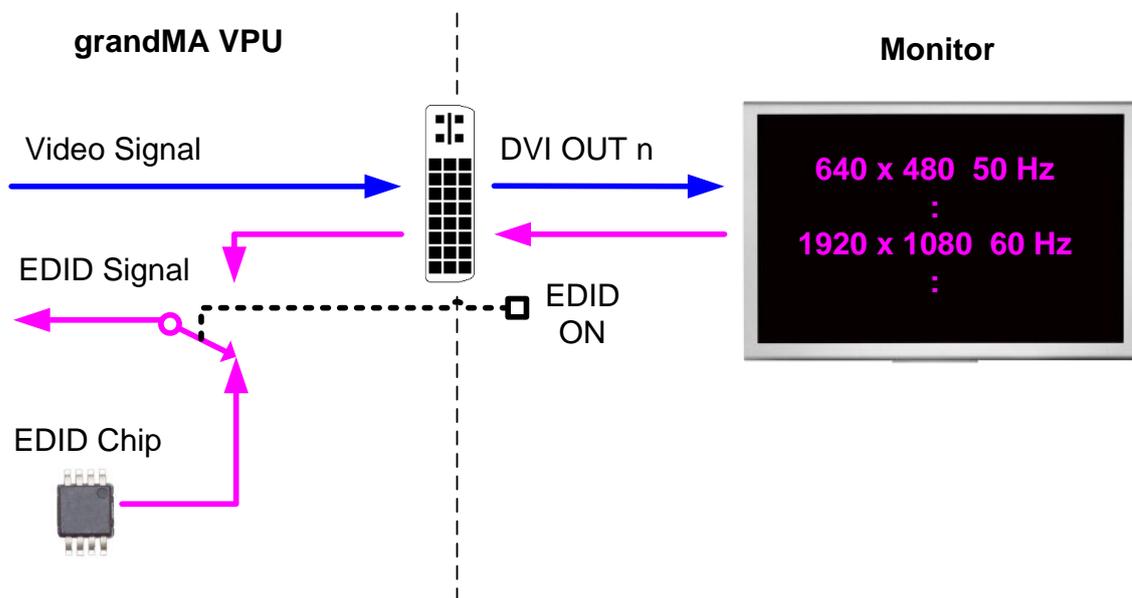
**Extended Display Identification Data** exchange is a standardized means for a display to communicate its capabilities to a source device. It enables the VPU to know what kind of monitor is connected. The EDID includes manufacturer name and serial number, product type, phosphor or filter type, timings supported by the display, display size, luminance data and (for digital displays only) pixel mapping data.

Unfortunately some LED walls offer no EDID data, so the VPU software cannot offer the correct resolution and refresh rates. Or if a monitor is reconnected the right resolution and refresh rate has to be set again.

To avoid these troubles the DVI outputs of the VPU have been equipped with additional hardware. An EDID Chip offers the common resolutions and refresh rates to the VPU hardware.



The switch near the DVI OUT connector lights **blue** if EDID is simulated.



**Note:**

If VPU is turned on and only output 2 is connected (EDID signal found) this output gets the logical output 1. If now a second monitor is connected to output 1 (or EDID 1 is switched on) this will be assigned to logical output 2. This situation can be undone if VPU is restarted with only on monitor (or EDID signal on) on output 1.

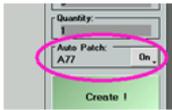
The EDID chip offers the following DVI resolutions and refresh rates. Other values are invalid:

H	V	Refreshrate Hz
640	480	50
640	480	59
640	480	60
720	480	59
720	576	50
800	600	50
800	600	59
800	600	60
1024	768	50
1024	768	60
1280	720	24
1280	720	25
1280	720	29
1280	720	30
1280	720	50
1280	720	59

H	V	Refreshrate Hz
1280	720	60
1280	800	60
1280	1024	50
1280	1024	60
1400	1050	50
1400	1050	60
1440	900	60
1600	1200	59
1600	1200	60
1680	1050	59
1680	1050	60
1920	1080	24
1920	1080	25
1920	1080	29
1920	1080	30
1920	1080	50
1920	1080	59
1920	1080	60

### 3 Communication with the grandMA Desk Series

Notice that the DMX channels have to be ‚patched’ to communicate with MA VPU.



The simplest way of ‚patching’ is to set the switch ‚Auto Patch’ in the dialog ‚Create New Fixtures or Channels’ to ‚On’ at the desk or the ‚on PC’.

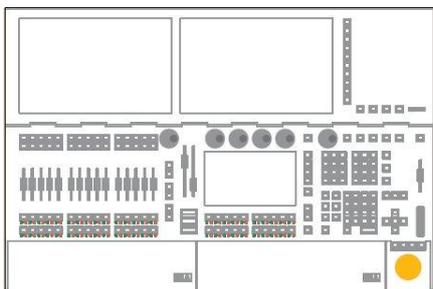
#### 3.1 Connection with the grandMA desk

Please make sure, that the program version of the grandMA desk meets the specifications described in: *2.6 Version of grandMA desk or grandMA onPC (off-line)*

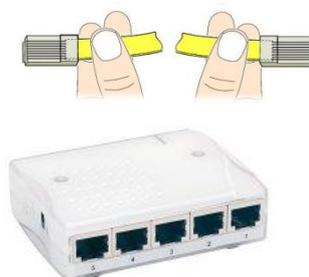
For communication you have to connect the VPU with the grandMA console or another PC running the grandMA onPC.

You can do this directly with a patch cable with two RJ-45 connectors or via a network switch.

grandMA Console



RJ 45 Cable or Switch



MA VPU/PC



If you use a network with a switch, connect the PC with a regular patch network cable to the switch.

Connect the cable to the desk.

Start the desk and load a video show

Start the grandMA application and join the session or invite the video application from the desk

The application connects to the desk and receives the data of the current show.

If you do not get a connection to the desk, make sure that MA VPU has the right IP address as described in ‚2.7 IP Addresses’ and that the corresponding mode: grandMA 1 or grandMA 2 accurate.

### 3.2 grandMA 1 or grandMA 2 mode

MA VPU supports series 1 and series 2 consoles. To set right the mode, start the application via double-click at the icon (Dongle users only, VPU users will see VPU Shell):



MA VPU starts in the last used mode (grandMA 1 or grandMA 2 mode).



The actual mode is displayed in the statusbar.



To switch between the mode select the menu entry 'File – restart with randMA ½ network'. The application restarts in the next mode.

### 3.3 Connection with the grandMA onPC (off-line) software

Please make sure, that the program version of the grandMA onPC software meets the specifications described in: *2.6 Version of grandMA desk or grandMA onPC (off-line)*

- Start the grandMA onPC and load a show (Backup Load Show)
- Start a new session at the grandMA onPC (MA Network Connections 'Start New Session')
- Start the MA VPU application

MA VPU searches for a running grandMA onPC session with a unique ID. If the session is found MA VPU connects automatically with this session and loads the current show.

If you do not get a connection to the desk, make sure that MA VPU doesn't run a master session.

### 3.4 Connection States

When you launch MA VPU it tries to connect to a session with the same ID. The four possible states of the connection are indicated by the heart in the status bar. The blinking of the heart indicates the communication between the desk and MA VPU.



Heart is broken and red:  
No connection to a session established



Heart is blinking green:  
MA VPU has joined a session as slave



Heart is blinking blue:  
MA VPU is the master of a session. The creation of a session with MA VPU can be used to transfer all data of a .gvs or .gz file (MA VPU 1 or 2 formats) to a desk or onPC. If the loading is completed, the desk automatic becomes the master and MA VPU gets the slave.



Heart is blinking yellow (grandMA 1 only):  
MA VPU has joined the session in the 'Sniffer mode' , this is a simple receiver mode.  
In opposite to the slave mode no session data will be exchanged with the desk.

**ATTENTION:** With the start of a new session (Create) the session founder overwrites all data of the other members. I.e. if a new session is founded by the MA VPU all data in the desk will be overwritten!

If more than one console, visualizer or onPC editor is connected to the network the connections to the equipment will have to be properly assigned.

The communication between consoles, visualizer, VPU applications and onPC editors takes place in sessions.

A session has only *one* founder. This is e.g. the master. On connection the founder transfers its data (fixture types) to the slaves.

From then on, all session members are synchronized and have equal rights. If a fixture is edited in the slave the change is reflected in the master and vice-versa.

Devices not assigned to any session are not in the list.

If you press the 'Invite Station' Button you get a list of these MA devices.

#### **Series 1 specification:**

A Session always has one master and up to 31 Slaves, i.e. max. 32 devices. For example a slave can be another MA desk, an NSP, a grandMA onPC application, the grandMA 3D visualizer or a MA VPU station. In the 'Sniffer mode' more VPU sessions are possible because similar to the Artnet protocol a VPU station is only receiving data.

#### **Series 2 specification:**

A Session always has one master and up to 199 stations.



The network configuration can be managed by the 'Settings Network' dialog.

**Remark:** If the session entry appears in red, the streaming version is wrong. You have to update the software.

The upper part of the dialog shows the active sessions and their members in a tree view. MA VPU is marked green.

**Leave (Session):**

Leave the session. Disable 'Allow invite' if you don't want to be invited automatically

**Join as Slave :**

Join the selected session as a member (usually as slave). After that data of the desk is transferred to the MA VPU.

**Join as Sniffer:**

Join the selected session as a sniffer i.e. the VPU application is only receiving data similar to an Artnet receiver application. If you change settings in the Video application no data is sent to the desk i.e. inserting of content from the desk is not possible in this mode.

**Create Session:**

MA VPU creates a new session as master. This function is used for example if a show already exists. The show with all data is sent to the slave. If the loading is completed, the desk automatically becomes the master and the VPU station gets the slave.

**Invite Station: (grandMA 1 only)**

Opens a dialog showing all connected MA members (desks and onPC) in the network. You can invite new members via the dialog.

**Settings:**

**MA Net IP:**

Use this listbox to choose an IP address for network communication. If there is more than one IP available (e.g. multiple network cards installed) select the IP address which is linked to the grandMA desk.

**Artnet IP:**

Use this listbox to select an IP address for the Artnet communication of the Pixelmapper (receive data only).

**Session ID:**

Every session in the grandMA network has a unique ID. Only members with this ID can take part in this session.

### Session Name:

Input or display for the name of a session.

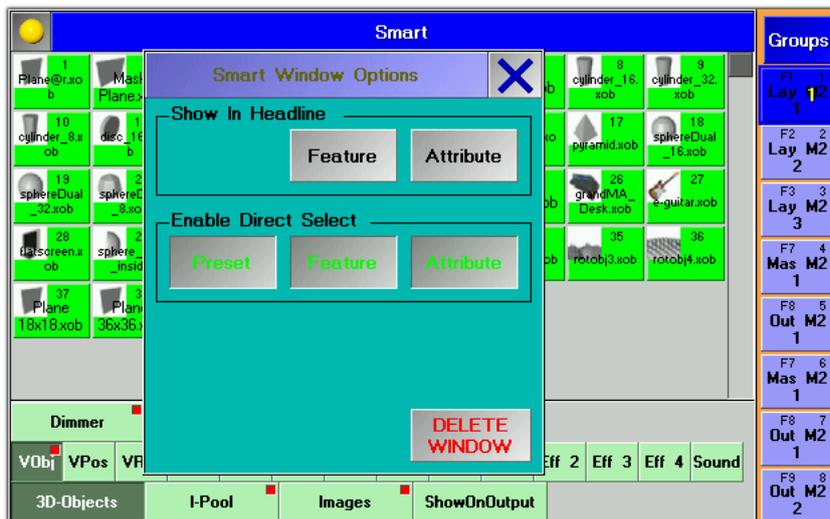
## 3.5 Preferred Operation Mode (Screen Layout MA 1Series)

To get a direct access to the channel sets of the fixture layers we recommend the smart view. The “Smart View” offers a clearly arranged summary about the layer content and objects. All important functions can be accessed via short keys.

To configure a ‘Smart View’ follow the following instructions:

- Click on the empty touch screen to call the “Create a Window” dialog
- Select the “Smart” button

In the upcoming “Smart” window press the yellow button left above:

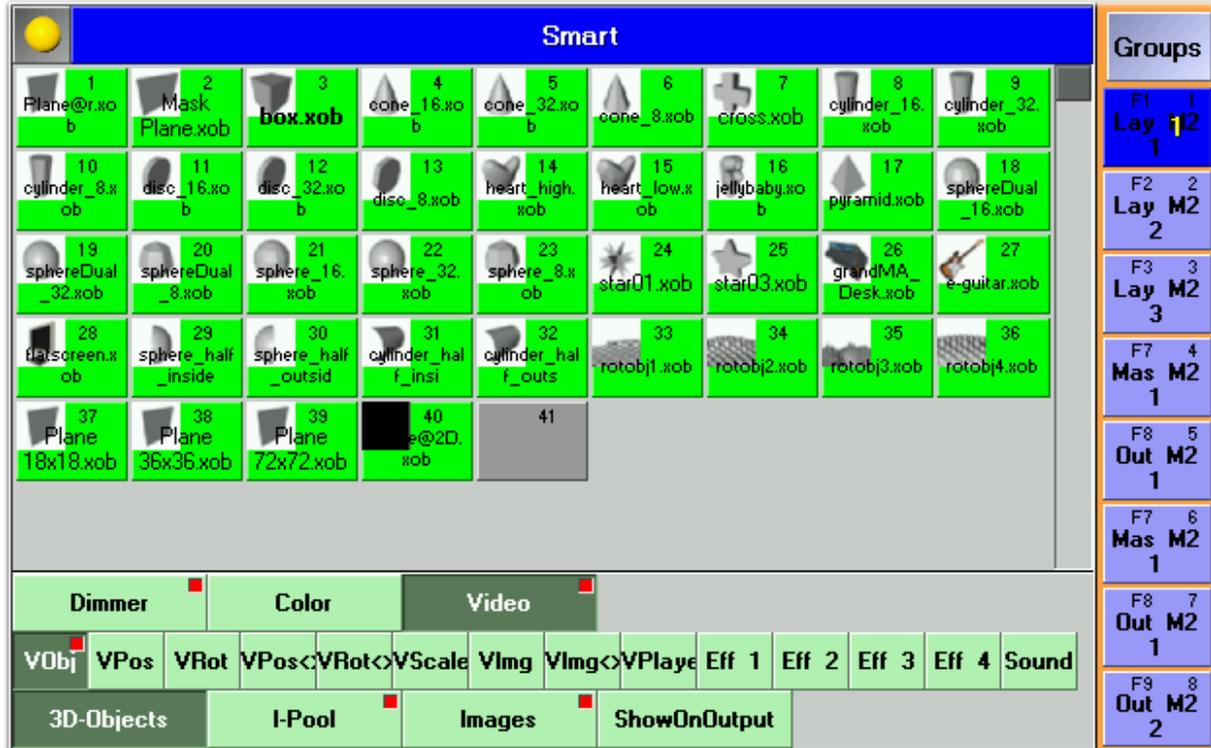


In the ‘Smart Window Options’ dialog select the ‘Enable Direct Select’ buttons ‘Preset’ + ‘Feature’ + ‘Attribute’

To create the “Group” buttons carry out the following instructions:

- Press the “Setup” key at the desk
- Push “Auto create” at the touch screen
- Set the “Select” entry in “Video Layer” and “Video Master” to “Yes” and press “Create single Groups only”
- Change into the “Smart” view and resize the smart window to get space for the group buttons
- Click into the blank area and select “Groups” in the upcoming dialog

The result should look like this:



## 4 Data management

This section describes how data is managed by the desk and MA VPU.

Desk and VPU can work independently. Each package can be operated standalone. If they are connected in a MA network session the desk gets the master and the video application becomes the slave of a session. Data changed within the video application is transferred to the desk and vice versa.

### 4.1 Master slave

The MA console or onPC is always the master of a session.

Only if the MA VPU is started as standalone it can be the master. If a desk is connected and a session is started within the VPU application the show file will be transferred to the desk and then this becomes the master and the VPU the slave. So the synchronization of desk and video data is guaranteed.

In **grandMA 1** mode you can directly invite the console from VPU after creating a session from VPU.

In **grandMA 2** mode you still can create a session from VPU but you need to join this session from the console.

## 4.2 Principle function diagram

The following pattern demonstrates how data is processed.

If you connect the MA VPU to a grandMA desk you can compare the result with some slide projectors remote controlled by an MA desk.

In contrast to a slide projector the slides are not projected on the screen. The screens or 3D objects are active light emitters like monitors and can take the shape of any geometric form. This takes place on so called "Layers". Each Layer output feeds a virtual camera.

The virtual camera outputs can be mixed up to a resulting video output.

Each layer has its own magazine containing emitting 3D objects.

Each layer has its own magazine containing videos, images and masks.

The number of 3D video layers can vary in dependence of the complexity of your show.

You can patch up to 32 layers.

If the MA VPU is invited in a session by the desk, layers behave similar to a fixture.

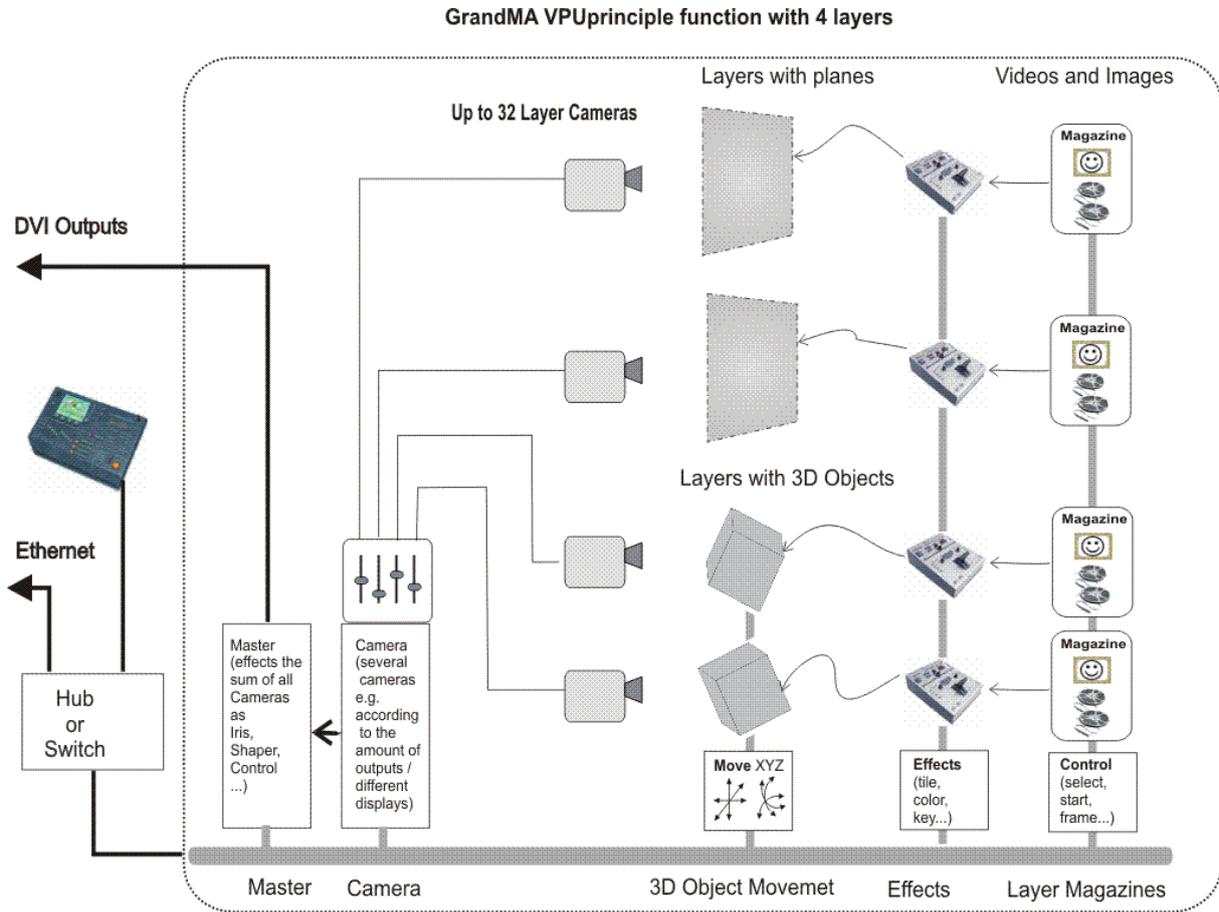
All layers have access to the same content pool.

The application receives the amount of layers and each layer magazine is assembled with several images and videos. These are indicated by their relative paths and names.

If a layer 3D object or the content of a magazine is changed within MA VPU, the changed properties are immediately taken up by the desk.

Several MA VPU applications are shown in several 'Layers' on the MA-desk.

The following diagram shows a principle structure with 4 layers.



### 4.3 Layer properties

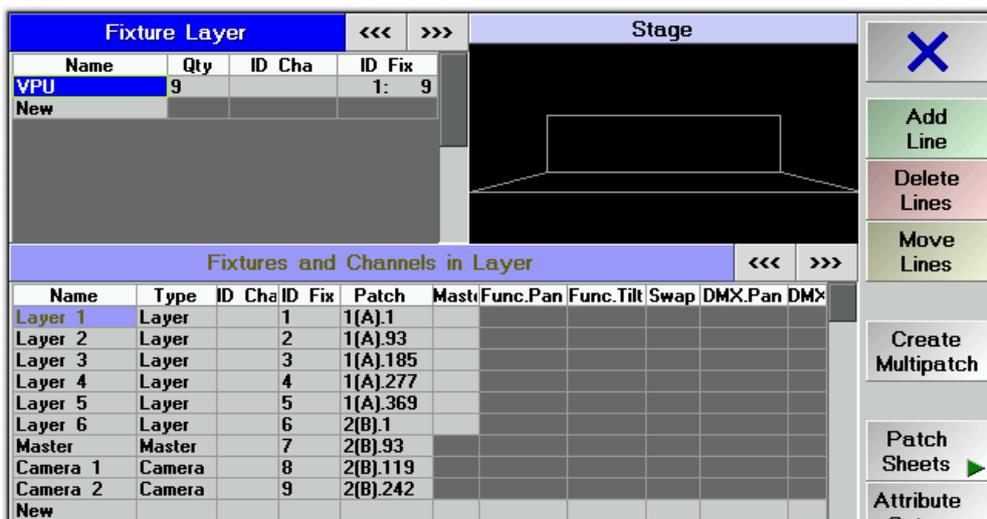
For a better overview shows can be arranged in Fixture Layers on the grandMA desks. E.g. the conventional lights can be separated from the multi functional fixtures and video engines.

For each MA VPU station an own Fixture Layer is created. This Layer accepts several Video Layers. These Video Layers can be combined to meet your requirements. In the following example the Fixture Layer with the name ‚VPU’ contains 1 Master Fixture, 6 Video Layers and 2 Camera Fixtures (known as former VPU Output fixture):

grandMA2:



grandMA series 1:



Layers for a show can be arranged for your requirements on the desk. You can find them in the fixture library at the entry: ‚MA LIGHTING’.

The different Layer Types have the following meanings:

Video Layer:

**Layer1 1 [FixID 1]** 2012-09-01 Versiön 7.0



Dimmer Dim	1.00	VObjI-Pool	0
VObj3D-Pool	0	VEffect1 Type	0
VEffect2 Type	0	VEffect3 Type	0
VEffect4 Type	0	ColorMix CM1	0.00
ColorMix CM2	0.00	ColorMix CM3	0.00
VObjImages	2	VPlayer Playmode	2
VPlayer Index	0	VPlayer Speed	1.00
VPlayer Begin	0	VPlayer End	65536
VImg Split X	1.00	VImg Split Y	1.00
VImg Offset X	0.00	VImg Offset Y	0.00
VImg<-> X	10.00	VImg<-> Y	10.00
VObj3D-Objects	0	VPos X	0
VPos Y	0	VPos Z	-200
VPos Scale	1.00	VRot X	0
VRot Y	0	VRot Z	0
VScale X	1.00	VScale Y	1.00
VScale Z	1.00	VScale AI	1.00
VRot<-> X	60	VRot<-> Y	60
VRot<-> Z	60	VPos<-> X	300
VPos<-> Y	300	VPos<-> Z	1000
VEffect1 P1	0.00	VEffect1 P2	0.00
VEffect1 P3	0.00	HSBC Hue	0.00
HSBC Saturation	1.00	HSBC Brightness	1.00
HSBC Contrast	1.00	Color Boost R	0.00
Color Boost G	0.00	Color Boost B	0.00
Colorkey R	0.00	Colorkey G	0.00
Colorkey B	0.00	Colorkey Toleranz	0
Colorkey Alpha	1.00	Colorkey Type	0.00
VEffect2 P1	0.00	VEffect2 P2	0.00
VEffect2 P3	0.00	VEffect3 P1	0.00
VEffect3 P2	0.00	VEffect3 P3	0.00
VEffect4 P1	0.00	VEffect4 P2	0.00
VEffect4 P3	0.00	Sound Volume 1	0.00
Border Left Soft	0.00	Border Left Hard	0.00
Border Right Soft	0.00	Border Right Hard	0.00
Border Top Soft	0.00	Border Top Hard	0.00
Border Bottom Soft	0.00	Border Bottom Hard	0.00
Camera Cam1	0.00	Camera Cam2	1.00
Camera Cam3	1.00	Camera Cam4	1.00
Camera Cam5	0.00	Camera Cam6	1.00
Camera Cam7	1.00	Camera Cam8	1.00

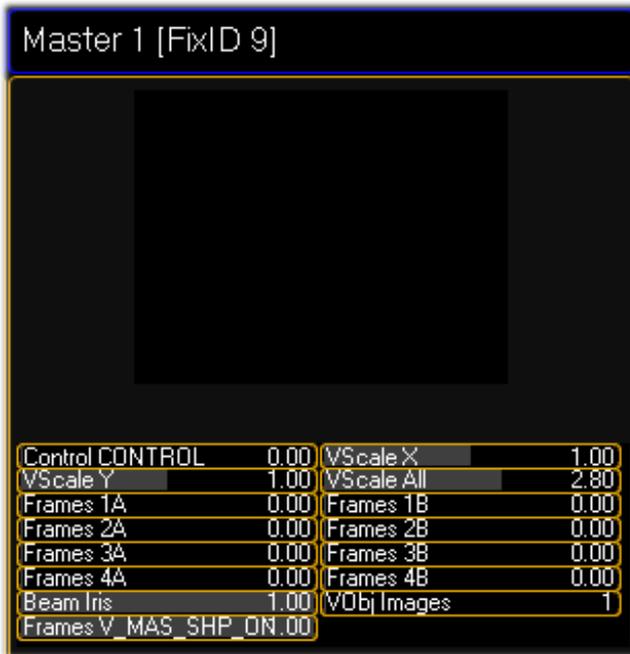
This Layer can use several 3D Objects from the library to represent images and videos.

The content can be shown on several outputs of the graphics card.

A MA VPU application can contain several 3D Video Layers for images and videos. You can patch up to 32 layers to be more flexible in programming. Please note that you cannot run Video Clips on all these layers at the same time!

The title shows the name of the layer, the Fixture ID and the version of the fixture type.

Master :

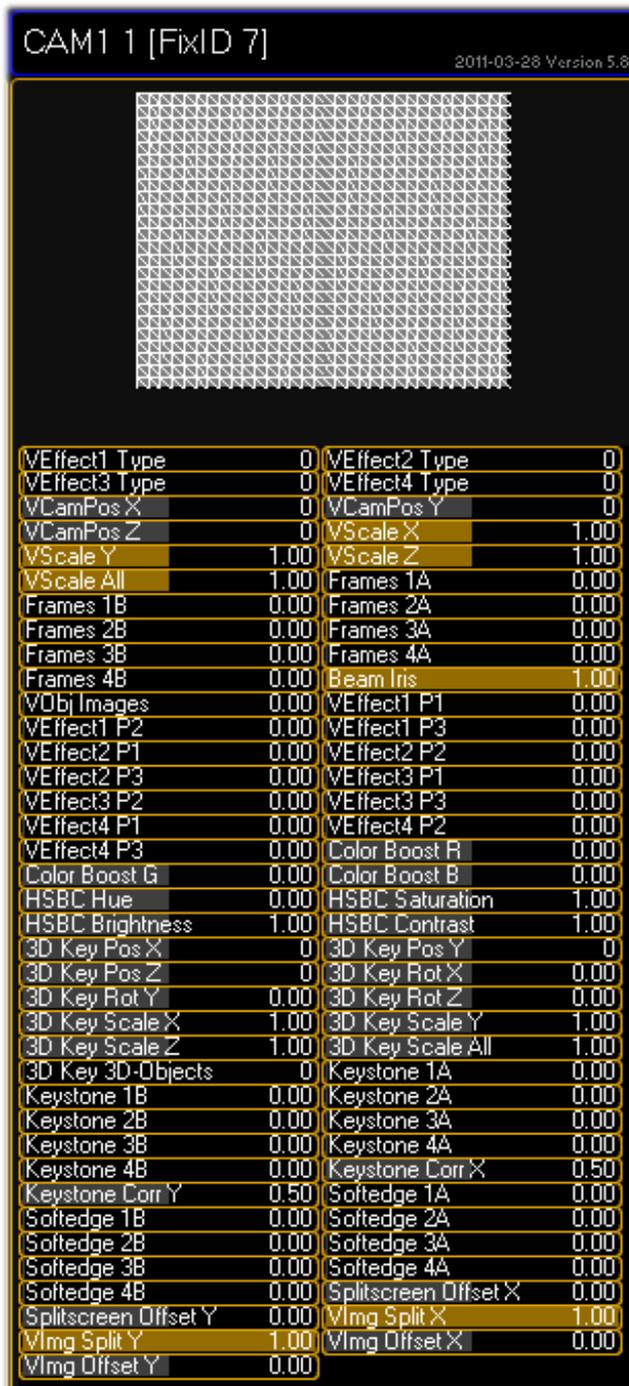


One MA VPU application can contain only one Master Layer. This layer represents a total view on all other layers. It serves the shapers, iris and scaling for all outputs.

A control channel offers for example

- remote controlled PC shut down
- Switch into Fullscreen View

Camera Layer (former Output Layer):



Each physical output (DVI) of the VPU needs one Camera Layer.

Additional to the effects in the video layers this fixture layer serves separate effects for each output and:

- Shapers
- Softedging
- Keystoning

**Note:**

The name of the former VPU “Output Layer” has been changed to VPU “Camera”. This was chosen to hopefully make it clearer and easier for the users to understand the main concept of this fixture and to don´t mix up real DVI Outputs and Output fixture. As known from grandMA video, with this version it is possible to freely assign a Camera to an Output. This was „Softedge ID“ in grandMA video.

Remember: Before this version the amount of Outputs (Camera) to patch into your show was limited by the amount of real DVI Outputs. So maximum 2. So when having a show with 6 monitors used as panoramic screens (one big screen composed of 6 screens) you needed to have 3 Layers „VPU“ in your show each consisting of Layers, Master and 2 Output fixtures. So you needed to handle 3 Fixture Layers but the setup could look much simpler. With the new function it is no longer necessary to handle different VPUs for this kind of widescreen application. One Fixture Layer with VPU Layers, Master and Cameras is enough and in the Settings - Display Dialog of the VPU you can tell the VPU witch Camera „View“ it should display.

### 4.3.1 Layer Reference

If you choose a 'Layer Reference' as input source for a layer the Layer shows the input from the source Layer. This saves performance because the video must not be decoded twice. For example if Layer 1 shows a video and layer 2 takes Layer 1 as reference the video has only to be decoded for layer 1. Layer 2 can be used to set effects.

To use the 'Layer Reference' use the new fixture type and select Layer Reference as content or go into the content editor standard folder and look for a free channel set. Select 'Insert for Layer reference' via right mouse button.

**Note:** Only the video itself if feed into the other layer, not the changes in colour or effects etc.

### 4.3.2 Virtual Outputs

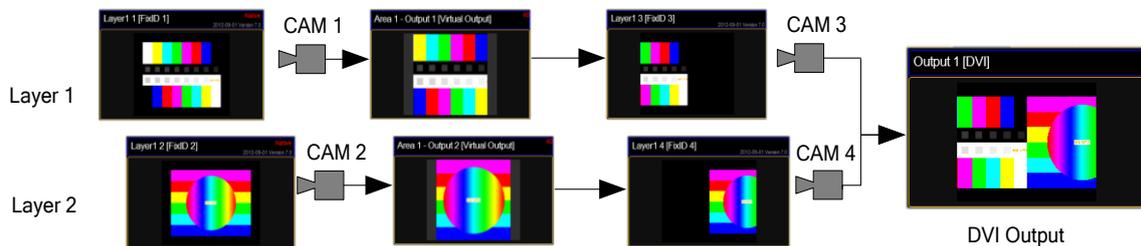
The Pixel Mapper Output can be configured with a "Virtual Output ID". You should not place any Pixel Mapper Fixtures onto that Pixel Mapper Output. If a Virtual Output ID is set, then any "Render IP" settings are ignored, the field is greyed out.

The idea behind that: since a Virtual Output can be assigned with a dedicated, single Camera, you can route certain Layers to this dedicated Camera. So these Layers are only displayed on that Camera and thus only rendered on the Pixel Mapper Output.

You can route as many Layers to that Virtual Output as you like.

The next step is to route this Virtual Output as Virtual Input onto another Layer. This Layer is only displayed on a Camera that is only visible on a DVI Output.

Example for 2 Virtual Outputs:



Layer 1 -> VirtOut 1 only visible for CAM 1  
 Layer 2 -> VirtOut 2 only visible for CAM 2

Layer 3 is shifted 40% x to left.  
 Input is VirtOut 1 and Layer is only visible for CAM 3

Layer 4 is shifted 60% x to right.  
 Input is VirtOut 2 and Layer is only visible for CAM 4

Name	Camera	ResX [Px]	ResY [Px]	Virt Out
Area 1 - Output 1	CAM1 1	1000	1000	1
Area 1 - Output 2	CAM1 2	1000	1000	2

Routing for VirtOut is done in Pixelmapper

What is it good for?

The user can create output display arrangements where each single arrangement is controlled by a Camera. So each single arrangement layer can be modified via the softedge, keystone and splitscreen parameters of each Camera. This comes in handy if an LED controller grabs certain areas out of the displayed picture and the VPU user wants to control these areas with a dedicated VPU Camera Fixture. This can be used to drive a "Matrox Tripple Head to Go" setup and control each DVI Output with a dedicated VPU Camera Fixture. The "Tripple Head to Go Device" is recognised by the VPU Software as one big output. What you basically do is to assign 3 Layers that display Virtual Output 1; 2 and 3 next

to each other.

Note: Don't use the Virtual Output signal as input for the same layer (e.g. VirtOut 1 as input for CAM 1 on the same layer). That will lead an optical feedback!

### 4.3.3 Virtual Output: Configuration of a TripleHead2Go Port

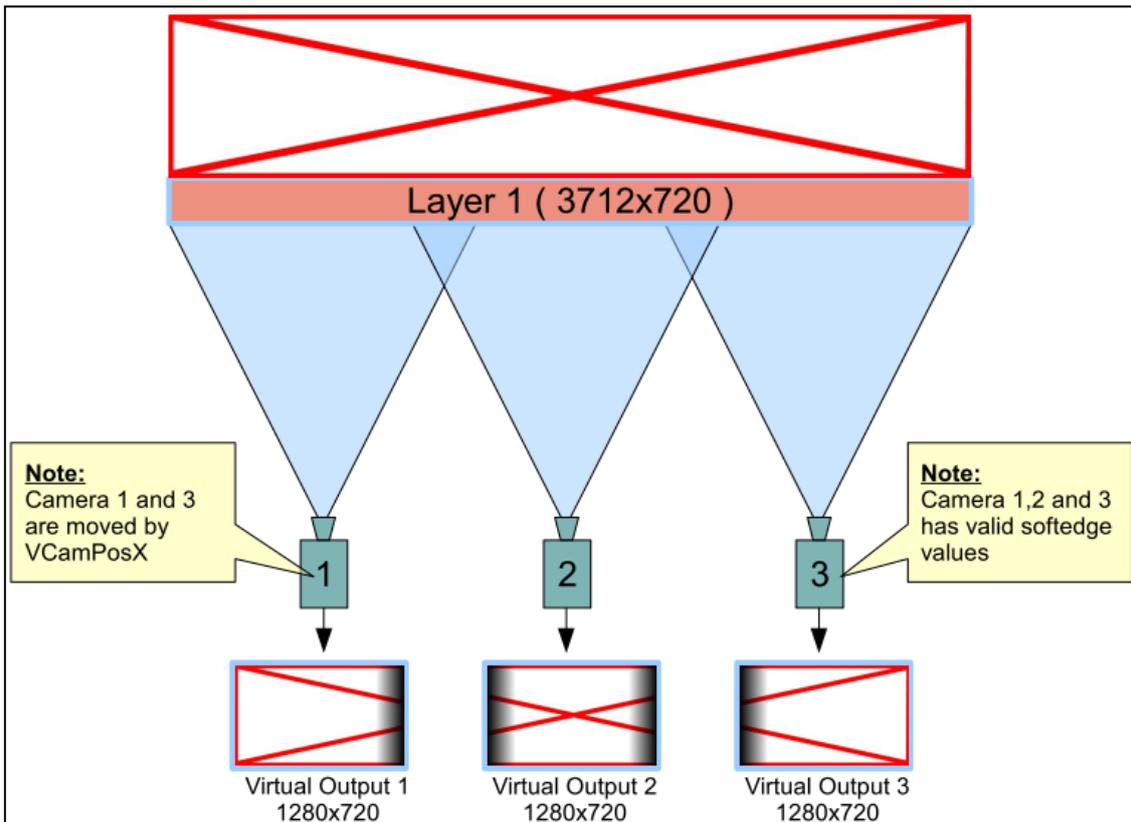
The following example shows the configuration of a **TripleHead2Go Digital** DisplayPort in 3xHD:

**Note:** To use the right product consider that the card has DVI-In- and Outputs!

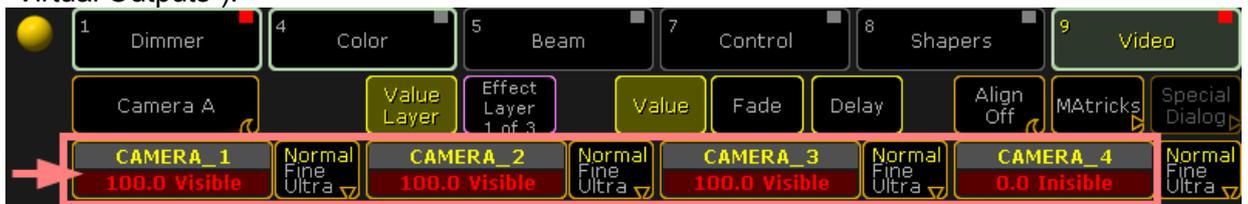
- The DVI Output needs to be set to "Matrox TripleHead2Go" with the resolution 3840x720 (for two times HD)
- Inside the Pixelmapper Setup:
  - First step is to create an "Area" (see figure below). It's helpful to use the same ratio when applying values for the dimensions as they will be used for the "Virtual Outputs" – in this case e.g. 12.8 x 7.2 meters. It actually matters only for the visualization inside the Pixelmapper and has no influence to the final output.
  - Next step is to create inside the area "TripleHead2Go" three "Virtual Outputs" each with a resolution of 1280x720. Next is the assignment of IDs for the "Virtual Outputs", (column "Virt Out", e.g. 1..3) and for the cameras (column Camera, e.g. 1..3). When a "Virtual Output ID" was entered the entry inside the column RenderIP of the same line will be automatically removed as no pixelmapper is to be used together with this output. The "Virtual Output ID" is important for mapping to layers. The individual attributes of the "Virtual Outputs" (e.g. Softedge) can be adjusted by selecting the proper camera by "Camera ID".



- The complete content which will finally range over all three displays will be played back using e.g. "Layer 1" with a resolution of e.g. 3712x720.



- Layer 1 will be parameterized in a way (using a MA Lighting console or onPC) that it is only visible for Camera 1, 2 and 3 (which are already linked with the corresponding "Virtual Outputs").



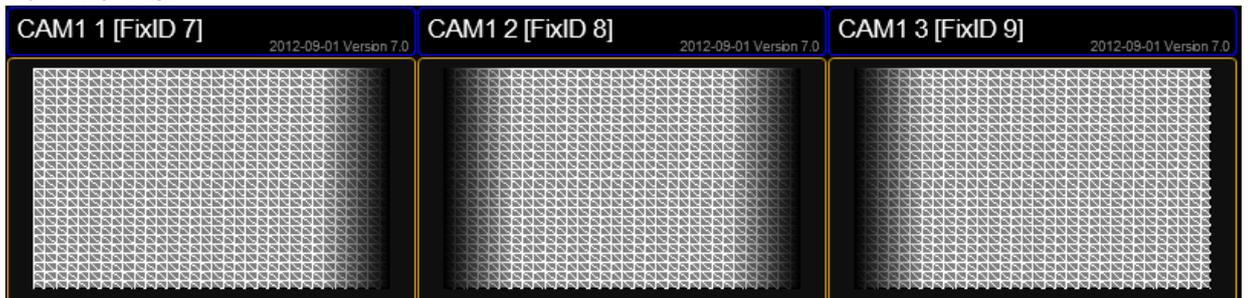
- Camera 1 and 3 will be shifted in a way to only show the wanted selection by using VCamPosX.



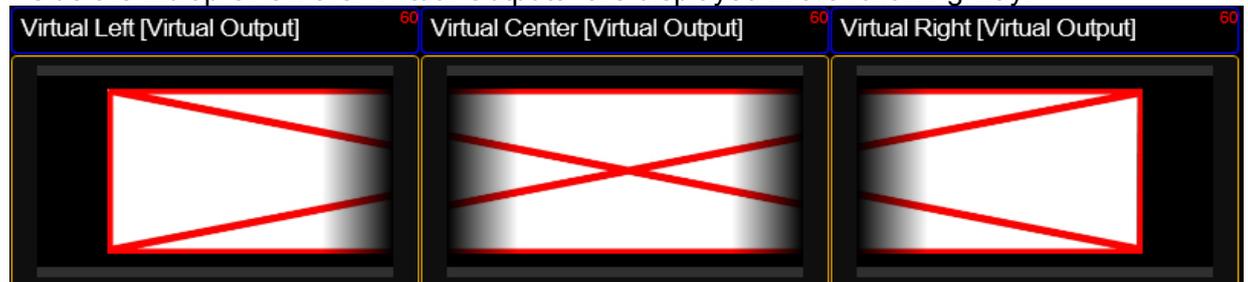
- The Softedge Parameter needs to be properly adjusted from the console or onPC software (Example for Camera 1, which is assigned to left part of the image)



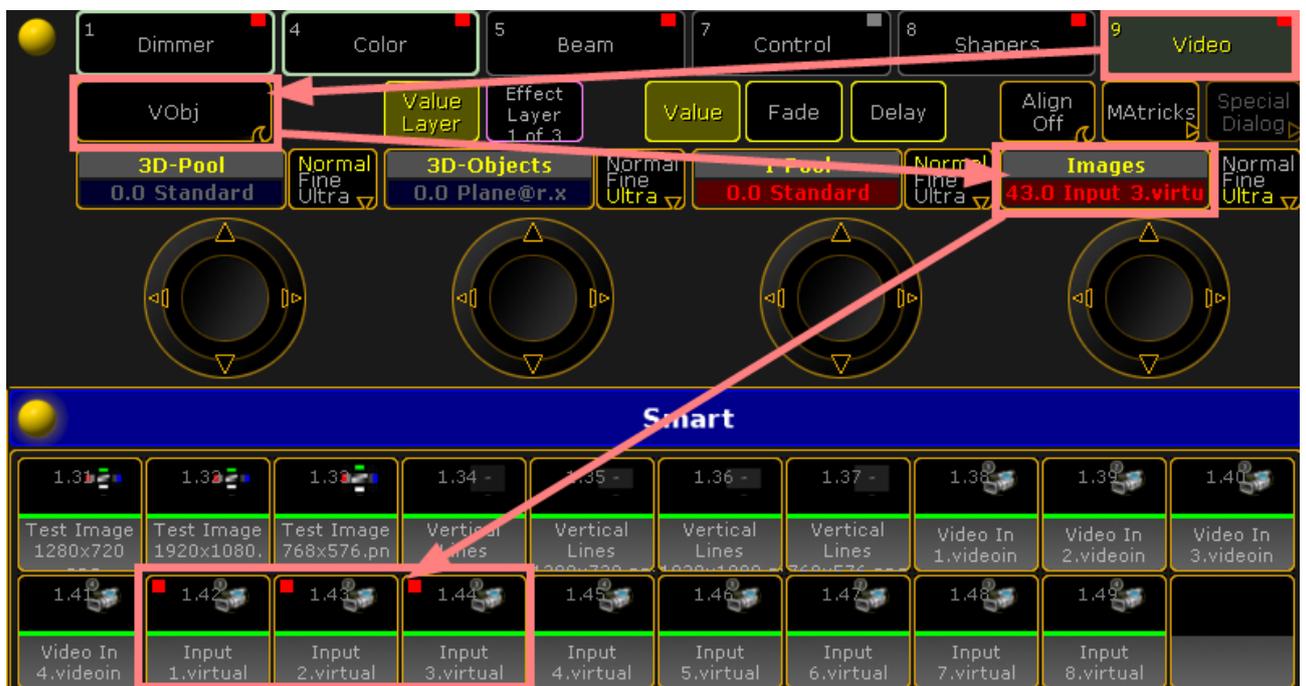
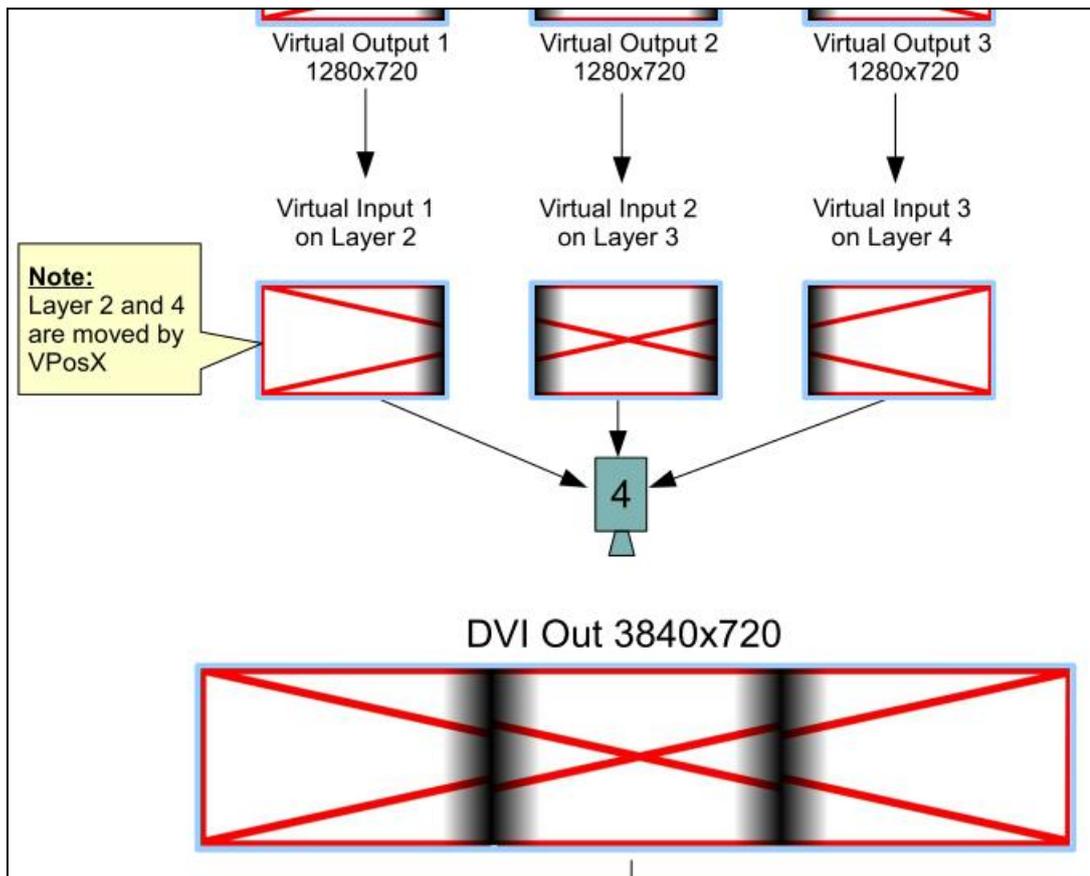
- Provided Softedge is adjusted correctly the Camera Layer display of the VPU looks now like this:



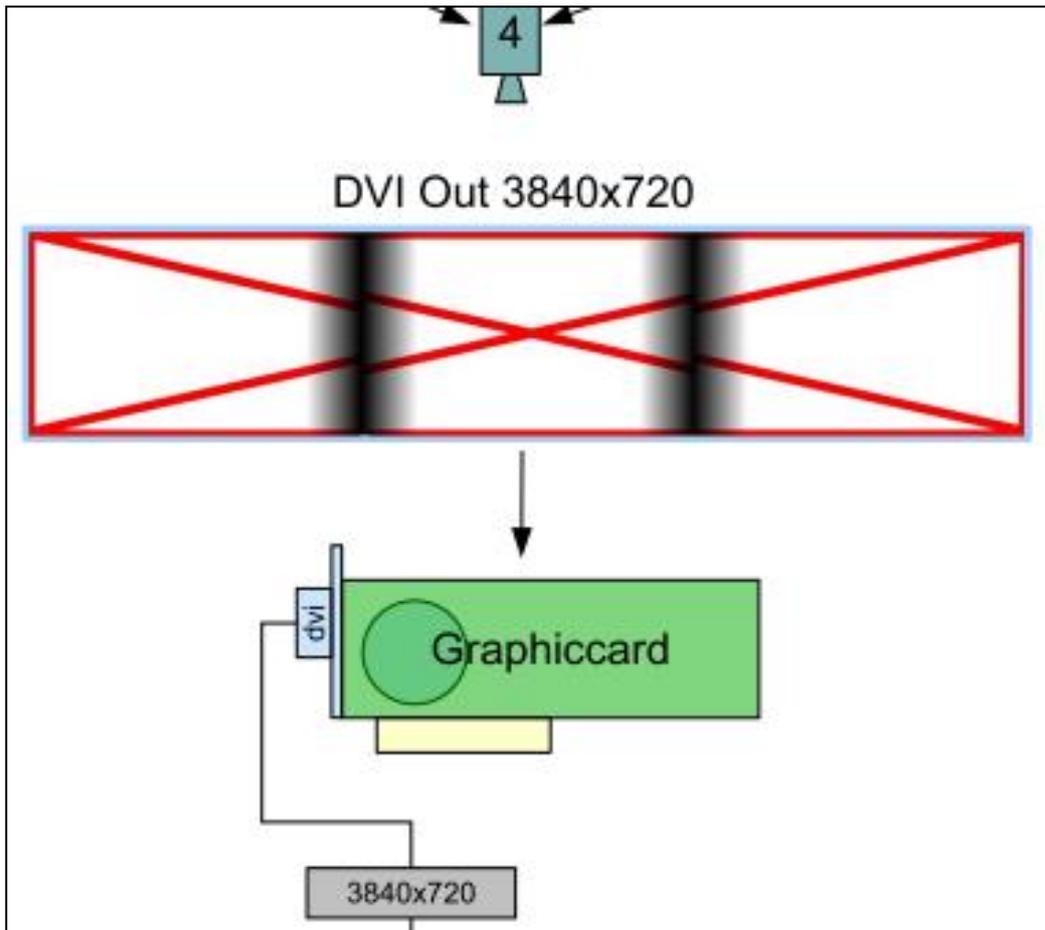
Inside the Multipreview the "Virtual Outputs" are displayed in the following way:



- Layer 2, 3 and 4 (referring to the figure below) are the carrier to apply the content of the virtual Outputs 1-3 via the channelsets "Virtual Input 1-3" . Layer 2 receives its input from the virtual Output 1 via the virtual Input 1. Respectively Layer 3 receives its input virtual Output 2 via the virtual Input 2. Analog the same is true for Layer 4 and virtual Output 3.



- Layer 2, 3 and 4 are parameterized to be only visible by Camera 4. Camera 4 is assigned to the physical DVI output of the VPU.



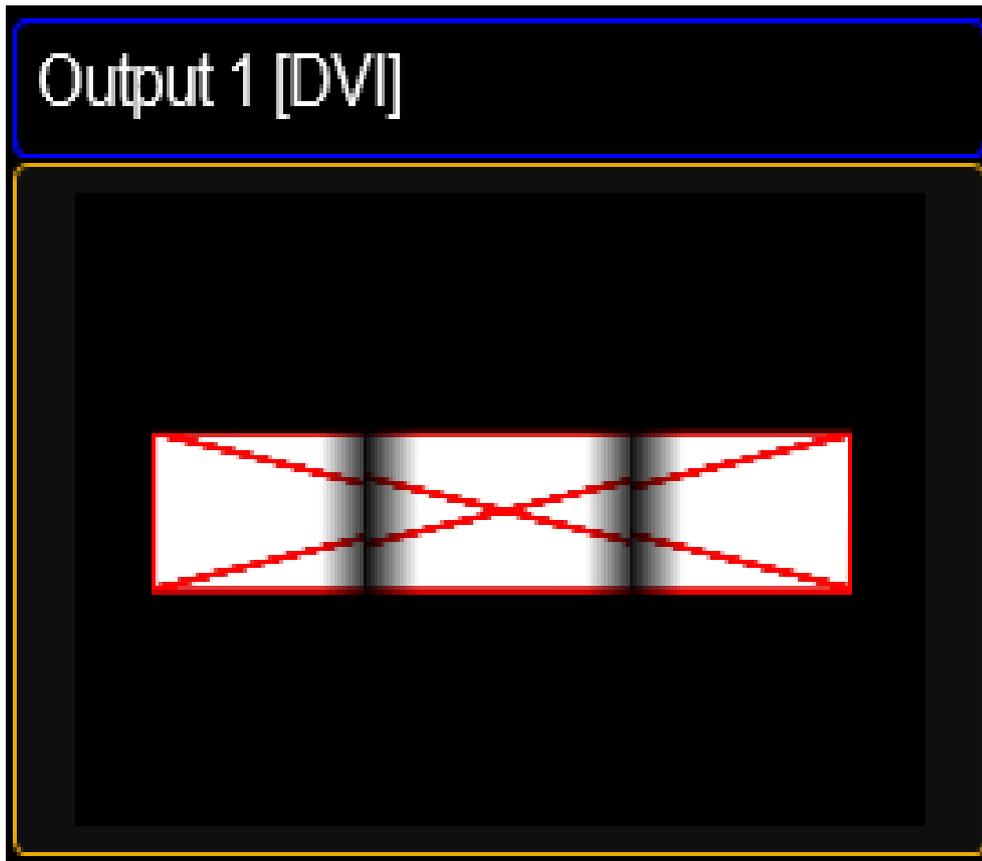
- The position of Layer 2 and 4 can be shifted by using the VPosX parameter.



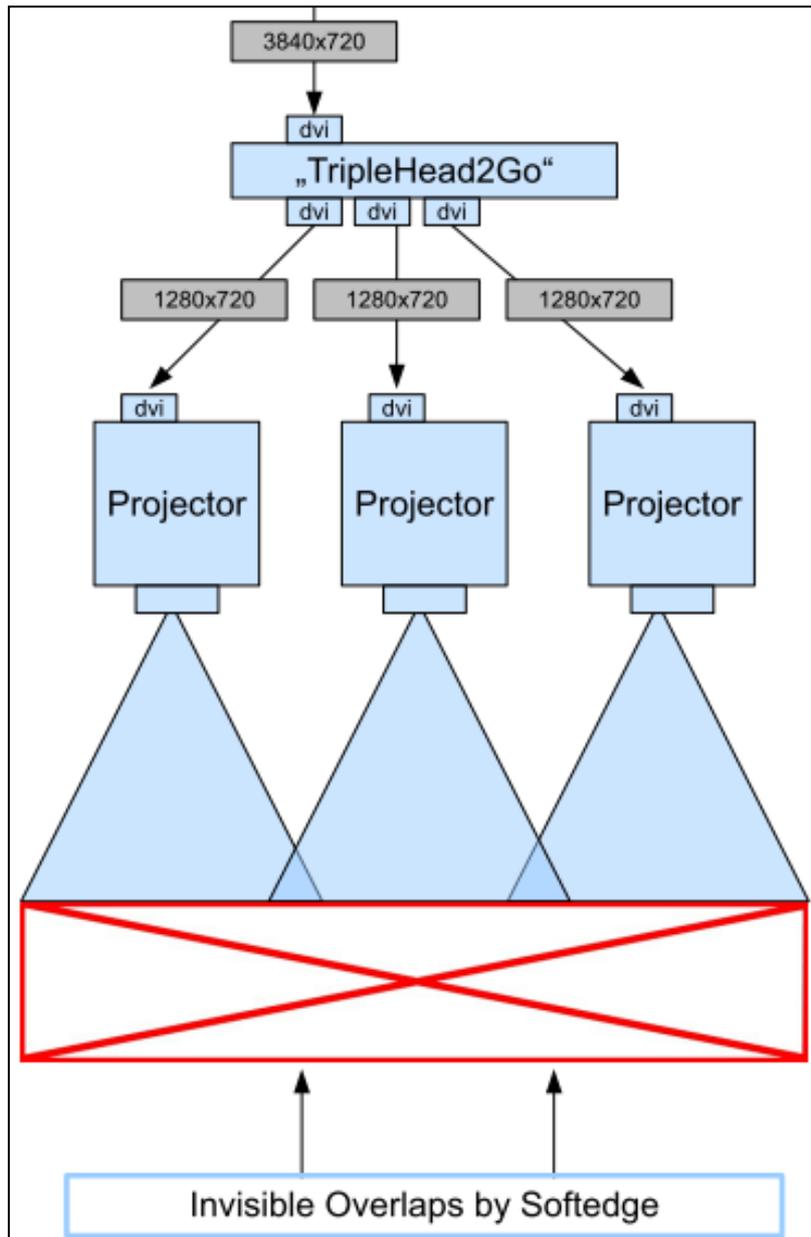
The Multipreview display of the Layer 2-4:



- The actual output at the DVI connector is shown below:



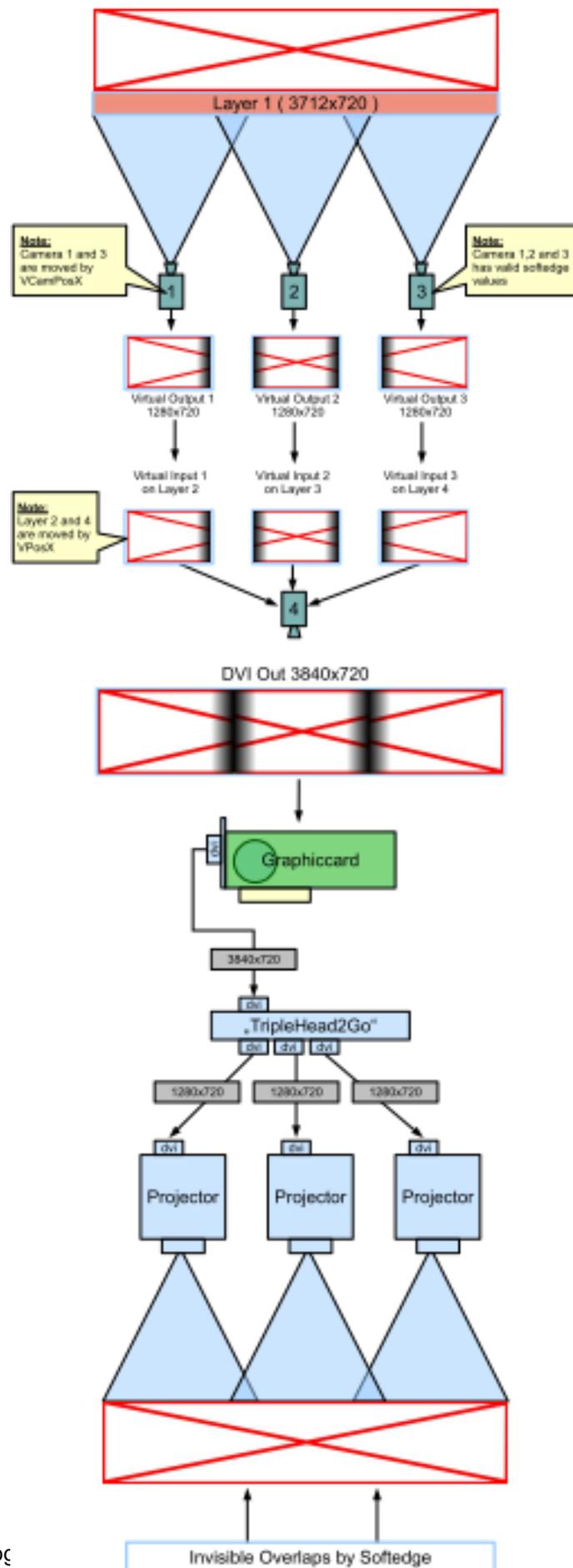
- The TripleHead2Go splits this signal into three independent single pictures. When send to three projectors and taken the soft edged overlap into account the complete images on the canvas looks like one big.



Note:

- The above described example uses only one Layer for rendering the virtual outputs. The number of Layers can be higher and thus the number of possibilities.
- Virtual Outputs can be used in many more applications. They might be used as an effect, e.g mapping a cube on top of a complete scene consisting of several layers or exceeding the limit of applying just four effects at the same time. When rendering those into a virtual output and use the next four with the final output.

Example of a „TripleHead2Go“ application in 3 x HD with Soft Edge



## 4.4 Predefined Constellation

If a MA VPU application is started, and a new show is created via 'File – New Show' the application starts a show with the following configuration:

	Video Layer	Camera	Master	Description
NewShow	6	4	1	Will be loaded via 'File – New'. Projection of 6 video layers

## 5 Several MA VPU applications in one grandMA show

Several MA VPU applications can be operated via one desk simultaneously. Remember, max. 32 stations in grandMA 1 and 200 stations in total in grandMA 2 network.

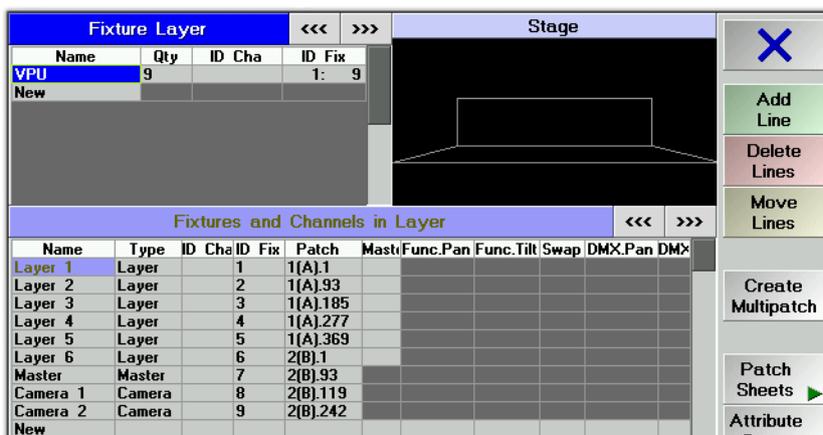
For each MA VPU application one fixture layer can be created in the desk.

A MA VPU application is working in the "MA-Net" and is identified via the fixture layer name.

All PCs running MA VPU with the same fixture layer name will "grab" what they need out of the data stream and show the same show with the same content. Several 'Video-fixtures' configured in the desk can be selected in the MA VPU application via a drop down menu in the status bar or directly via the touch screen:



Example with one connected MA VPU application in one Fixture Layer in grandMA 1 mode via Tools – MA Network configuration video:



Or grandMA 2 mode via Setup – Network – Config. Network Video:



A layer in MA VPU is analog to a Fixture in the grandMA desk.

So if you use for example 6 video layers 6 fixtures are patched and shown in the Fixture Layer of the desk.

In this example a second Fixture Layer named 'video2' has been added for a second MA VPU application with one Master fixture named 'Master 1' and one Video Layer named 'Layer 1':

Fixture Layer				<<<	>>>	Stage										
Name	Qty	ID Cha	ID Fix													
video	9		1: 9													
video2	2		10: 11													
New																
Fixtures and Channels in Layer																
Name	Type	ID Cha	ID Fix	Patch	Master	Func.Pan	Func.Tilt	Swap	DMX.Pan	DMX.						
Master 1	Master		10	2(B).324												
Layer 1	Layer		11	2(B).348												
New																

## 6 Quick Guide

This chapter gives a brief description how to operate with the MA VPU application.

### 6.1 Quickstart with grandMA1

#### – Start master session and connect to the desk:

To give you a sense of achievement MA VPU is delivered with a short demo file that can be opened via the menu entry 'File – Default Show'. This gives a survey of the possibilities of manipulation.

If you carry out this example the video application starts a master session and transfers its show to the connected desk or onPC.

**Attention!** Consider that the actual desk show will be overwritten if you carry out this example.

For the following steps a grandMA desk or the grandMA onPC should be connected.

Without the connected desk, or onPC editor, you are able to do the setup where the used pictures and videos are stored, but you cannot control the resulting output via the desk.

Start the connected desk or onPC with an empty show.

(Backup; Load Show; New Show)

At: ,Tools' ,MA Network' make sure, that no session is running.

If not, stop the session with 'Leave Session'.

Then start MA VPU.

Start the 'New Show' via the menu entry 'File – New Show' or at the touchscreen 'Setup – New Show'.



If no MA session is found, this is indicated by a red broken heart in the status bar. Please Note: If you are not in a session or the master there will be no output!



Create a new session by opening the network dialog (click 'Network'), and then click the 'Create Session' button. The Master state will be indicated by the blue heart.



Now you can invite the desk or onPC to the MA session (grandMA 1 only; in grandMA 2 join the session from the desk): Click the 'Invite Station' button (Settings - Network) and select the Station (Desk or onPC). Invite the station by clicking the OK button.

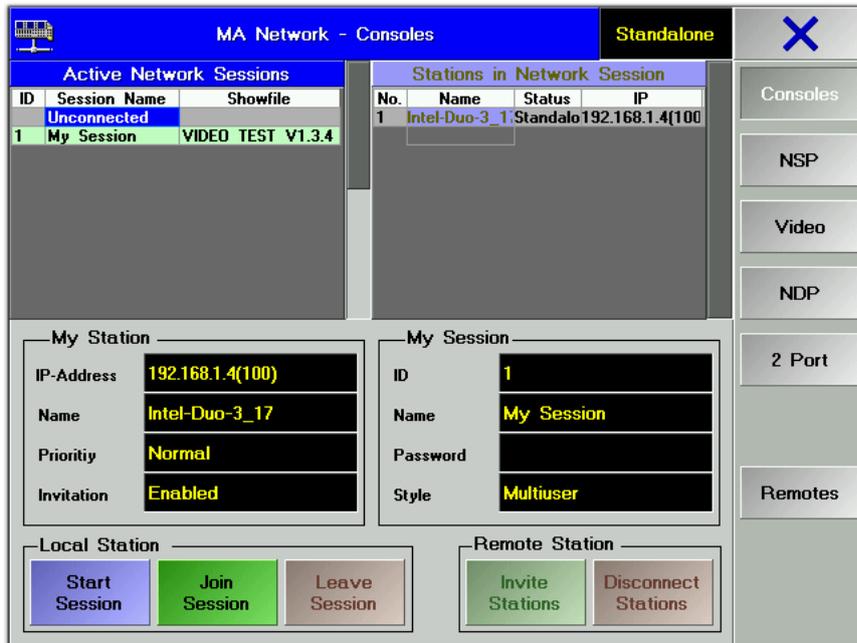


Show data of MA VPU will be transferred to the desk. This is signaled via a progress bar.

**Note:**

MA VPU can create a session as a Master. If a desk joins into this session, the desk will become the master and MA VPU will become the slave. All show data on the desk will be overwritten!

From now on the desk becomes the master of the grandMA session and MA VPU joins as slave:



You also can join the session via the desk or onPC. Therefore select the 'Tools' button on the desk and open the 'MA Network' dialog. Select the 'Active Network Session' and click on 'Join Session'. The show will be transferred to the desk and the desk will become the master of the session (if it was created from MA VPU).

**Controlling Images and Videos via the grandMA 1 desk:**

Now you have access to the images and videos arranged in the demo show of MA VPU. The surface of the touch screen should look like this:



The column 'Name' shows all configured layers of the show file. In the columns beside all available effects for this layer are listed.

Now we'll see how to control MA VPU via the desk:



Click on the 'Preview' tab of MA VPU to watch the resulting output preview. If you prefer a Fullscreen view, apply the 'Fullscreen' button in the toolbar (back with the 'Alt + Enter' button).



Select a layer and open the dimmer. Now you can fade in the actual selected image for the layer.



If you want to change the image or video for the layer, scroll through the image selection with the encoder wheel or select the image or video from dialog after clicking on the image entry.



For example if you select the image 'Color Test stepless.bmp' the preview window shows this image.

Now you can test the effects and see how the change of a value on the desk affects the resulting output in the MA VPU preview window.

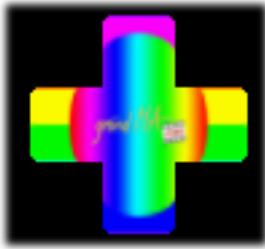
We will see how this Texture looks on a 3D Object:



Select the '3D-Objects' at the desk:

In the next dialog you can select a 3D Object to project onto:

Select the 'Cross'.

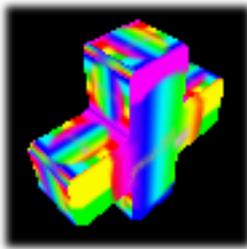


The resulting output in the Preview looks flat, because you are looking perpendicular on the 3D cross.

So let's rotate the cross:

Fixture: Preset&Values sorted by Numbers(+)											
ID	F/C	Name	VPos			Scale			VRot		
			X	Y	Z	X	Y	Z	X	Y	Z
1-		Lay M2 1	Center	Center	Center	50	45°	45°	Center		
2-		Lay M2 2	Center	Center	Center	50	Center				

Therefore enter values e.g. 45° into the VRot field.



The result in the preview shows a rotated cross with the new texture.

Instead of a simple texture you also can map a running video on the 3D Object.

Feel free and change other parameters.

This is the best way to see how MA VPU works.

## 6.2 Quickstart with grandMA2

At first start the VPU with grandMA 2 network.

Start the grandMA2 OnPC

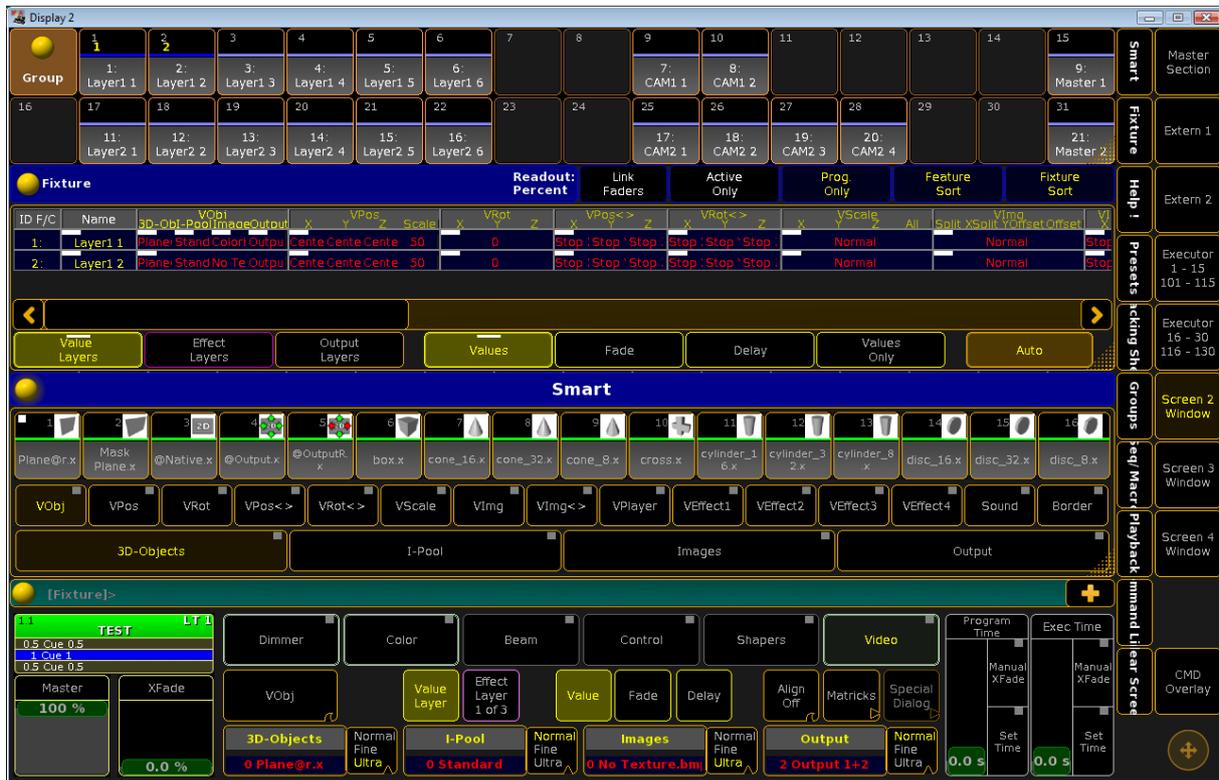
Press ‚Backup‘ and select the tab ‚Demoshows‘ – ‚Load Show‘



In the upcoming dialog select the ‚vpu demo show.show.gz‘

The show will be loaded.

On the Display you see an overview of the layers and the fixture sheet:



You can configure the layout via the buttons on the right:



Now we will invite the VPU to the session:

To start a session press 'Setup' select the tab 'Network Master' and press 'MA Network Control'



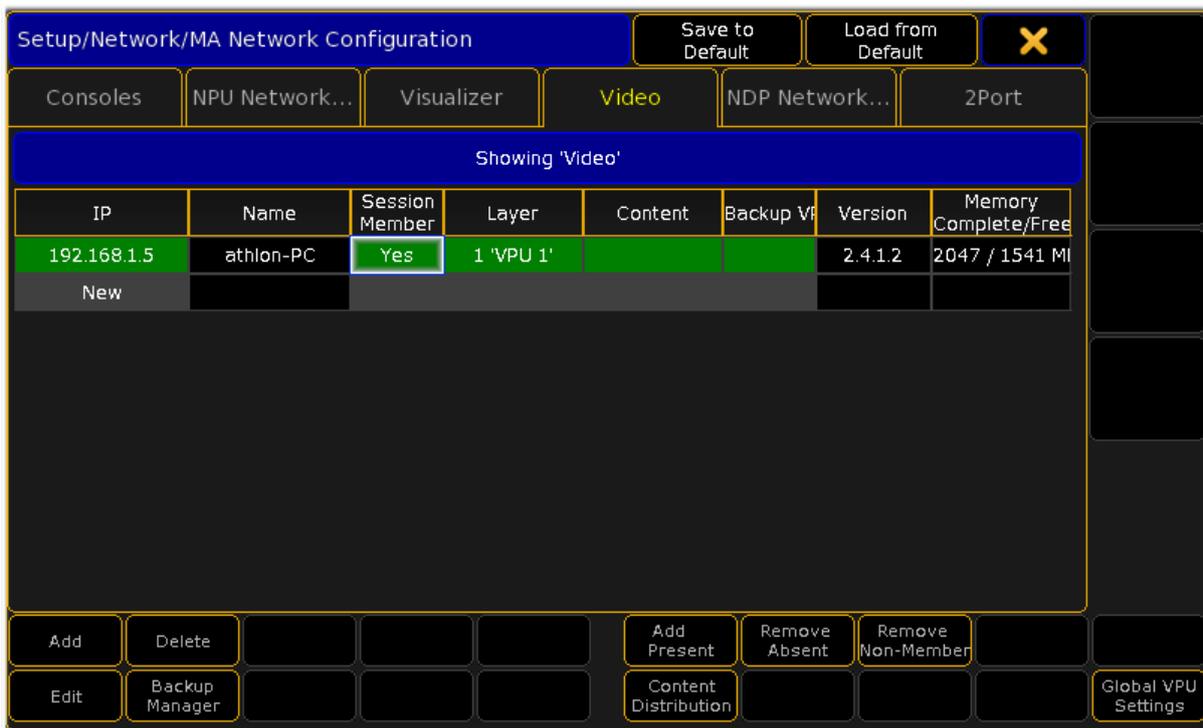
Press the 'Start/Join Session' button. The session will start:



Press 'Setup' select the tab 'Network Standalone' and press 'MA Network Configuration'



In the upcoming dialog select the 'Video' tab:



If the VPU is not already a member of the session, select the 'Session Member' entry. It will change to 'Yes' and the VPU will join the session.

Note:

If the VPU won't join check the VPU IP address. It is displayed in the VPU status bar e.g.:



In this case the desk IP is **192.168.1.6** and the VPU IP is **192.168.1.5**. Console and VPU must be in the same IP segment that means the first *three* numbers must be equal.

Now you can select the 'Layer1 1' button on the display:



On the Fixture sheet you can see all settings of the Layer1 1:

ID F/C	Name	VObj	VPos X	VPos Y	VPos Z	Scale	VRot X	VRot Y	VRot Z	VPos<> X	VPos<> Y	VPos<> Z	VRot<> X	VRot<> Y	VRot<> Z	VScale	All	Split	XSplit	YSplit	VF
1:	Layer1 1	Plane Stand Color Output	Centre	Centre	Centre	50	0			Stop	Stop	Stop	Stop	Stop	Stop	Normal					Normal

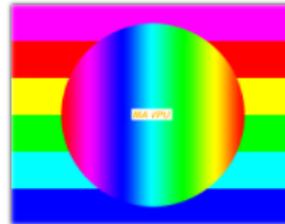
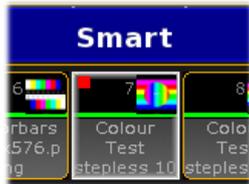
On the Smart sheet all settings of the VPU Layer are displayed as buttons. Select the 'Images' button and you get an overview of all images of the selected I-Pool.



Click an image button and the appropriate image is displayed on the VPU output screen:

Desk Image button

VPU output



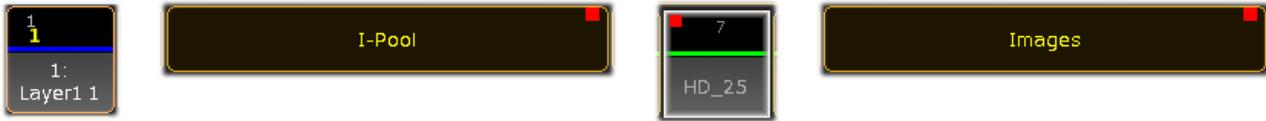
To change the VPU output screen select the 'Master 1' Layer and the 'Control' field:



The 'Smart View' offers the controlling possibility to watch the output in 'Fullscreen':



Press the 'Clear' button, change to 'Layer1 1' and select the 'I-Pool' 'HD\_25' and 'Images':



Now the 'Smart View' offers a choice of video loops in HD quality with 25 frames:



Select a video of your choice and press the 'VPlayer' button.

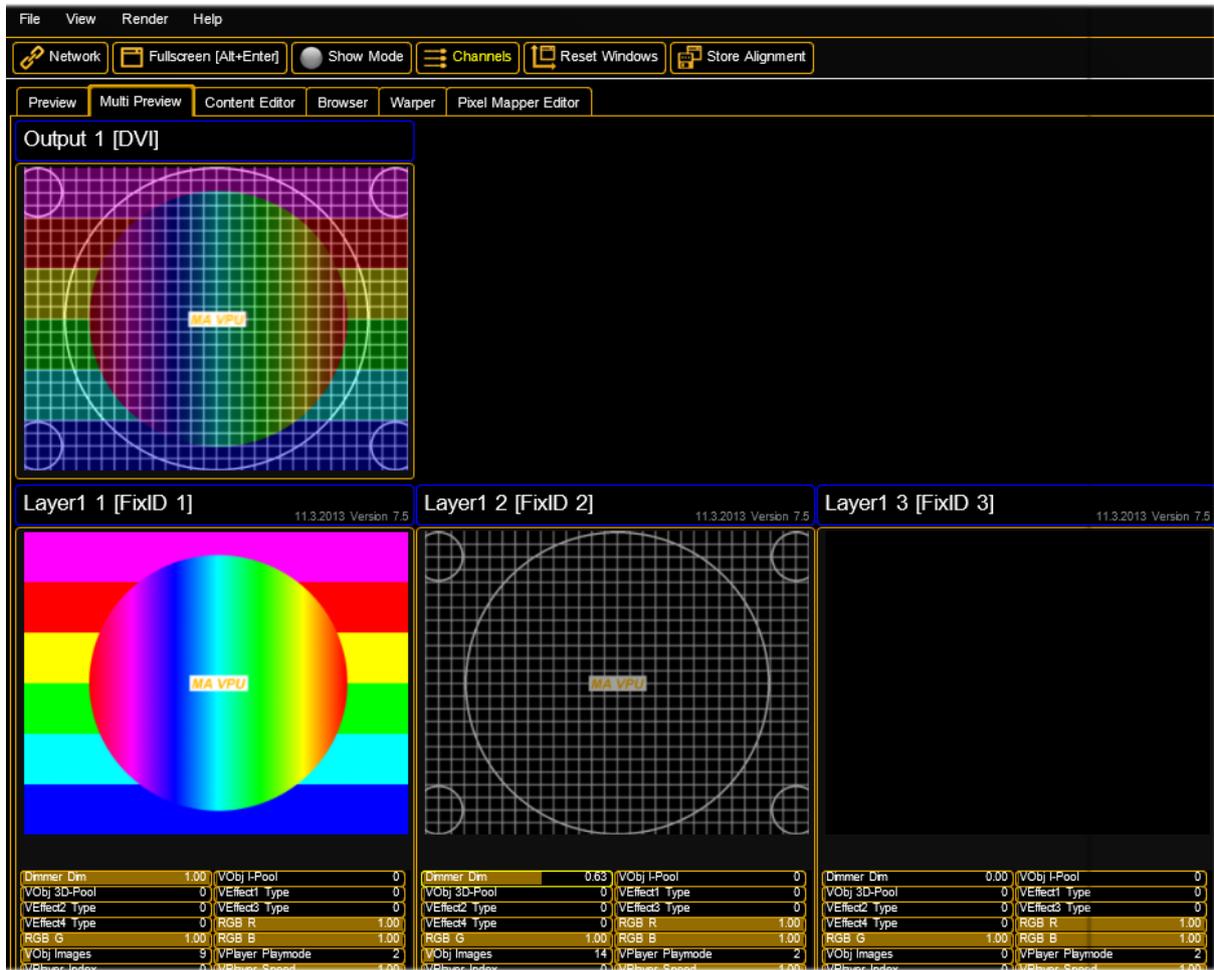
Now you can choose how to play the video e.g. as a loop, select 'Loop':



The selected video should be played in an endless loop on the VPU in the fullscreen view. Feel free to try other modes and effects to learn how the VPU works.

## 7 Program Surface

After starting the program an empty show will be opened or if connected with a desk or onPC the show will be loaded. The surface should look like this:



As already known from other applications, the program surface is divided into several parts:

Menu bar	
Toolbar	
Preview, Multi Preview, Content Editor, Browser, Warper, PixelMapper Editor	Overview window for images and videos of the channel functions or the LED panels in the Pixelmapper
Status Bar	

## 7.1 Internal Touch Screen VPU plus

The touch screen offers a direct access to important VPU functions and shows which content is send actually to the outputs:



The headline informs about the network type and VPU software version, the session ID and name of the show. Also the active outputs Pixelmapper and DVI are shown.

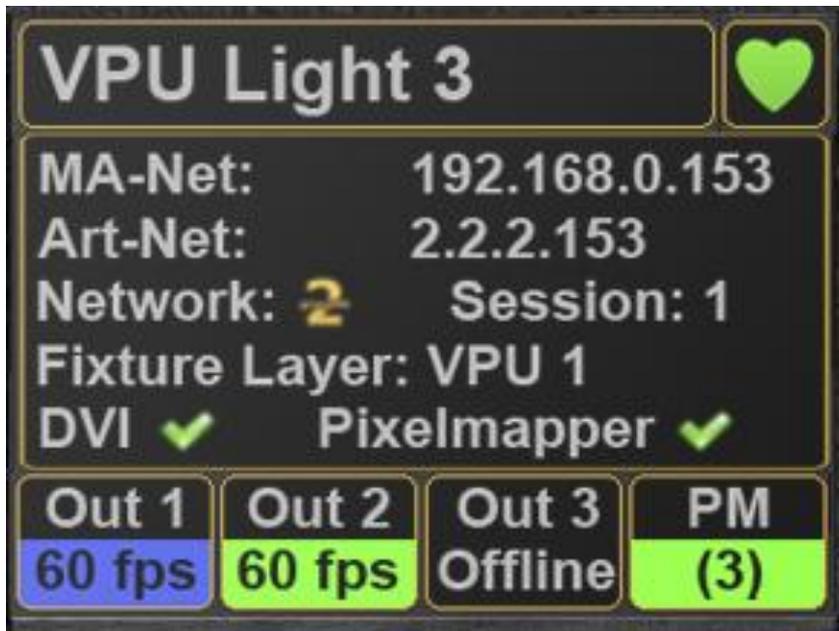


The lower part shows the IP addresses of the MA-Net and Artnet adapters.

<b>Locked</b>	Most important VPU functions can be operated directly: - Lock / Unlock the touchscreen buttons
<b>Unlocked</b>	
<b>Preview</b>	
<b>SystemMonitor</b>	
	- Switch between the output preview and system monitor information
<b>Shutdown</b>	- Shutdown or reeboot the VPU
 Slave	- Indicates the status of the MA-Net see: 3.4 Connection States
<b>Settings</b>	- Opens settings dialog (Display, Network, Main, Video In) as described in 7.3.1 File....Settings
<b>Setup</b>	- Opens the Setup dialog (New Show, Load Show, Save Show as, Update Software, Pixelmapper/DVI , Restart with grandMA 1/2 Network)
Fixture Layer	
<b>VPU 1</b>	- Select the fixture layer

## 7.2 Internal Screen VPU light

The internal screen offers the following information:



<b>Title</b>	Shows the ,Name' of the device consisting of device type and serial number	
<b>State</b>	Indicates the status of the MA-Net see: 3.4 Connection States.	
<b>MA-Net</b>	The actual IP-Address	
<b>ART-Net</b>	The actual Art-Net IP-Address	
<b>Network</b>	grandMA1 or grandMA2 possible	
<b>Session</b>	The session number of this VPU	
<b>Fixture Layer</b>	The selected Fixture Layer	
<b>DVI</b>	<b>green:</b> active	<b>red:</b> not active
<b>Pixelmapper</b>	<b>green:</b> active	<b>red:</b> not active
<b>OUT 1/2/3</b>	<b>blue:</b> Output is active + EDID is active <b>black:</b> Offline, this output is not active	<b>green:</b> Output is active <b>fps:</b> Frames/Second
<b>PM (Pixelmapper)</b>	Number of outputs	

## 7.3 Menu bar



You can store and recall files, and adjust the settings of the program:

### 7.3.1 File...

- |                    |  |
|--------------------|--|
| New Show           | Creates a new show with 6 Layers, 1 Master fixture and 2 Camera fixtures.  |
| Load Show...       | Opens a dialog to load a showfile<br>(.gvs – grandMA 1 or .gz – grandMA 2 file).   |
| Save show<br>as... | Opens a dialog to save the current show at a given filename.   |
| Settings...        | Opens the Settings dialog:<br>Within this dialog you can set: <ul style="list-style-type: none"><li>- Display settings</li><li>- Network settings</li><li>- Main settings e.g. FOH feature</li><li>- Video In settings</li></ul> |

**Settings...**  
**Display**

Set the display properties:



**Output:** Up to 4 monitor outputs (VPU plus) are supported.

- Camera: Each output can display a different camera.
- GUI: Select the output for the GUI (**G**raphical **U**ser **I**nterface)
- EDID: State of EDID Manager see:2.8 EDID Manager
- Monitor: Name of the physical interface card
- Refresh rate in Hz
- Resolution for output

**Global:**

- **Monitor Identification:** Shows a number 1...4 on the output to identify it.
- **Fullscreen GUI:** Show the Graphical User Interface in fullscreen
- **Activate all Monitors:** Activates all outputs of the graphic card
- **Test Image:** Outputs one of ten selectable Testimages related to the connected outputs ratio. These images can be used to adjust the output geometry and colors. **Note:** To get the 1:1 pixel correct display of the test pattern make sure to use the @Native Object only!

**Settings...  
Network**

Within this dialog you can set the properties for the network.



The dialog shows the actual state of all machines in the MA net:

**Red text:** Allow Invite Disabled.

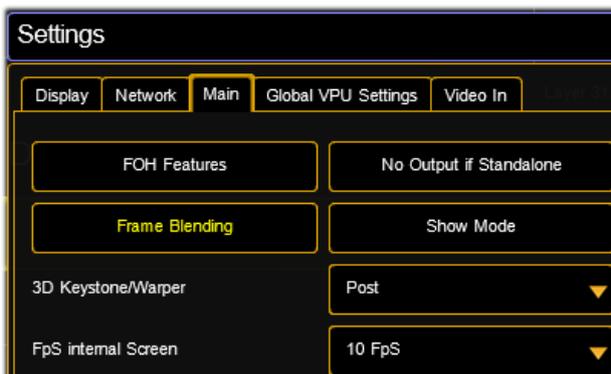
**Green background:** selected station.

**Red background:** version is not compatible.

The different states in the network are described in detail in chapter 3.4 Connection.

**Settings...  
Main**

Within this dialog you can select:



**FOH features:**

If this button is checked an additional buttons appears at the toolbar.

The button 'Blind' preserves the blind programming preview.

**No Output if Standalone:**

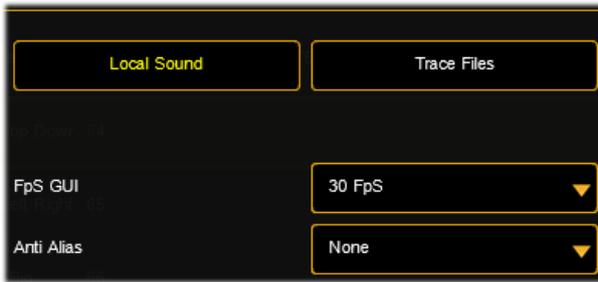
If no desk is connected the output is suppressed.

**Frame Blending**

Frame interpolation allows smoother motion when you slow down or speed up a layer.

**Show Mode**

This mode avoids interruptions of the running show caused by manual operations of a user. It can be set by a channel in the Master layer or this button. See also:7.4 Toolbar



### Local Sound

Switch the local speaker on or off.

### Trace Files

To get log files (in case of crashes) this must be switched on (decreases the performance). The trace files can be found in the trace file folder on the desktop.

### Fps Internal Screen or GUI

Set the **Framerate per second** for the internal screen and the VPU **Graphical User Interface** to optimize the performance. The lower the rate the better the performance.

### Anti Alias:

This filters are useful for Warper and Keysone projections.

Examples:

**none:** no Anti Alias filter



**Multi Sampling:**



**Super Sampling:**



### Note:

Multi and Super Sampling costs performance!



### Content Redirection

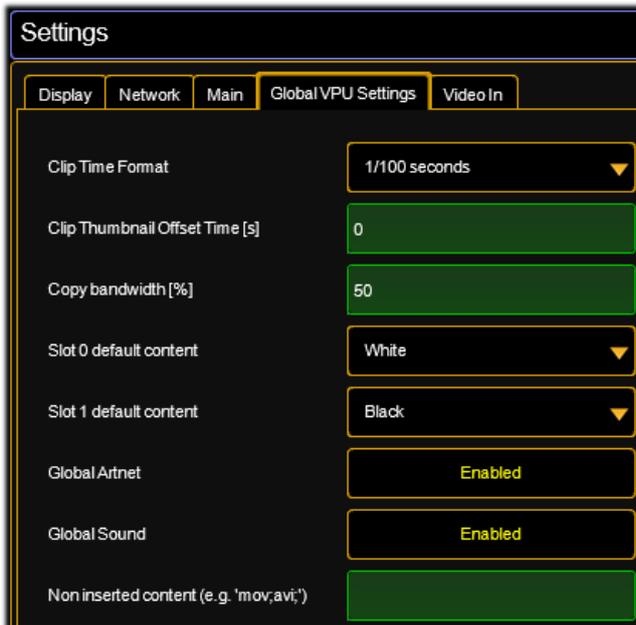
If your content has moved to another location you can redirect the search folder e.g. from drive "D:" to drive "E:." The redirection is indicated by a button in the toolbar:



and can be switched on or off

## Settings...

### Global VPU Settings



Within this dialog you can select the

**Clip Time Format:** Clip timing calculation, e.g. clip with 30 fps and clip time Format 30 Fps, Encoder Speed finest/ultra: you can step framewise through the clip. If you prefer to step Frame Index in seconds you select „seconds“. The setting will be spread via network so all VPUs have the same clip time format.

**Clip Thumbnail Offset Time(s):** Thumbnails show the first frame of a clip, if this is empty you can add an offset to get a meaningful image.

**Copy bandwidth:** Sets the copy bandwidth for the content distribution. The distribution of new content stresses the network so reduce this value if you have too much network load.

**Slot 0/1 default content:** Set the default image of the first slot to black or white. This affects only new created Function Blocks.

**Global Artnet:** Enable or disable Artnet.

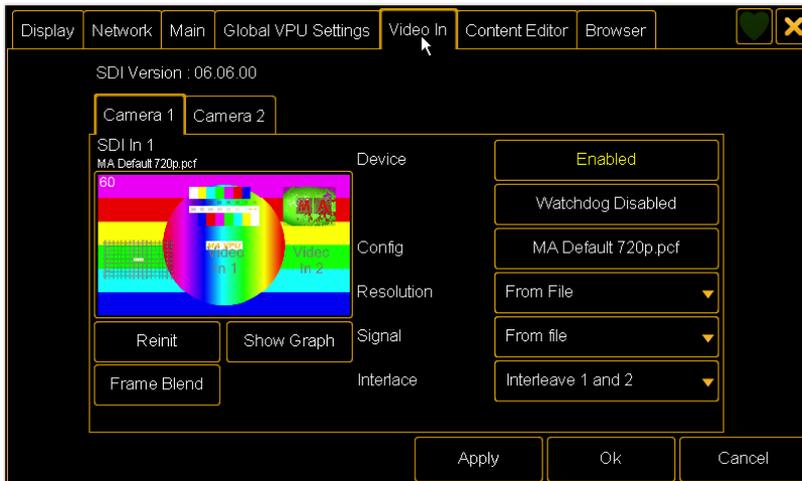
**Global Sound:** Enable or disable Sound.

**Ignore when inserting content...:** If a whole folder of content is imported you can ignore files by specifying the extension e.g. if the folder contains also '.avi' files and you only want to import the '.mov' files the '.avi' entry suppresses importing of all '.avi' files.

**Note:** the following dialogs are only available in the Widowed Mode

## Settings

### Video in...



### SDI In Configuration for Camera 1/2

The first line shows the version and actual status of the SDI input signal.

#### Device:

Enable/disable SDI input.

#### Watchdog:

If SDI signal is missing an automatical initialization is done every 30 ms.

#### Config:

There are 3 preconfigured files for SDI In MA provides: MA default 1080i (Full HD 1920x1080)

MA default 720p (HD 1280x720)

MA default 576i (PAL 720x576)

i (interlaced)

p (progressive)

#### Resolution:

Select SDI input resolution

#### Signal:

Interlaced or progressive

#### Interlace:

see list below:

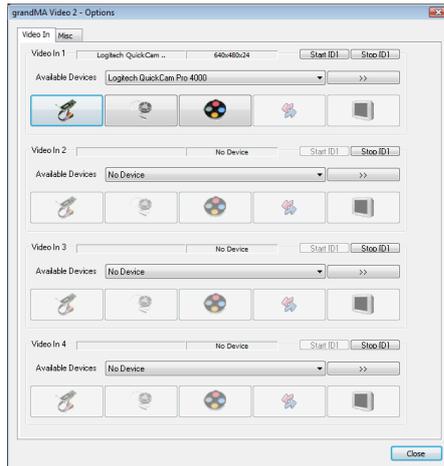
**Note:** The VPU dongle version only shows the button “Start external Configuration” described below.

### Interlacing Formats:

Here you can define how images are handled within the application. Since grandMA VPU does only output progressive scanning via DVI these settings may effect your image quality.

- Interleave 1 and 2  
field one is interleaved into field two
- Field 1 then 2  
field one is displayed first (and stretched to full ratio) then field two
- Field 1 only  
field one is displayed (and stretched to full ratio), field two is not displayed

Video in...  
Start external  
Configuration



(VPU dongle version only)  
If you are not using SDI but want to use other external video feed like a webcam you can run 2 external devices:

You cannot access this button via the touch screen, only via the GUI.

**External Video Configuration:**

This interface allows the input of a live video stream. It is realized via the Microsoft Direct Show mechanism.

**Video In 1...4:**

In this dialog up to 4 different 'Video In' devices can be assigned.

Every Video Capture Device supported by Windows can be used as input source for MA VPU.

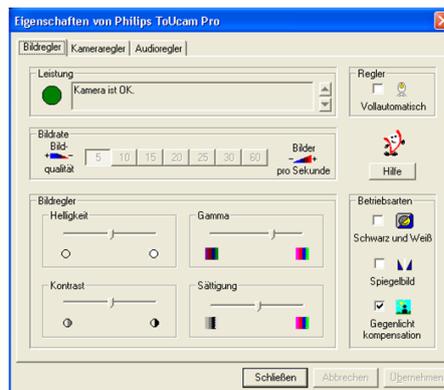
**Available Devices:**

All recognized Video Capture Devices are listed in this selection bar. By selecting one device this will be assigned to the 'Video In' source and is available for MA VPU.

**Start / Stop [D]**

Additional options to restart drivers in case of synchronization faults.

Video in...  
Device



**Device...:**

If a Capture Device with a driver is installed, its property dialog will be opened after the selection of this button.

In this dialog the device specific properties of the manufacturer can be managed. The following example shows the property dialog of a webcam:

If no device property is available, nothing happens.

Video in...  
Device  
Settings



### Stream...:

If a Capture Device with a driver is installed, its streaming dialog will be opened after the selection of this button.

In this dialog the device specific streaming properties of the manufacturer can be managed. The following example shows the property dialog of a webcam:

If no device property is available, nothing happens.

Restart with  
grandMA 1/2  
Network

Switch between the grandMA 1 and grandMA 2 mode. The application restarts in the next mode.

Exit

Leave the application.

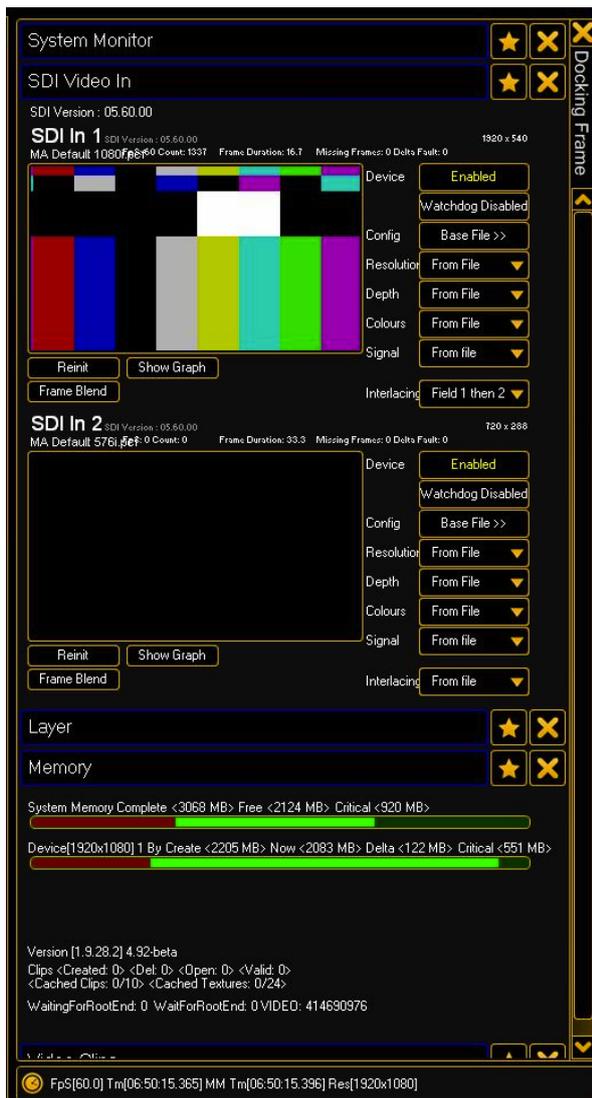
### 7.3.2 View...

Dialog Docking Frame	Opens a dialog to arrange your views, see below.
Timing Window	Opens window with timing information to check the performance.
Info Window	Opens an Info window for internal purposes.
Layer Window	Opens a window with information about the layers as type, Show on Head, Scale etc..
System Monitor	Opens the system monitor that shows communication data between the desk and VPU.
Video Clips Window	Opens a window that offers information about the used video clips. This can be helpful for troubleshooting.
Memory Window	Opens an overview window about the usage rate of the memory.
Start in Fullscreen	The application always starts in the 'Fullscreen Mode'
Start in Black	If this option is enabled, the GUI (Graphical User Interface) is disabled (Black) when the VPU starts. To enable the GUI press 'Ctrl + Enter'. This option is stored local for each VPU.
Show FpS in Fullscreen	Show the framerate in FpS ( <b>F</b> rames <b>p</b> er <b>S</b> econd) in the fullscreen output.

The following entries are only visible if the option 'Menu – File – Settings – Main – Extended Menus' is selected:

Error Window	Opens a window with internal error messages.
Statistics Window	Opens an Info window for internal purposes.

## Dialog Docking Frame:



The Docking Frame contains all opened Views. Views can be minimized or opened by pressing the star or removed by clicking the x. So now it is possible to keep dialogs open for monitoring reasons and close all dialogs by one click and open exactly the same views by only one click. You can scroll in this frame and the preview or multi preview will be downscaled when Docking Frame is opened.

### SDI Dialog

There are 3 preconfigured files for SDI In MA provides:

- MA default 1080i
- MA default 720p
- MA default 576i

In the „Config“ drop down you can select those files. Afterwards you need do set the drop down „Interlacing“ to Field 1 then 2. If you need any other resolutions just select any other resolution in the drop down „Resolution“.

### Memory Window

This window gives you an overview of the system memory. The first bar is the complete System Memory, the second bar the memory of the graphics device 1 and the third bar shows the memory of graphics device 2. So on this example we have different resolutions on both outputs - which means 2 devices for the system and this may indicate that working with different resolutions cuts the system down in performance - as two devices are in use. So keep in mind to avoid using different resolutions whenever possible. You can do so but the headroom is reached much faster.

### Timing Window

Shows: FpS, Runtime, Resolution

### 7.3.3 Render...

**New:** DVI and Pixelmapper outputs can be enabled simultaneously (not with dongle version)

DVI	Switch the output signal to DVI ( <b>D</b> igital <b>V</b> isual <b>I</b> nterface) output.
Pixelmapper	Enable the Pixelmapper see also chapter: 11 Pixelmapper. Video output will be transformed into DMX values. Finally output via Ethernet adaptor (Artnet) to RGB devices/fixtures.

### 7.3.4 Help...

Release Notes...	Opens the release notes document.
Info...	Shows the about box with the current version number. In the lower part of the box you can find the license information and the Dongle Serial Number.

## 7.4 Toolbar

The toolbar contains several buttons that are related to the general operations of the program.



**Network...** Shows the actual network state or opens the MA Network dialog as described in 7.3.1 File...

**Fullscreen :** Switches the GUI (Graphical User Interface) off. You can also use the 'Shift + Enter' key on the keyboard to switch the GUI off.

Leave the full screen mode with the 'Shift + Enter' button

**Note:** MA VPU always runs in Fullscreen View. Only if the VPU is installed on a PC with a protection dongle (former grandMA Video application) the switching between Windowed and Fullscreen is relevant. Therefore you can use the 'Alt + Enter' key.

**Show Mode:** This mode avoids interruptions of the running show caused by manual operations of a user. It can be set by a channel in the Master layer or this button.

The following actions are performed:

- GUI is set to Fullscreen
- Thumbnails are not distributed to avoid network traffic
- Preview of the outputs of the VPU is set to Pause
- frame rate of the GUI Screen (if turned on) is limited to 10fps
- more details see release notes

If the Show Mode is set permanently (via control channel in the master fixture) the user cannot turn on the GUI of the VPU and the internal screen shows "Show Mode locked".

**Accept Blind:** (Only enabled if the 'FOH Features' in the Options Dialog is enabled)  
You can take or reject the 'Blind Preview' from the desk by selecting the appropriate check buttons. If the 'Blind Preview' is active, the button gets blue.

**Channels:** (Only enabled if 'Multi Preview' tab is selected)  
Toggle the Channel controls in the 'Multi Preview'.

**Rest Windows:** Rests the window layout of the 'Multi Preview' to the standard.

**Store Alignment:** Stores the alignment of the window layout on the local VPU (not in the showfile)

## 7.5 Status Bar

The status bar offers an overview about the system status:

Network Type: grandMA1 Connection State: Standalone Show: New Show Dongle: IP: 192.168.1.3 Ver: User: Administrator Fixture Layer: VPU Cam.Out 1: Camera 1 Cam.Out 2: Camera 2

Network Type: grandMA1 (1)

Type of network:  
grandMA 1 or grandMA 2

Connection State: Slave

Connection state in network:  
Not connected, Master, Slave or  
Sniffer as described in: 3.4 Connection  
States.

Show File: VIDEO TEST V1.3.4

Name of the showfile

Dongle: ✓

Shows the status of the dongle

IP: 192.168.1.2

Used IP address for MA Net

User: Administrator

User of grandMA show rights:  
,Restricted' or ,Administrator'

Fixture Layer: VPU

Shows the used fixture layer.  
You can switch the fixture layer via this  
drop down menu.

Cam.Out 1: Camera 1

Assign the VPU Camera (e.g. Camera  
1) to an Output. This function is  
identical to the former "Softedge ID".

## 7.6 Preview

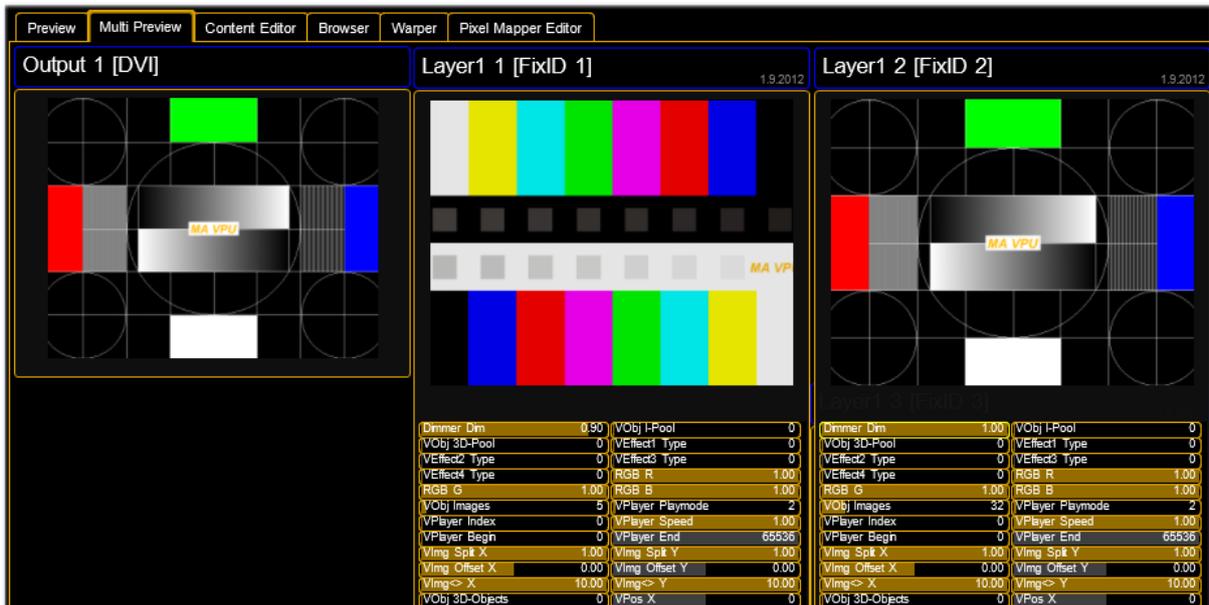
This view offers a preview of the resulting output video.



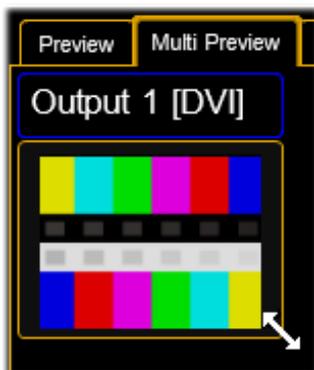
If you enter the tab, MA VPU receives the commands from the desk and shows the resulting output but in opposite to the Fullscreen view the menus, the toolbar and the status bar are also active.

## 7.7 Multi Preview

This View allows an overview of all layers, their effects and the resulting output:



The example above shows 2 layers with the resulting output picture for a single head output. Only one DVI Output is selected via the menu entry 'File - Settings – Display'.

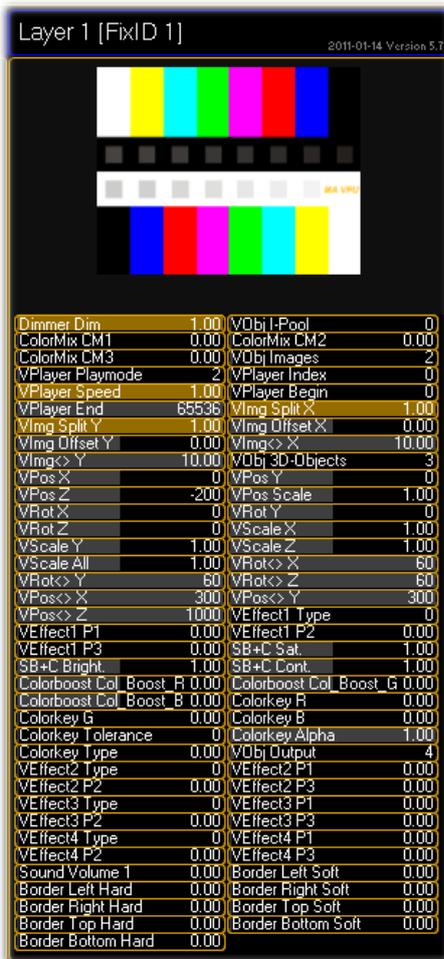


The size and position of the single windows can be changed via the left mouse button. You can reset or store the arrangement via the buttons in the toolbar:



**Reset Windows:** Resets the window layout of the 'Multi Preview' to the standard.

**Store Alignment:** Stores the alignment of the window layout on the local VPU (not in the showfile)



The content of each layer is shown in a small window.

The controls below allow watching the effect values for each channel in the layer. The horizontal bar in each control indicates the setting from 0...100 %.

Changing values are highlighted. Please note that these are no programmer values but all changes from the default values are indicated this way.

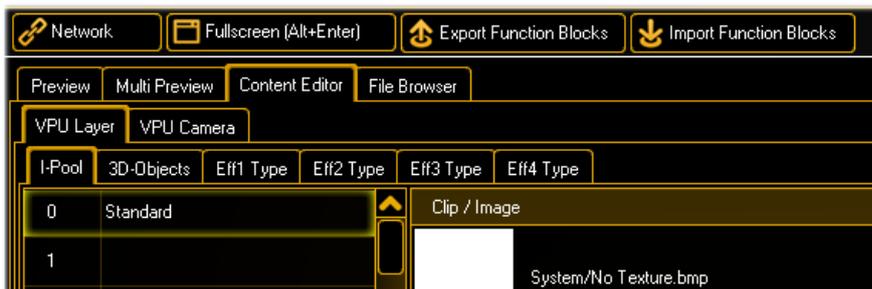
You can toggle the controls with the 'Channels' button in the toolbar: 

If the 3D-Object is a native object like '@Native.x' Scaling, Rotation and Position Z is not possible. This is indicated by a red hint 'native' in the title bar:



## 7.8 Content Editor

By selecting the 'Content Editor' tab this view is activated.



In this view you can edit the content for VPU Layer and VPU Camera e.g. videos images and 3D objects:

VPU Layer: 'I-Pool'; '3D-Objects' and 'Eff Type'

VPU Camera: 'Images', 'Eff Type' and '3D-Objects'

### Content Redirection



If your content has moved to another location you can redirect the search folder e.g. from drive "D:" to drive "E."

The redirection is indicated by a button in the toolbar and can be switched on or off

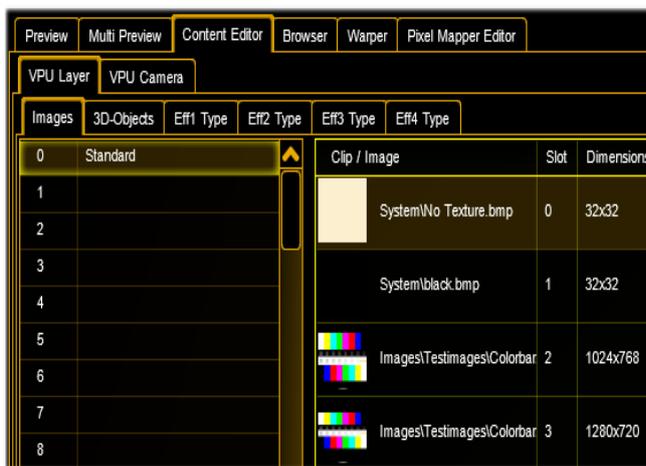
### 7.8.1 Content: Images (I-Pool)

MA VPU comes with a sample library containing images, gobos and video clips. This content is preinstalled on the VPUs and can be ordered from MA Lighting.

Similar to the magazine of a slide projector such a folder behaves like a slide magazine. Up to 255 folders can be accessed directly from the desk. The different images and videos of a folder correspond to the 'Channel Sets' of the desk and can be accessed from there.

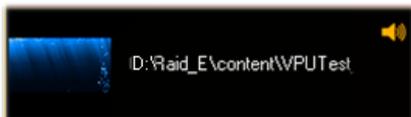
To insert images and videos click with the right mouse button somewhere in the 'I-Pool Folder' or 'Channel Functions' field and navigate in the upcoming dialog to the folder where the images and videos are located. It is not recommended to use an external drive for the content, we recommend to copy the files to the content drive D:.

After the selection of the folder and confirming with 'OK' it will take a while until the images are shown because MA VPU has to build a so-called thumbnail (little image) for all items. Therefore each file has to be opened and searched for a usable picture.



Items can be edited, changed or deleted via the context menu of the right mouse button. Data of the items like size, framerate and length are shown in a grid. If an item is selected its preview is shown in the preview window at the lower left side of the screen.

Multiple items can be selected if you hold down the 'Ctrl' key while selecting items or use the mouse as a lasso. Hotkeys, 'Ctrl' + x,c,v (Cut, Copy, Paste) and 'delete' are allowed.



Video clips do have a video thumbnail showing the first frame of this clip. If the clip contains sound this is indicated by a yellow speaker icon.

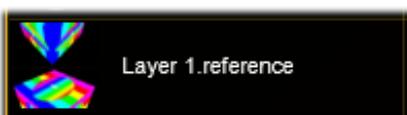
If the clip is selected you can see a preview in the left corner below.



If a clip does not fulfill the content specifications this will be indicated by a red blinking text and an exclamation mark and cannot be previewed.

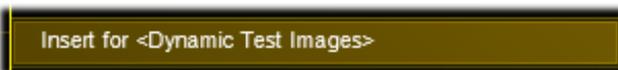
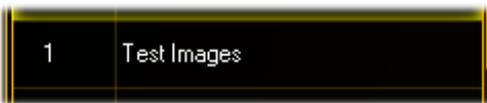


Sound only files like mp3 or wav are displayed with a speaker icon.



Layer Reference: This allows any Layer to take the output of another layer as input. This saves performance because a video must not be decoded twice.

**Note:** Only the video itself if feed into the other layer, not the changes in



### Export and Import Function Blocks



With this function it is easy to change Fixture Types of old shows without losing content information or manually inserting it again.

1. Export Function Blocks
2. Exchange Fixture Type
3. Import Function Block again
4. The show can go on!

colour or effects etc.

To assign a new folder to a ,Channel Function' click with the left mouse button into a line.

A context dialog appears. After selecting the entry a browser window appears where you can navigate to the folder containing the videos.

If the switch 'Global VPU Settings' 'Slot 1or 2 default content' is selected a white or black image is inserted always at the first position.

After the selection of the folder its name is taken as a name for the ,Channel Function' as shown in this example ,Test Images'. You can change the name via the context menu with the right mouse button

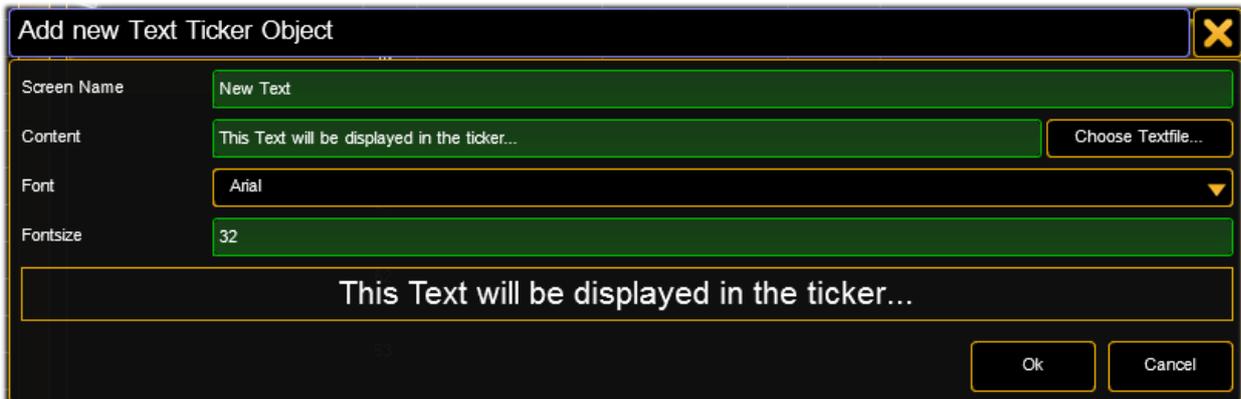
### Insert **Dynamic Test Images**

This function generates 10 different Testimages related to the connected outputs ratio and inserts them in to the last slots. These images can be used to adjust the output geometry and colors.

**Note:** To get the 1:1 pixel correct display of the test pattern make sure to use the @Native Object only!

## 7.8.2 Text Ticker

Text Ticker Elements can be inserted into free content slots. Do a right mouseclick into the 'Clip/Image' column slot. The following dialog appears:



**Screen Name** Name of the Channel Set in the Console

**Content** Text that is displayed in the VPU  
/n creates a new line

**Choose Textfile...** Browse to a text file (\*.txt)  
This text file is part of the Content Distribution triggered from the grandMA2 console if "Distribute Show Content" is selected. Be sure that it is available on all VPUs in the session in the same location as any other content.

**Font:** Choose the font types that are included

**FontSize:** Choose the size of the displayed text

Already created Text Ticker items can be adjusted by using the option "edit" in the context menu. To Display the Text Ticker item on screen, simply select it via the IPool / Image Channel.

Four attributes allow the use of the text ticker:

- Compos Type: Choose how the Text Ticker is animated
- Compos Speed: Choose how fast the animation is done
- Compos P1: Choose how long the pause in the middle of the animation is
- Compos P2: For Future Use (currently not implemented)

The animation can be edited via the grandMA2 command line (incl. import and export).

The animations are based on keyframes. They can be adjusted or new frames can be added.

They are located in the PixelMapperContainer/Videocompositioncontainer.

### 7.8.3 Content: 3D Objects

The tab '3D-Objects' shows the projection objects of the layers.

In the simplest case a layer contains a 2D plane object. This is a canvas where images or videos are shown like on a TV screen. But this screen mustn't be flat. You can use 3D boxes, cones or other 3 dimensional objects to render your images or videos.

The fileformat is DirectX with the file extension '.x' see chapter 12 Creation of customized 3D Objects.



Items can be edited, changed or deleted via the context menu of the right mouse button.

Data of the items like name and size are shown in a grid.

To assign a new item insert a 'Channel Set' via click with the right mouse button.

#### 3D object definitions:

If you use objects with the extension „@r“ like „Plane@r.x“ the aspect ratio of the object fits automatically to the aspect ratio of the texture (Ratio of width / height e.g. 16/9).

So we recommend using this object (Plane@r.x) for the easy projection of videos.

Objects with the extension „@2D.x“ are displayed as 2D Plane exact in that dimensions that are given by the used texture. This happens exactly as determined by the texture. Via the position parameter these objects can be moved. Rotation and scaling are blocked because the pixel precise displaying won't work in that case. See example object PixelExact@2D.x.

**@Native.x:** pixelexact keeps image resolution. Scaling, Rotation and Position Z not possible as this is a 2-dimensional object with defined size (defined by image resolution!).

**@Output.x:** scales to full output resolution and ignores ratio. Scaling, Rotation and Position Z not possible as this is a 2-dimensional object with defined size (defined by output resolution!).

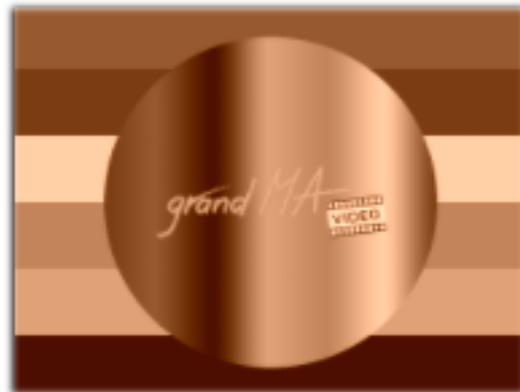
**@OutputR.x:** scales to full output resolution and keeps image ratio (Letterbox). Scaling, Rotation and Position Z not possible as this is a 2-dimesional object with defined size (defined by output resolution!).

### 7.8.4 Content: Eff1 Type...Eff4 Type

The tabs 'Effect Type 1...4' show the possible effect types for the layers (Video and Master):



The effect engine is based on the Direct3D standard. Effects are defined within .fx files. An effect file is a text file with an .fx extension. It defines how something is to be rendered. It includes state information along with vertex and shader declarations. The shader code is written in HLSL (High Level Shading Language). The following example shows the assignment of a sepia effect the test image:



MA VPU comes with a default setup of effect files.

New effect files can be added to the ,Channel Set' via the context menu in the 'Effect Type' view with the right mouse button.

Examples:

Despite Ocean and Water Effect others only use 1 parameter (1 Encoder Wheel)

**Water**

- Par1 Circulation
- Par2 Intensity
- Par3 Speed

**Ocean**

- Par1 Amplitude
- Par2 Wavecount x
- Par3 Wavecount y

## 7.9 File Browser

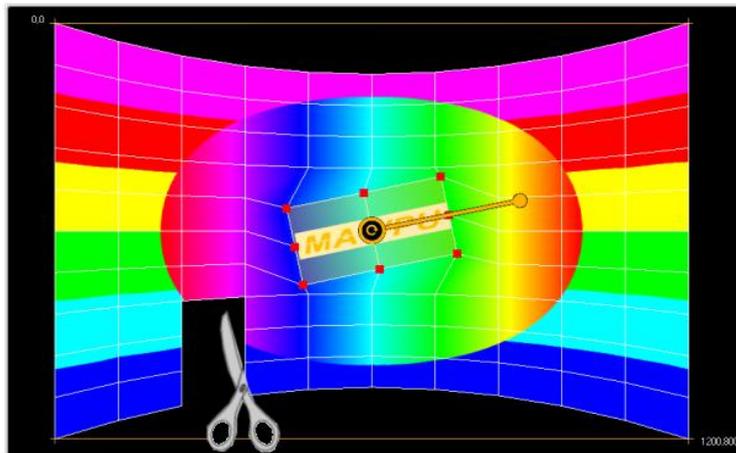
With the File Browser you can import content from external hard drives or USB into the VPU or move content to drive D: or wherever by a simply drag & drop. You can delete and rename files or folders and create new folders.

**Note:** Known issue that you cannot drag and drop on Touch Screen without using mouse.



## 7.10 Warper

The Warper enables you to warp or straighten out the image output on a bended area, stretch, shrink and rotate selected parts of the image and cut out parts of the projection:



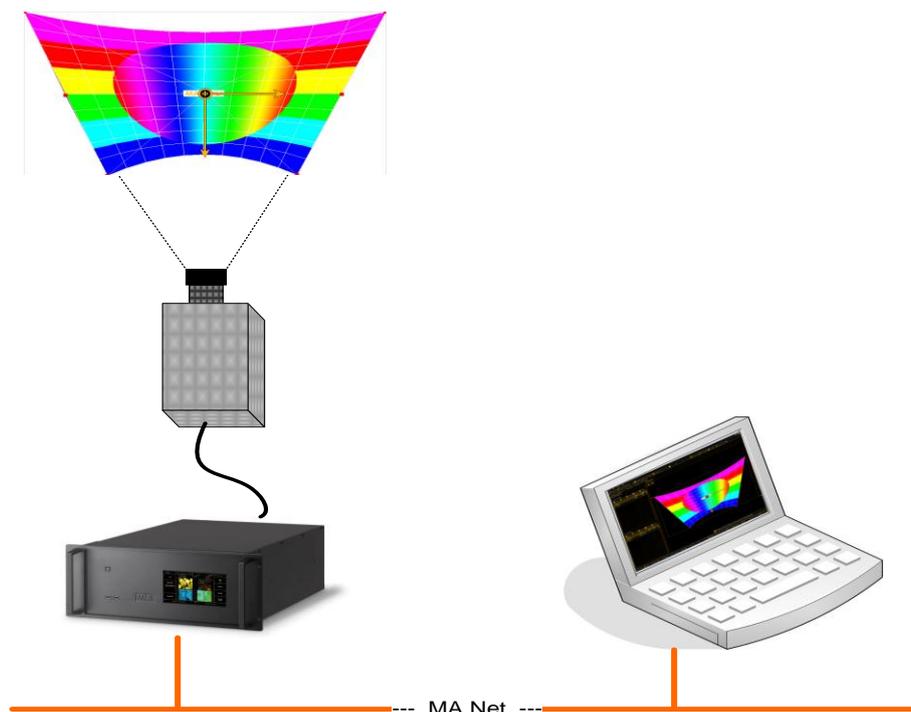
### 7.10.1 Warper Fullscreen View

You can toggle the GUI (via Ctrl + Enter) and watch the manipulated output in real-time while dragging the image into the right position of the projection screen.

Editing the warper objects can be done on the VPU machine simultaneously in the Warper Window and the Warper Fullscreen View. Or the VPU is remote controlled by another VPU PC that is connected via MA-Net. In both cases the warped output can be checked in real time:

VPU with image output

Laptop to operate the Warper



### 7.10.2 Basic Operation

The Warper functions can be configured via the tab 'Warper':



**Note:**

The Warper only works in grandMA 2 mode!



In the 'Warper Settings' you can define a Warper object. It is handled by the VPU like the other 3D Objects but it only has 2 dimensions X and Y.

This object should have the dimensions of your output resolution e.g. 1200 x 800 pixels.

**Note:** The Warper output is not pixel accurate because he has to interpolate the output image.

Warper 3D Objects can contain several meshes. These meshes divide the projection area into several parts that are defined in the window 'Warper Meshes'.

E.g. if your projection area is only one big bended plane you only need one mesh.

If the area is splitted into different objects it favorable to use different meshes for these objects e.g. if the projection plane is covered with a box you can define a separate mesh for this box, put this box in font position and edit the characteristics.



Meshes even can overlap. To define the order use the context menu:



If a Warper 3D Object is created a dialog comes up to describes the mesh:

Field	Value
Name	upper right
Center X [Pixel]	900.000
Center Y [Pixel]	200.000
Resolution X	10
Resolution Y	10
U From [Pixel]	600.000
U To [Pixel]	1200.000
V From [Pixel]	0.000
V To [Pixel]	400.000

Note: Resolution X\*Y should not exceed 128\*128 ( 16384 )

Meshes can be edited always via a doubleclick into the graphic view on the mesh or the mesh list table.

All coordinates refer to the origin 0,0 in the upper left corner.

**Name:**

Enter a name for the mesh

**Position X/Y (Center X/Y):**

If a mesh is created with 'Add' it is placed to the position (0,0). If the mesh is edited later the entry describes the center of the mesh in X/Y coordinates of the 3D Object in pixel.

**Resolution X/Y:**

Describes the grid resolution of the mesh.

The grid divides the mesh into faces that can be manipulated.

The resolution is limited to 128x128

**U From, To:**

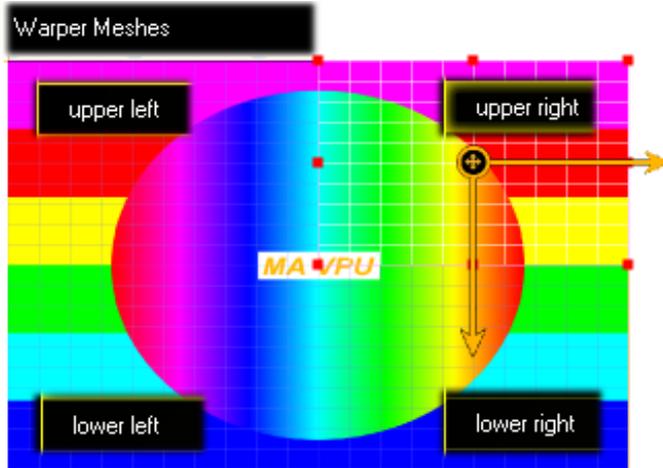
**V From, To:**

Describes how the original image is mapped on the map.

If the U and V values are higher than the resolution of the image, the image is tiled like the VImg Split effect in the layers.

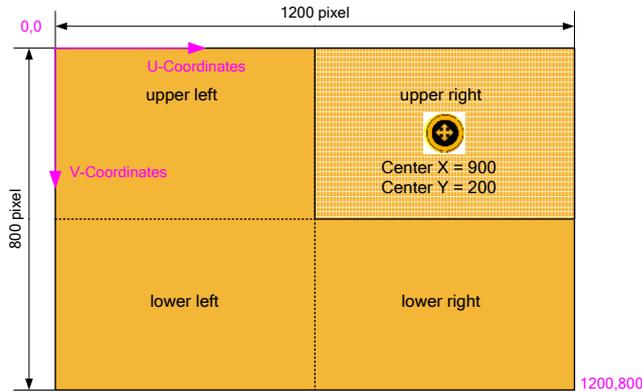
**Example**

The projection plane is divided into 4 even planes:



This Warper 3D Object is tiled into 4 meshes:  
 - upper left  
 - upper right  
 - lower left  
 - lower right

Placement of the 4 meshes:



The output image can be placed on the meshes. The coordinates of the output image are described via the U/V coordinates. The origin (0,0) of the U/V coordinates is in the upper left corner of the image.

### 7.10.3 Warping

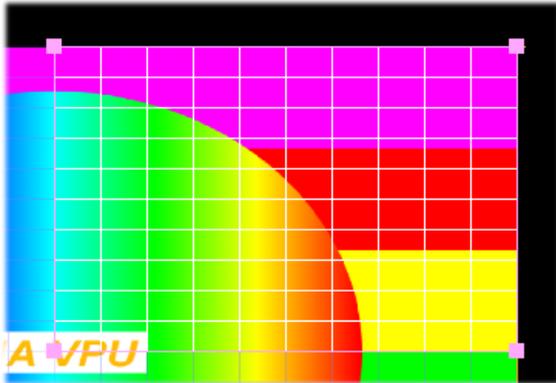
If the Meshes are defined the image can be warped.

The outer frame of the mesh can be edited in the 'Bezier Mode'.

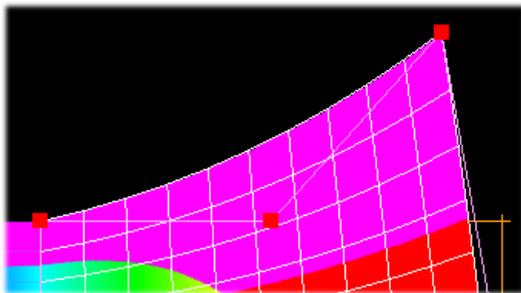
The inner points or faces can be edited in the 'Grid Mode'.

Switching between the modes can be done via the context menu with a right mouse click.

#### Bezier Mode – the outer frame can be edited

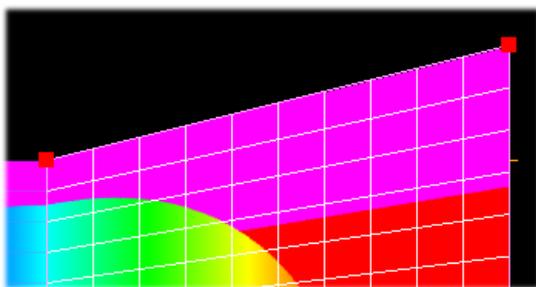


The mesh is tiled into a grid with a resolution of X/Y points. The resolution can be increased via the context menu with the right mouse button or edited in the list directly.



Manipulate the outer frame of the mesh by dragging the red marked points.

This example shows a **Bezier function**



This example shows a **Linear function**

You can switch between the functions via the right mouse click context menu:



#### Grid Mode – inner points and faces can be edited

The Grid Mode offers a more detailed adjustment of the output frame.

The grid is a uniform distribution of the mesh into rectangles.



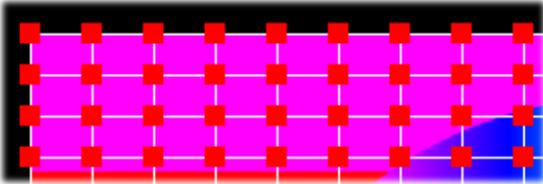
4 points in the grid describe a face.

The resolution of the grid is limited to 128x128.

To change into the Grid Mode do a right mouse click on the preview:

Convert Object to Grid Mode

All points in the preview are selected:



The toolbar shows how the points can be selected:



Fullscreen [Alt+Enter]

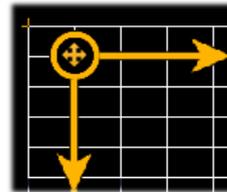
Switch to the Fullscreen View [Media PC] (Alt + Enter), toggle GUI [VPU] (Shift + Enter)

Toggle Warper GUI [^Enter]

Toggle the Warper GUI (Ctrl + Enter)  
Useful to manipulate the output in real time.  
It is like the Fullscreen View but the grid and selected points are visible and can be manipulated in real-time.

Control [C]

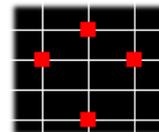
Switches the control on or off.  
The manipulation of the selected points can be done via this control.



Only active in Grid Mode

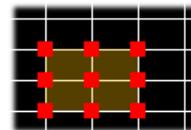
Point

Select single points in the grid.  
Multiselection of points can be done while holding the Ctrl button down or dragging the mouse over the points.



Faces

Several connected points form a face (area).



Rows

Select all points in a row.

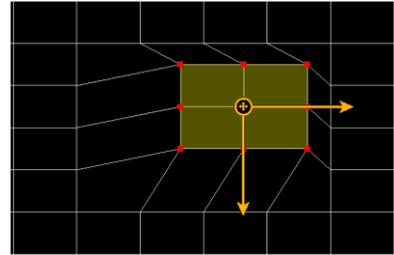
Columns

Select all points in a column.

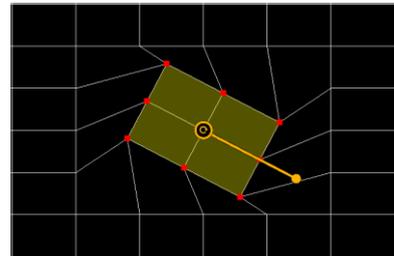
If the points are selected they can be manipulated via the control symbol. Therefore the control must be switched on and the mesh has to be switched into the Grid Mode.  
To delete faces use the context menu 'Delete selected Faces'.



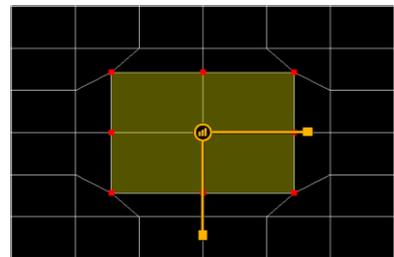
Move the selection:



Rotate the selection:



Scale the selection:



**Note:** To increase or decrease the mouse resolution hold the 'Shift' or the 'Ctrl' button



Undo or redo the last action.



This warning appears if unknown 3D Warper Objects are found, e.g. 3D Warper Objects have been created in another show. To use them the channel functions have to be updated first.

If all manipulations are done you can switch to the Bezier Mode:



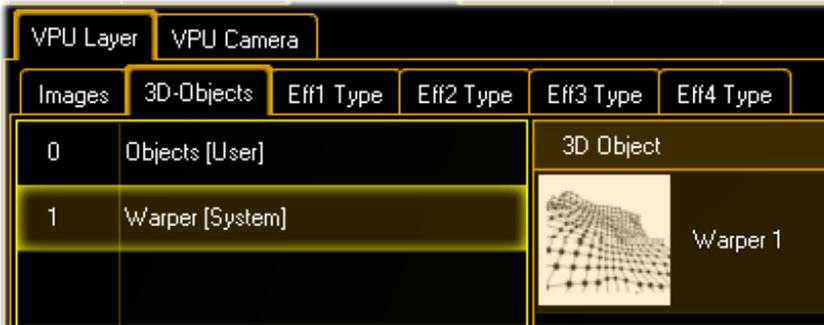
This converts the object into a 3D Object.

**Note:**

Switching back from Grid- to Bezier Mode forces a recreation of the 3D vertex data (a new 3D Object is build). The manually changes of the points are lost because they are converted into vertex data! This is always announced via a warning dialog.

### 7.10.4 Use of Warper 3D Objects

The 3D Warper Object can be used in the VPU- **and** the Camera Layer as well.



The resulting Warper 3D Object is available in the 3D-Objects folder.

It is stored in the channel set of the VPU fixture type.

**Note:**

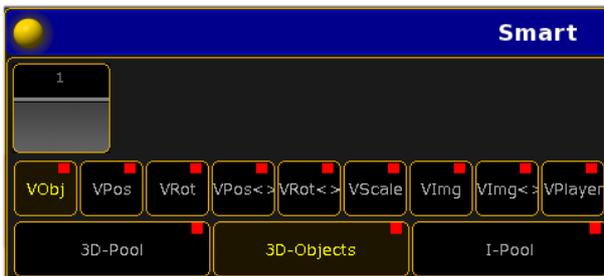
It is recommended to change your existing fixture type to work with the Warper 3D Objects.



Warper 3D Objects can be imported and exported via the right mouse button context menu.

#### Reuse of Warper 3D Objects

If Warper 3D Objects have been created and would be used in another show the channel functions have to be updated.



The desk shows the Warper in the 3D-Pool but no Warper 3D-Objects are visible...

This is indicated by a blinking button in the VPU toolbar:



Press the button on the VPU toolbar to update the Channel Functions.



After pressing the button the Warper 3D-Objects are shown in the Smart View of the desk and can be used.

## 8 Features Attributes and Functions

To explain the layer effect engine it is illustrative to imagine MA VPU as a model of a several movable cameras where every camera looks at a layer object like a 2D plane or a 3D cube.

In these examples an image may be a texture (picture), or a video.

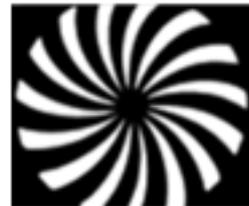
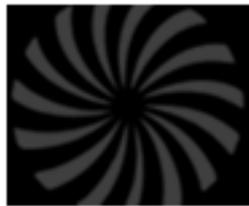
### VPU Layer:

Layer Features and Attributes	Example with values in %	
<b>Dimmer</b> <b>Dimmer</b>	Dimmer <b>50 %</b>	Dimmer <b>100 %</b>

Dimmer function.

To facilitate fading between different layers the dimmer controls the transparency of an object.

If the dimmer is 0 the object is transparent and the projection is invisible. If the dimmer is "full" the object is opaque and you can only see the front layer (front Z-position)



Layer Features and Attributes	Example with values in %
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**Color**

**ColorMix** (CM1; CM2; CM3)

Color (0,0,0)

Color(0,0,100)

Tint the output with the CMY(Cyan; Magenta; Yellow ) color mixer

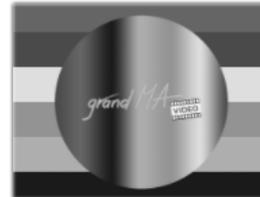


**HSBC**  
(Hue Saturation Brightness + Contrast)

SBC (0,50,50,50)

SBC(0,0,50,50)

Set, Hue (position in the color space), Saturation, Brightness and Contrast of a layer



**Colorkey**  
(R; G; B; Tolerance; Alpha; Type)

Layer 2  
Key R,G,B (100,0,0)  
Tol R,G,B (10,0,0)

Set the transparency for the foreground object.  
For each RGB channel the value and tolerance can be set separately.  
First select the color then set the tolerance.  
The switch 'Alpha' decides if the pixel gets complete transparent or opaque in dependency to the color key.

The switch 'Type' decides if the calculation is done in the RGB (Red Green Blue) or HSB (Hue Saturation Brightness) model.

Image Layer 1



Image Layer 2



Resulting Output Image



Layer Features and Attributes	Example with values in %	
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**Colorboost** (ColBoost-R; -G; -B)    ColBoost (50,50,50)    ColBoost (0,0,**100**)

Manipulate the intensity of red, green or blue color of the image seperately.



### Borders

#### Borders

(Left Hard, Left Soft, Right Hard...Top Hard, Top Soft)

soft borders

hard borders

Borders can be used for realizing PiP (picture in picture) applications. Softborder works with alpha channels so that the layer underneath can even shine through the top layer to merge the layers.

For example first cut the layer to a smaller size (which is NOT scaling!) and then create a soft edge by using the soft parameter for the respective side of the layer. This makes the layer underneath shine through (see picture).



Layer Features and Attributes	Example with values in %	
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**Video**

**VObj (3D-Pool)**

3D Standard Object

3D Warper Object

Select between the Standard- and Warper 3D objects

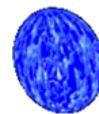


**VObj (3D-Objects)**

cross

sphere

Select an 2D or 3D object on which surface the image or video is shown



**VObj (Transistion Type)**  
**Single Layer Transistion**  
**Note:** (grandMA 2 only)

Select a fade effect between images on the layer.



**VObj (Transistion Time)**  
 Enter the fadetime between the images or '0' for the cuetype.

**Note:**  
 If the value is set to '0' the cuetype is taken!

The transistion time can be set from 0....3600 seconds

**VObj (I-Pool)**

Pool ,**Standard**' selected

Pool ,**Video Test2**' selected

Selection of the 'I-Pool'.  
 One ,Pool' can contain up to 255 images or videos

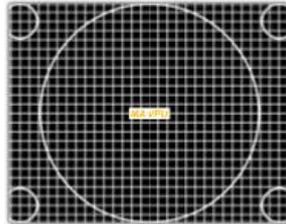


Layer Features and Attributes	Example with values in %	
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**VObj (Images)**

Choose the image or video from the selected 'Pool'

**Image 1**



**Image 2**



**VObj (Output)**  
(**obsolete** from Fixture Type V7)

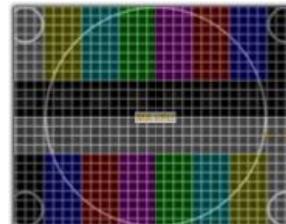
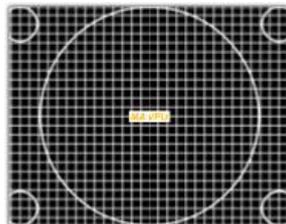
Choose output for the Layer e.g. the Layer 1 is only visible on output 1

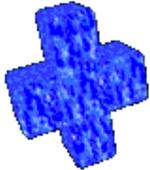
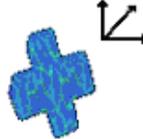
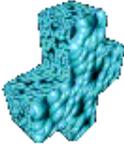
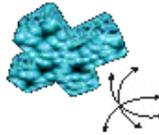
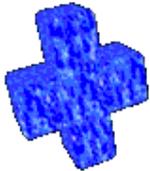
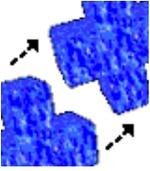
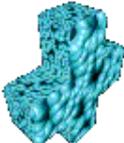
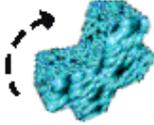
**Camera Cam1...Cam(n)**  
(from Fixture Type V7 on)

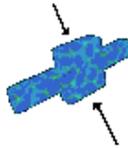
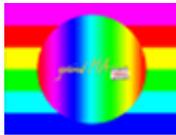
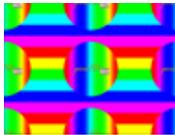
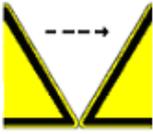
Output 1 with 2 Layers but Camera **Cam 1 = 0 % on Layer 2**

Output with 2 Layers of Image 1+2 with Camera **Cam 1 = 50 %**

For each Camera Output Layer the transparency can be set continuously from visible up to invisible



Layer Features and Attributes	Example with values in %	
<p><b>VPos</b> (X; Y; Z ; Scale) Scale modifies the range of X ;Y ;Z</p>	<p>X= <b>50%</b>; Y=<b>50%</b>; Z=<b>50%</b></p>	<p>X=<b>25%</b>; Y=<b>25%</b>; Z=<b>25%</b></p>
<p>Positioning of the projection object in X; Y; Z - direction</p>		
<p><b>VRot</b> (X; Y; Z)</p>	<p>X=40%; Y=<b>60%</b>; Z=50%</p>	<p>X=40%; Y=40%; Z=40%</p>
<p>Rotate the projection object around the X; Y; and Z-axis</p>		
<p><b>VPos &lt;&gt;</b> (X; Y;Z)</p>	<p>X= <b>50%</b>; Y=50%; Z=50%</p>	<p>X= <b>60%</b>; Y=<b>60%</b>; Z=50%</p>
<p>Animate continuous moving of the projection object in X; Y and Z - direction</p>		
<p><b>VRot &lt;&gt;</b> (X; Y;Z)</p>	<p>X= 50%; Y=50%; Z=<b>50%</b></p>	<p>X= 50%; Y=50%; Z=<b>60%</b></p>
<p>Animate continuous rotation of the object around the X; Y and Z - axis</p>		

Layer Features and Attributes	Example with values in %	
<b>VScale</b> (X; Y; Z ; All)	X= 50%; Y= <b>50%</b> ; Z=50%	X= 50%; Y= <b>30%</b> ; Z=50%
Scale the dimensions of the object in X; Y ;Z direction		
<b>VImg</b> (Split X; Split Y)	Split <b>X 0</b> ; Split <b>Y 0</b>	Split <b>X 2</b> ; Split <b>Y 2</b>
Split the image or video in X and Y		
<b>VImg</b> (Offset X; Offset Y)	Offset <b>X=0</b> ; Offset Y=0	Offset <b>X=50%</b> ; Offset Y=0%
Offset of the image or video		
<b>VImg</b> ↔ (X; Y)	X= <b>50%</b> Y=50%;Z=50%	X= <b>60%</b> Y=50%; Z=50%
Animate continuous scrolling of the image or video on the object		

Layer Features and Attributes	Example with values in %	
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<b>VPlayer</b> (Playmode Speed; Begin; End; Index) (Only for videos)	Frame <b>100</b>	Frame <b>200</b>
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**Playmodes:**



**Frame Index:** Select a single frame with the Index channel

**Play:** Starts the Video once forward from the beginning to the end

**Stop:** Stops immediately

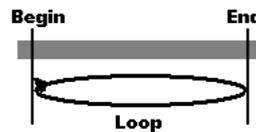
**Pause:** Pauses

**Resume:** Continues after Pause (even with the Looping)

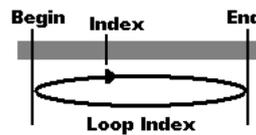
**Play Index:** Plays the video from the indexes frame which has to be set first



**Loop:** Starts the video endless looped forward from the beginning



**Loop Index:** Loops around the frames index which has to be set first



Layer	Example
Features and Attributes	with values in %



**Play Ignore Dimmer:**

**Loop Ignore Dimmer**

**Loop Index Ignore Dimmer:**

**Play Index Ignore Dimmer:**

**Pause Ignore Dimmer:**

These modes start/pause the video and keep on playing regardless if the dimmer is on or zero

**VPlayer (Speed)**

modify the playback speed

**VPlayer (Begin)**

Set an inpoint

**VPlayer (End)**

Set an outpoint

**VPlayer (Index)**

Select a frame index

**Pause Ignore Restart:**

Pauses the video at the very frame that is played back in the moment Pause Ignore Restart is executed. If any playmode is executed afterwards, then the video will carry on playback from the point Pause Ignore Restart was executed. If a playmode is chosen that respects the index position, the index position is ignored as well.

Layer Features and Attributes	Example with values in %	
<b>VEffect 1...4</b> (Eff Type; Eff Part)	Eff Type = 0	Eff Type = Sepia
Several effects based on the Direct3D standard can be selected. Effects are defined within .fx files as described in 7.8.4 Content: Eff1 Type...Eff4 Type.		
<b>Sound</b> (Volume)	SndVol = <b>0%</b>	SndVol = <b>100%</b>
Control the sound output for video files with a soundtrack	Sound is off	Sound is on

**Master Features and Attributes**

**Example Fullscreen View**

**Beam**

**Iris (Iris)**

Iris = 10 %

Iris = 80%

Open or close the Iris



**Control**

**Control (CTRL)**

Multi Preview

Fullscreen View

The Control channel of the Master Layer is used to switch to the Fullscreen View or to shut down the VPU via the desk. These functions are available as buttons in the Smart View:

- No Operation: ---
- Shutdown: Shutdown VPU
- Restart: Restart VPU
- Fullscreen: GUI off
- Windowed: GUI on
- Sniffer Mode: Sniffer mode (only GMA 1)
- Slave Mode: Slave Mode (only GMA 1)
- Enter PM: Start Pixelmapper
- Leave PM: Leave Pixel Mapper
- Clear cache



**Master** Features and Attributes

**Example Fullscreen View**

**Shapers**

**Shaper**

(1A; 1B; 2A; 2B; 3A; 3B; 4A; 4B  
Blades)

1A=0; 1B=0; 2A=0;  
2B=0; 3A=0; 3B=0;  
4A=0; 4B=0 %

1A=30; 1B=0; 2A=30;  
2B=0; 3A=30; 3B=0;  
4A=30; 4B=0 %

With the beam shapers the  
resulting image can be masked  
variable with four shapers each  
with 2 channels A and B.  
With the Blade switch shapers  
can be switched on or off.



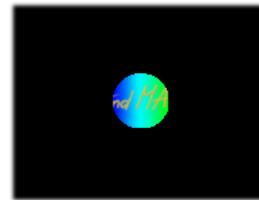
**Video**

**VObj (Image)**

Image = no Image

Image = Circle

Select the image for the iris  
mask



**Note:** Camera effects manipulate the complete output signal:

**Camera Features and Attributes** Example with values in %

**Color**

**Colorboost** (ColBoost-R; -G; -B) ColBoost (50,50,50) ColBoost (0,0,**100**)

Manipulate the intensity of red, green or blue color of the image separately.

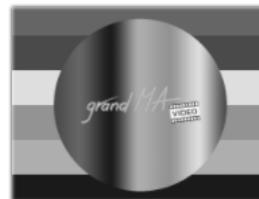


**HSBC**  
(Hue **S**aturation **B**rightness + **C**ontrast)

SBC (0,50,50,50)

SBC(0,0,50,50)

Set, Hue (position in the color space), Saturation, Brightness and Contrast of a layer



**Beam**

**Iris** (Iris)

Iris = 10 %

Iris = 80%

Open or close the Iris



**Camera Features and Attributes** Example with values in %

**Shapers**

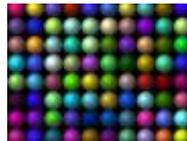
**Shaper1**

(1A; 1B; 2A; 2B; 3A; 3B; 4A; 4B)

1A=0; 1B=0; 2A=0;  
2B=0; 3A=0; 3B=0;  
4A=0; 4B=0 %

1A=30; 1B=0; 2A=30;  
2B=0; 3A=30; 3B=0;  
4A=30; 4B=0 %

With the beam shapers the resulting image can be masked variable with four shapers each with 2 channels A and B



**Video**

**VObj** (Images)

Image = no Image

Image = Circle

Select the image for the iris mask

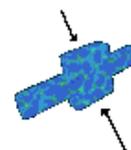
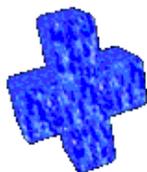


**VScale** (X; Y; Z ; All)

X= 50%; Y=50%;  
Z=50%

X= 50%; Y=30%;  
Z=50%

Scale the dimensions of the object in X; Y ;Z direction



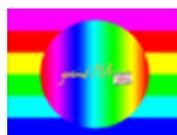
**VImg** (Split X; Y Offset X; Y)

Split X 0; Split Y 0

Split X 2; Split Y 2

Split the image in X and Y  
Split offset of the image.

This offset can be understood as the Point of View (PoV). By using this function the perspective doesn't change. Try this with the cube and you will clearly see the difference!



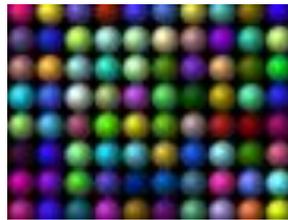
**Camera Features and Attributes** Example with values in %

**VCamPos** (X; Y; Z)

X=50%;Y=50%;Z=50%

X=46%;Y=52%;Z=54%

All layer views are mixed up to one view for the main cameras whose images are send to the physical outputs. These imaginary cameras can be moved to show only parts of the whole image. So several applications can be connected together to project a huge image. If the camera position moves the perspective changes: Take a cube, rotate it a bit and then move the camera. You can see that the perspective changes - you can see that the „world’s“center is still the centre of your monitor.

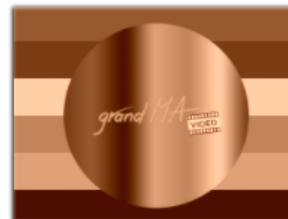


**VEffect 1...4** (Eff Type; Eff Part)

Eff Type = 0

Eff Type = Sepia

Several effects based on the Direct3D standard can be selected. Effects are defined within .fx files as described in 7.8.4 Content: Eff1 Type...Eff4 Type.



**3D Key** (PosX;Y;Z Rot X;Y;Z Scale X;Y;Z; All)

Select a 3D object for the camera. This is useful to manipulate the complete output e.g. for projecting on a cyclorama or display all layers on a sphere.

**Camera Features and Attributes** Example with values in %

**Keystone**

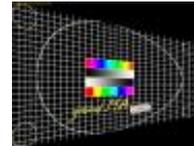
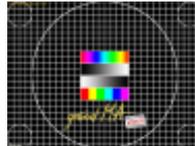
(1A,; 1B; 2A; 2B; 3A; 3B; 4A; 4B)

1A=0; 1B=0; 2A=0;  
2B=0; 3A=0; 3B=0;  
4A=0; 4B=0 %

1A=0; 1B=0; 2A=0;  
2B=30; 3A=0; 3B=0;  
4A=0; 4B=30 %

All layer views are mixed up to one view for the main camera.

Each edge of this view can be moved towards the opposite edge to generate a keystone effect.



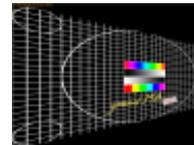
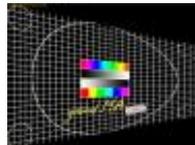
**Keystone Corr.**

(Corr X.; Corr Y)

X Corr. = 0 %;  
Y Corr. = 0 %

X Corr. = 75 %;  
Y Corr. = 0 %

If a picture is projected distorted on a surface, a perspective correction is necessary to distribute the content on the surface correctly.

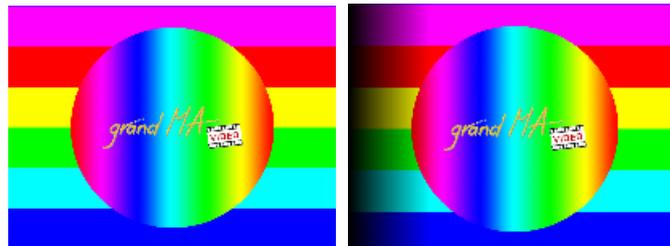


Therefore the distribution of the picture content can be manipulated in X- and Y-direction.

**Camera Features and Attributes** Example with values in %

<b>Softedge</b> (1A,; 1B; 2A; 2B; 3A; 3B; 4A; 4B)	1A=0; 1B=0; 2A=0; 2B=0; 3A=0; 3B=0; 4A=0; 4B=0 %	1A=0; 1B=0; 2A=50; 2B=0; 3A=0; 3B=0; 4A=0; 4B=0 %
---	--	---

If several projectors should show one common image, the borders must be cross faded. For every border one channel for the position and one channel for the dispensation of the black wedge exist. This example shows a soft edging for the left border of the image.

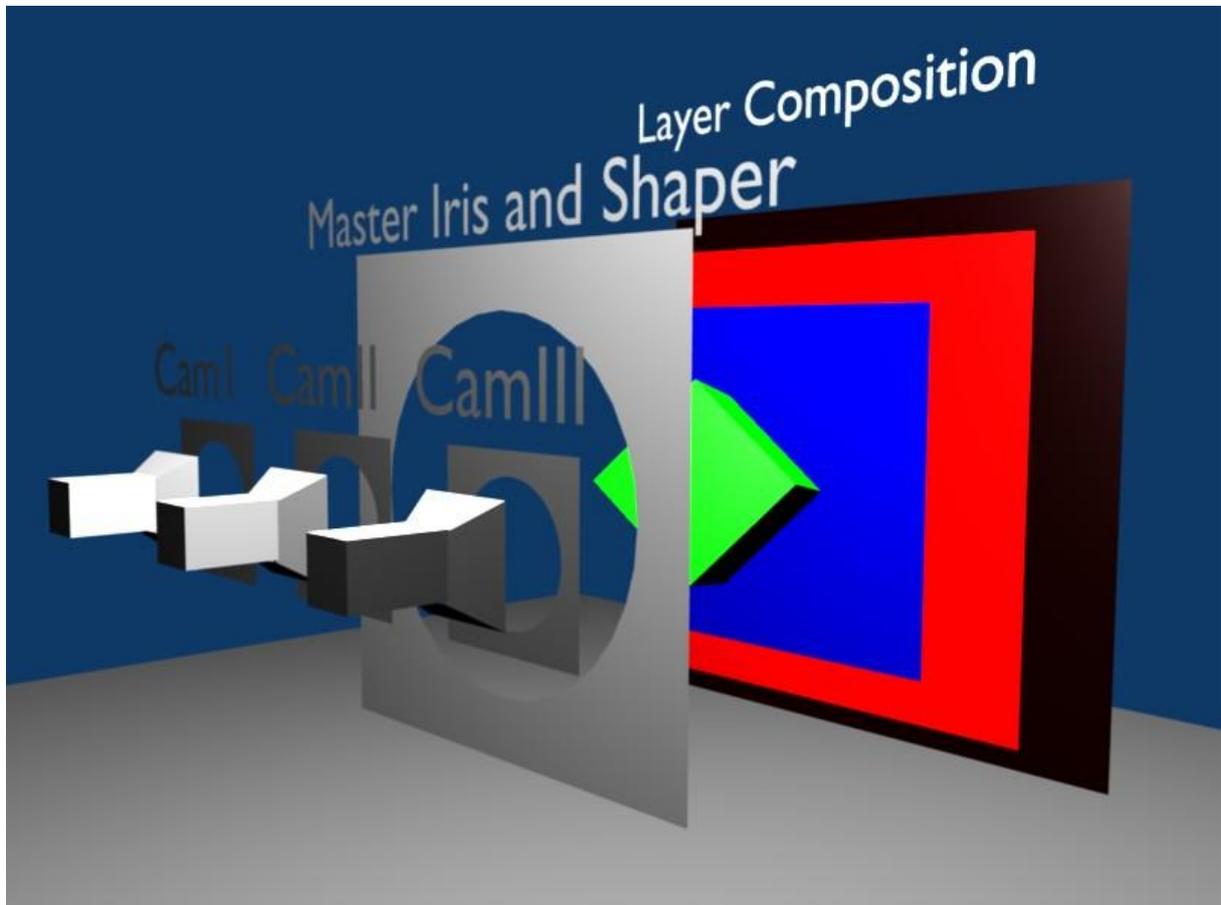


**Splitscreen** (Offset X; Offset Y)

Changing the X or Y offset doesn't change the point of view. Camera axis stays on the view. Camera axis stays on the object axis. This is different from VCamPos.

## 8.1 Order of Effect Execution

The following image shows the virtual arrangement of the cameras to the master layer, and the 3D object:

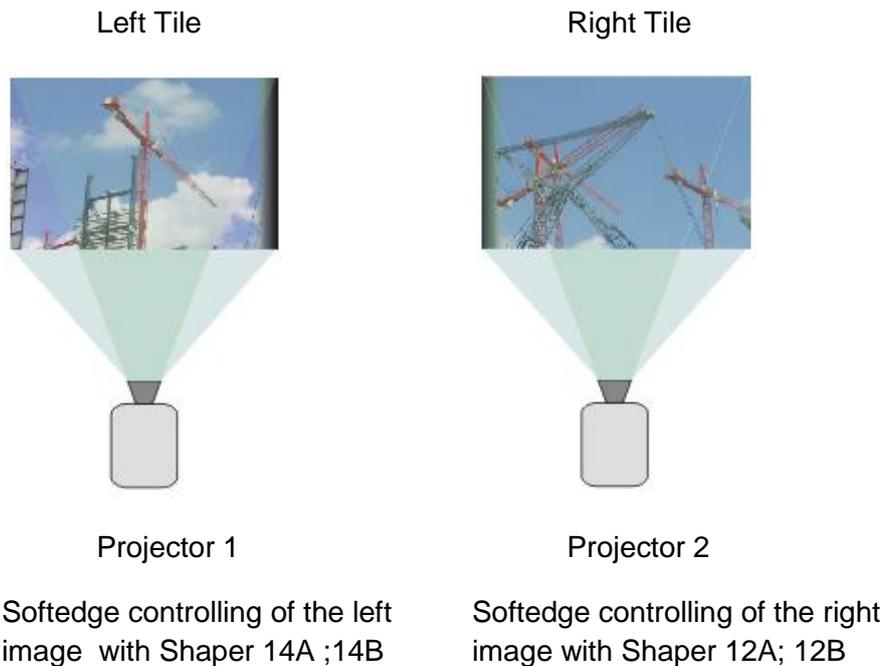


Effects are executed in the following range (top-down):

- Texture Color
- Color Key
- Effects ( SW or Sepia or stuff like that )
- RGB Values (**R**ed **G**reen **B**lue)
- Color Boost
- Saturation
- Contrast
- Brightness
- Dimmer
- Alpha

## 9 Softedging

Softedging or Soft Edge Blending is a technique to split a complete picture into several smaller tiles. Therefore the margins of the flanking edges overlap. Inside the overlapping range both images show the same content, but with decreasing brightness to the borders. MA VPU supports this technique for videos and images. This is realized via four controllable grayscale (gray wedges) at the borders of the image. Position and distribution of the grayscale are controlled by the grandMA desk with each two channels:



Projection of the complete Image



The following example shows the functionality of the Softedge control channels:

Out Layer Softedge  
Shaper 12A = **0 %**  
Shaper 12B = 0%



Out Layer Softedge  
Shaper 12A = **100 %**  
Shaper 12B = **0%**



Out Layer Softedge  
Shaper 12A = 100 %  
Shaper 12B = **50%**

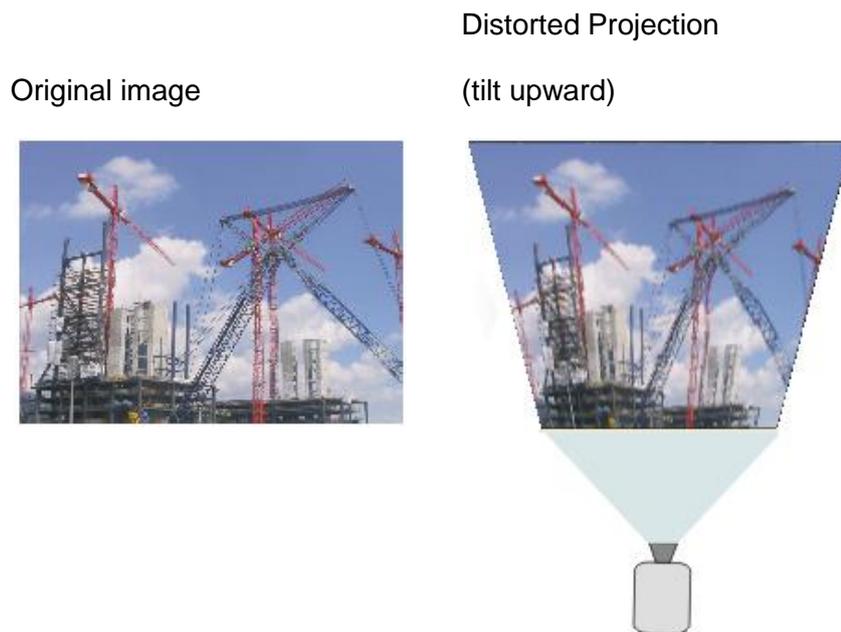


## 10 Keystoning

If a projector is parallel to the screen, the image is a right-angled plane.

If the projector is shifted horizontally or vertically the right-angled projection gets trapezoid.

This effect is called Keystoning.

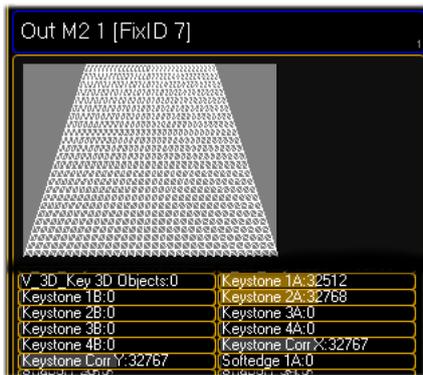


This effect can be minimized by using the Keystone Correction.

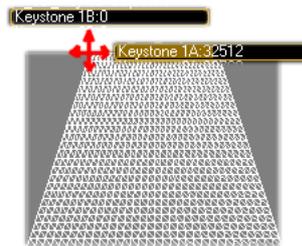
Keystone Correction recalculates the image that it is shown right-angled independent of the position of the projector. Therefore the pixels must be compressed and the image is made smaller.

Pay attention, the Keystone Correction always causes a compression of the projected image. This causes a loss of quality of your projection.

This correction is done in Camera Layer Fixture:



For every edge of the image 1...4 there exists two control channels (Keystone 1A-1B...Keystone 4A-4B). With these channels the edges can be moved in horizontal and vertical direction:



Channels Keystone. X and Y are for the distribution of the picture content in X and Y direction.



The resulting output image for this distorted Keystone Layer looks like the image beside.

## 11 Pixelmapper

The Pixelmapper allows the presentation of the video output to a DMX matrix. DMX data is sent directly from the MA VPU PC via Ethernet using the Artnet protocol.

The LED wall can be configured individually using several LED panels from different manufacturers. The operating on the desk is analog to the operating of a video wall.

**New:** The output of the Pixelmapper now can be routed as a virtual input of a layer:

Outputs					
Name	Render IP	Camera	ResX [Px]	ResY [Px]	Virt Out
Output 1		CAM1 1	100	100	2

**Example:**

Input of this Pixelmapper output is Camera 1. This 'virtual input' can be used as input for any desired Layer. See also: 4.3.2 Virtual Outputs

LED Panels are defined similar to dimmer or multi function spots via fixture type text files.

These files are located on the video PC in the default path:

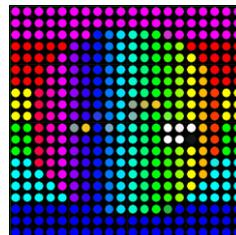
C:\Program Files\MA Lighting Technologies\MA VPU\NEWPANELS

Here the properties of the LED panels are defined as a Fixture Types in single files (grandMA Serieies1: PanelName.txt).

The following example shows a test image mapped on a 20 x 20 LED wall



Test image original



Mapping on a 20 x 20 LED Wall

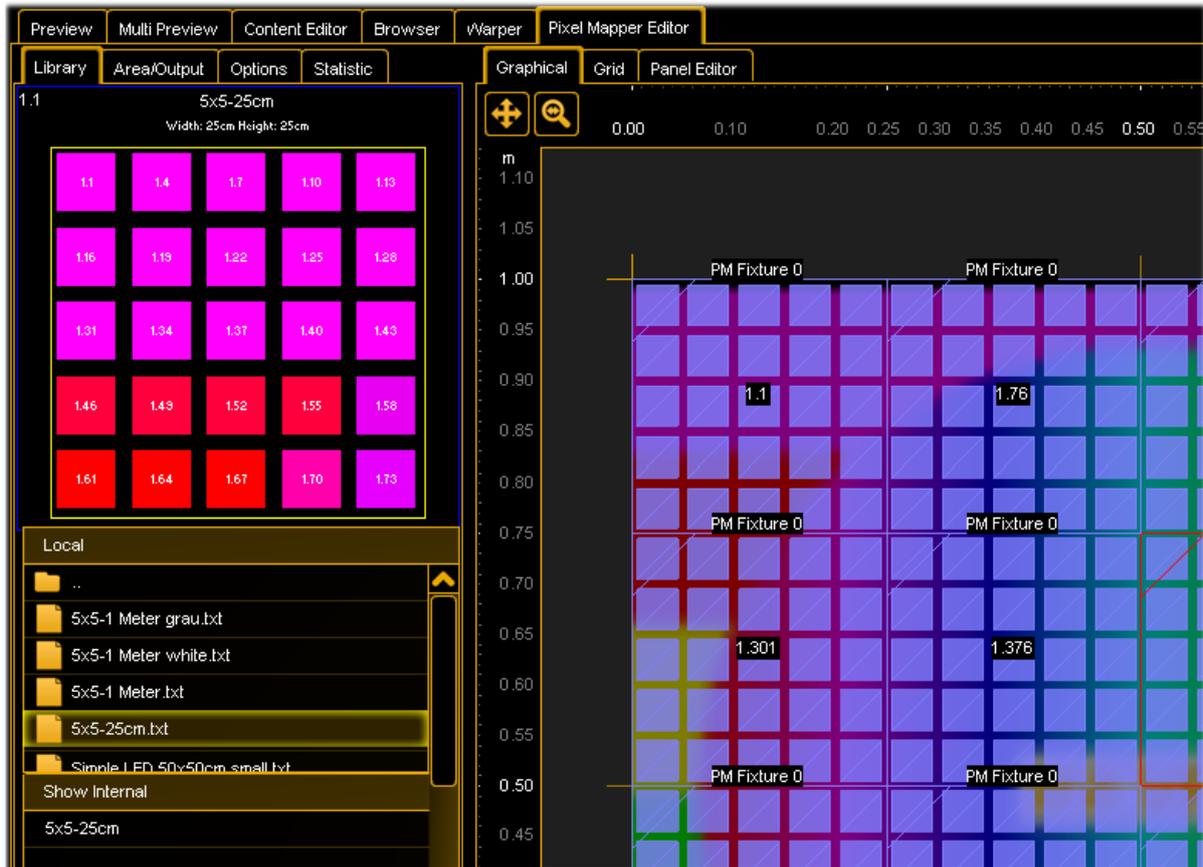
Switch to the Pixelmapper mode via the menu: 'Render – Pixelmapper' or touchscreen 'Setup – Pixelmapper'. (Touch Screen: Setup – Pixelmapper)

After the activation of the Pixelmapper an extra tabbed window 'Pixelmapper Editor' appears. The general output of MA VPU is now done via the Ethernet protocol Artnet instead of the graphic card of the PC.



## 11.1 Pixelmapper Graphical View

This view presents the graphical LED wall arrangement and allows a comfortable editing and controlling of the used panels:



**Zooming** allows seeing all DMX addresses and panel names. Markers for the left upper corner of a panel are scaled on a percentage basis.

When zooming in a certain area, the centre stays in the area the user is zooming in/out via scrolling.

Once you have zoomed out and want to zoom in again, the centre will be in the middle of the area but then you can select what ever part of the area and zoom in again without losing position information.

When entering the Pixelmapper the area will automatically be scaled so that you can see the complete area.

All units are in [meter].

In whatever mouse mode you are (Select, Zoom or New) there are 2 buttons in the upper left corner in the graphical editor:

View Move and View Zoom. Just press and hold those buttons and you can move the area or zoom in/out.

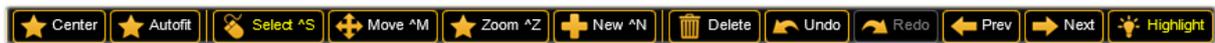


**ViewMove:** Click and hold this button and then move the mouse to move the area.



**ViewZoom:** Click and hold this button and then move the mouse to zoom in/out the area.

### 11.1.1 Pixelmapper Toolbar



Center	Shows the center of the Pixelmapper Editor
Autofit	Zooms the Editor automatically so that all panels are visible.
Select	If this button is selected, <b>single LED fixtures</b> can be selected to arrange them inside the LED wall or show their attributes via a right mouse click.
Move	Move selected panel via keyboard
Zoom	<b>Zoom</b> the render window to fit. <b>Zoom in</b> with the right mouse button <b>Zoom out</b> with shift + right mouse button
New	If a rectangle is drawn up while holding the right mouse button down in the right window, this rectangle will be automatically equipped with the necessary number of the selected panels. See 11.4 Setup of an LED Wall
Delete	<b>Delete</b> the selected LED panel.
Undo Redo	<b>Undo</b> or <b>Redo</b> the last action
Prev	Select the previous panel
Next	Select the next panel
Highlight	Highlight the selected panel output to white (RGB 255,255,255). <b>Attention:</b> The real Artnet output channels are highlighted, so it is not recommended if you are on air.

### 11.1.2 Pixelmapper Editor



#### Library:

On the left side of the window all configured default LED panels are shown. By double clicking you can open the folders to see the panels.

You can change the width of the window by selecting the border and move the mouse holding the left mouse button down.

If a panel is selected in the lower part, a detailed view of the panel is shown in the upper part.

To edit this file do a double click the icon, the panel will be opened in the Panel Editor and can be edited there (Local only).

The pop-up menu of the preview offers the LED simulation of a panel that has been selected in the graphical window and the indication of the Universe/DMX addresses.

#### Local:

Shows panels stored on the local hard drive.

#### Show Internal:

Shows panels stored in the showfile.

Via the right mouse button you can change the panel type in the 'Show Internal'. So paneltypes can be exchanged with paneltypes that are used in the show file or a file that is stored locally on the hard disk of the VPU.

**Note:** If the Panel Editor is used and the tag "\_NAME" in the .txt file is identical with a paneltype that is used in the showfile, a save instruction tries to update the paneltype of the showfile.

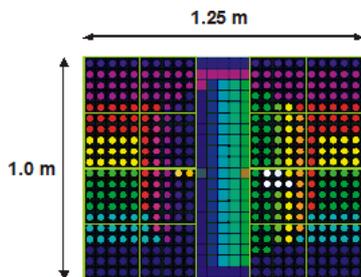
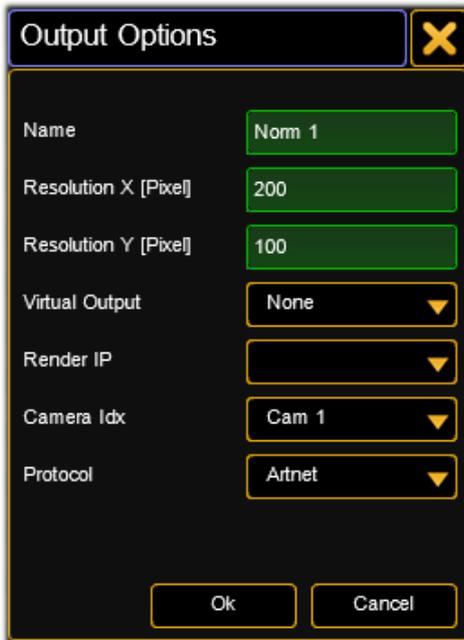
Example: The user patched 10x C 100 Panels  
The user edits the external stored C100.txt file, does some changes and saves that file.

Then he is prompted "Adapt changes and replace Paneltype" and can allow the change or discard them.



**Area/Output:** The general output of MA VPU is done now via the Ethernet protocol ArtNet instead of the graphic card of the PC. Therefore the physical dimensions of the LED matrix (Area) and the number of pixels (Output) can be set:

**Areas:** Here the physical width and height of the LED matrix is determined. This must not be conforming to the whole size of the LED Panels. So e.g. only sub ranges of the general view of the LED Panels can be set. The units are set via the



dialog of the menu entry, Options – Pixelmapper’  
The area is definend in n \* m cm.

**Outputs:** Mapping of the whole output to the Artnet output range. The output resolution is defined in n \* m pixel.

**Virtual Output:** The output of the Pixelmapper can be mapped as a virtual input of a layer. In this case the Render IP is suppressed.

**Render IP:** IP where the physical output is send to.

**Camera Idx:** Index of the camera used for this output.

**Protocol:** Choose between ArtNET - or sACN protocol. sACN is comparable to ArtNET but allows the multicast option to reduce network traffic.

**Example:** The physical dimensions of the source picture must not confirm to the whole size of the Panels. The LED Panels can display, for example only a sub range of the whole output.

In this example the area size is 1,25m x 1,0 m with 25 x 20 pixel.

There are only 16 panels used (5 x 5 LEDs). The middle stripe is not equipped with LED Panels and is not used.



**Options:**

**Network Send Artnet :** Enable sending data sending to the Artnet IP that is selected in the dropdown field.

**Adjustment:** Display a grid with the selected resolution in X and Y direction. You can align the panels at the center or top left or bottom right. A right click in the graphical view also displays the option ‘Dock on Grid’ to automatically dock all panels on the grid.

**Panel Outlines:** Marks the panel borders.

**LED Outlines:** Marks the LED borders.

**DMX Addresses:** Show the universe + DMX start addresses of each panel.

**Name:** Display the fixture name of each panel.

**LEDs:** Preview content for each LED.

**Background:** If the part of the output area is not equipped with a panel, the background image is

indicated transparent. Select the transparency.

Library	Area/Output	Options	Statistic
Topic		Value	
Universes ok		82527	
Universes fault		0	
Universes per second		90.3	
Universes Per cycle		3	
Fps		30.1	
Bytes received		0.0 Bytes	
Bytes sended		41.7 MB	

**Statistic:**

This tab offers information about the used universes, DMX channels and the performance .

## 11.2 Pixelmapper Grid View

Via the tab 'Grid View' you can switch to the Grid View of the Pixelmapper:

Index	Universe	Address	X [m]	Y [m]	Rot*	Paneltype	Name
0	1	1	0.125 [m]	0.875 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
1	1	76	0.375 [m]	0.875 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
2	1	151	0.625 [m]	0.875 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
3	1	226	0.875 [m]	0.875 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
4	1	301	0.125 [m]	0.625 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
5	1	376	0.375 [m]	0.625 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
6	2	1	0.625 [m]	0.625 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
7	2	14	0.875 [m]	0.625 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
8	2	89	0.125 [m]	0.375 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
9	2	164	0.375 [m]	0.375 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
10	2	239	0.625 [m]	0.375 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
11	2	314	0.875 [m]	0.375 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
12	2	389	0.125 [m]	0.125 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
13	3	1	0.375 [m]	0.125 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
14	3	27	0.625 [m]	0.125 [m]	0.0 [°]	5x5-25cm	PM Fixture 0
15	3	102	0.875 [m]	0.125 [m]	0.0 [°]	5x5-25cm	PM Fixture 0

This view offers an overview about all used LED panels. All values can be edited directly in the grid. Selected panels are displayed bold. Patch collisions are indicated and marked **red**.

You can use common functions like:

**Multiselection:** select first row while pressing <Shift> and select last row (still hold <Shift>)--> all rows inbetween are selected. Select or deselect several rows by pressing Ctrl. Press F2 for editing a value and all selected values will take over the new value.

Selecting multiple values can also be done by using the rubberband, means to lasso a certain area.

The edit control (to type in the value) directly opens after releasing the mouse when selection is done.

Holding <Ctrl> while lassoing (selecting) values allows toggling the selection.

The selection of several rows (multiselection) is indicated as shown in the graphis below. All green highlighted values will take over the new value.

Note: Keyboard Shortcuts CTRL + C (Copy) and CTRL + V (Paste) are allowed too.

**Export- Import to Excel:** You can Export or Import the panels to an Excel (.csv) file via the context menu

**Copy & Paste from an Excel Sheet:**

Note: you can only do this on a Media PC or on a external PC running the VPU Software. If you want to use the functionality in combination with a VPU, this external PC has to be in a session with the VPU or the same showfile that you just edited. It has to be uploaded to the VPU afterwards. Create an Excel sheet or Tab separated .txt file that fits the options in the VPU change all cells to the desired values:

	A	B	C	D	E	F	G	H
1	Index	Universe	Address	X[m]	Y[m]	Rot[°]	Paneltype	Name
2	0	50	1	0,2		3	25 C100	Circle 1
3	1	53	1	0,3		3	25 C100	Circle 1
4	2	58	1	0,4		3	25 C100	Circle 1
5	3	59	1	0,5		3	25 C100	Circle 1
6	4	62	1	0,6		3	25 C100	Door 4
7	5	65	1	0,7		3	25 C100	Door 4
8	6	68	1	0,8		3	25 C100	Door 4
9	7	71	1	0,9		3	25 C100	Door 4
10	8	74	1	1		3	25 C100	Door 4
11	9	77	1	1,1		3	25 C100	Door 4
12	10	80	1	1,2		3	25 C100	Door 4

Copy these settings to the clipboard by pressing CTRL + C (only values shall be selected, not the headline, numerical values comma or Tab separated, so e.g. only values like “2,3” are valid. Open the VPU software; go to the grid view in the pixel mapper mode. Select the row, where you want to insert new values:

Index	Universe	Address	X [m]	Y [m]	Rot°	Paneltype	Name
0	1	1	0.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 0
1	3	241	1.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 1
2	5	481	2.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 2
3	8	209	3.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 3
4	10	449	4.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 4
5	13	177	5.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 5
6	15	417	6.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 6

Right click into the grid view and select “Paste”. The result looks like this:

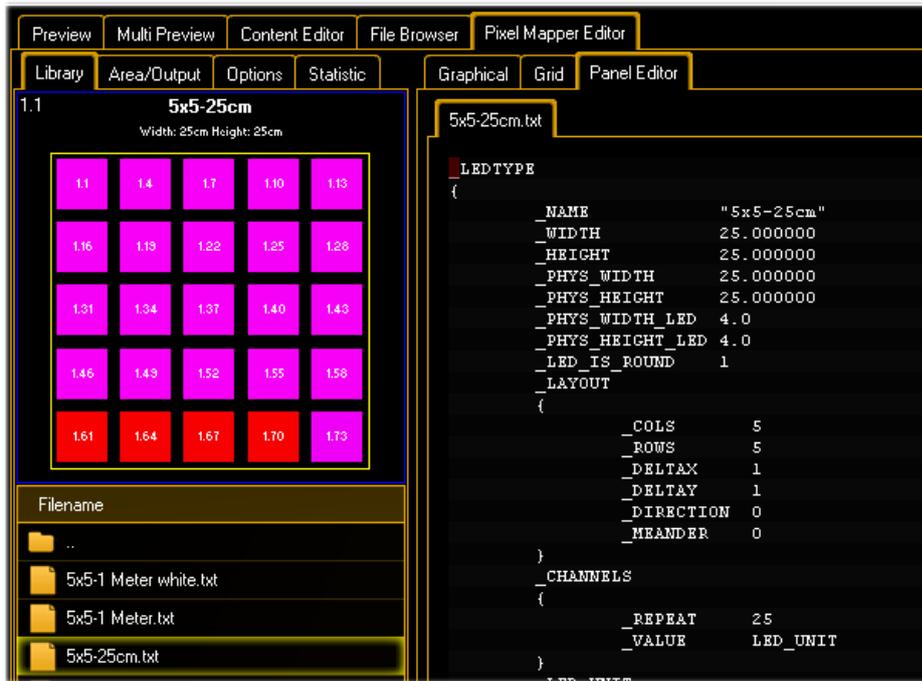
Index	Universe	Address	X [m]	Y [m]	Rot°	Paneltype	Name
0	50	1	0.200 [m]	3.000 [m]	25.0 [°]	C 100	Circle 1
1	53	1	0.300 [m]	3.000 [m]	25.0 [°]	C 100	Circle 1
2	56	1	0.400 [m]	3.000 [m]	25.0 [°]	C 100	Circle 1
3	59	1	0.500 [m]	3.000 [m]	25.0 [°]	C 100	Circle 1
4	62	1	0.600 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
5	65	1	0.700 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
6	68	1	0.800 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
7	71	1	0.900 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
8	74	1	1.000 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
9	77	1	1.100 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
10	80	1	1.200 [m]	3.000 [m]	25.0 [°]	C 100	Door 4
11	28	81	11.500 [m]	39.500 [m]	0.0 [°]	C 100	PM Fixture 11

You cannot change the index or the Paneltype. If you select e.g. only Universe and Address in the Excel Sheet (and copy that into the clipboard), then set the marker in the cell from

where you want to change the values and you paste this information into the VPU software, only these values will be overwritten. So selected copy paste is possible as well.

### 11.3 Pixelmapper Panel Editor

Via the tab 'Panel Editor' you can switch to the view of the Panel Editor:



A double click on a panel at the left side opens the description text file of the selected panel as text. Within this editor you can edit several panel files. Common commands like cut, copy, paste etc. are supported. Via a right mouse click you reach the commands like save, save as....

If the option "save as" is used, the name tag in the file is overwritten to the new "save as" name. Then this file can be used as a replacement of paneltypes in the showfile.

## 11.4 Setup of an LED Wall

An LED (wall) matrix consists of several LED panels that are arranged in a grid.

The LED matrix in the following example exists of 4 pieces 5x5 LED panels with 25 RGB channels each.

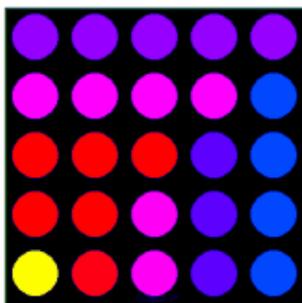
Therefore every panel needs  $25 \times 3 = 75$  DMX channels.

In the example each panel is assigned to an individual DMX universe.

**Panel 1:**

Universe 1

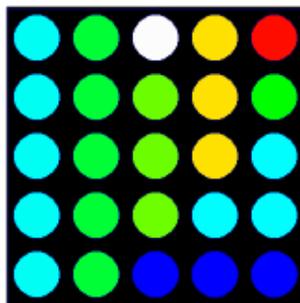
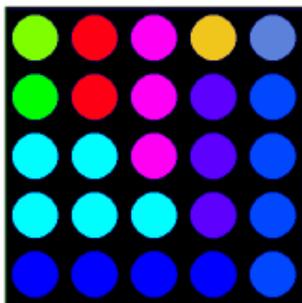
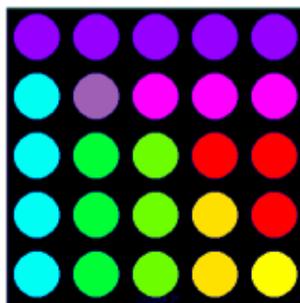
DMX Chan. 1...75



**Panel 2:**

Universe 2

DMX Chan. 1...75



**Panel 3:**

Universe 3

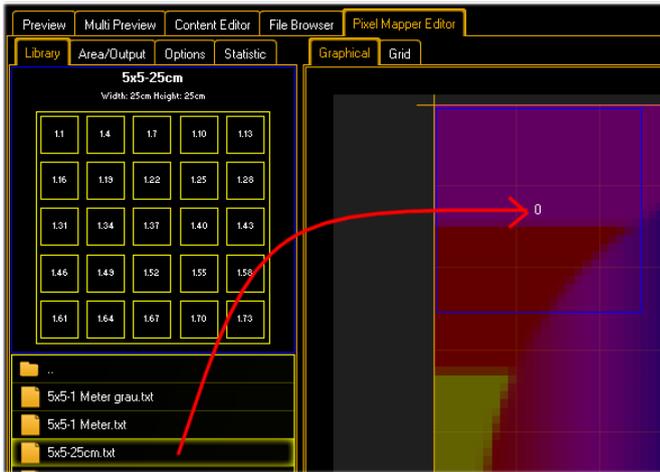
DMX Chan. 1...75

**Panel 4:**

Universe 4

DMX Chan. 1...75

To configure the LED wall there are two possibilities 1. or 2.:



**1.**  
 Drag the LED Panel from the left field holding the left mouse button down into the output area.

To move the panels you can use the arrow keys:

Arrow key moves:

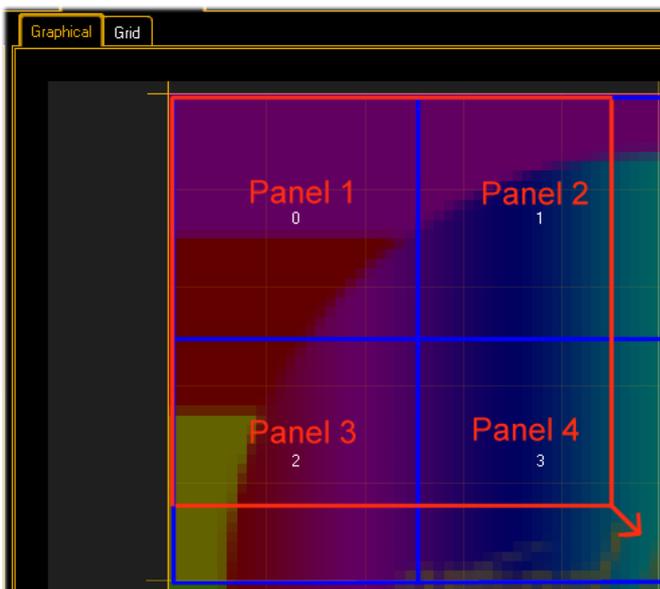
1 grid snap

Arrow Key + Shift moves:

½ grid snaps

Arrow Key + Ctrl moves:

2.5 grid snaps



**2.**  
 Or choose the



,New' button in the tool bar.

Draw a rectangle while holding the left mouse button down. Draw from the upper left down to the lower right corner diagonally. The area will be filled automatically with the necessary amount of panels.



After dropping a dialog for the DMX values appears:

**Panel Count:** Number LED panels.

**Channels per Panel:** Number of the DMX channels per panel.

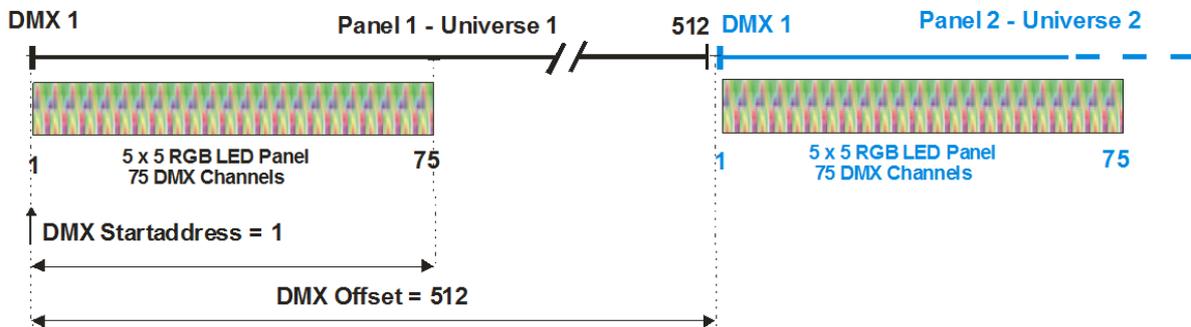
**Universe:** Address of the first DMX universe for patching.

**DMX Address:** DMX start address of the first panel.

**Panel Offset:** Distance between the start addresses of the single panels.

For example: With the offset of 512 for each panel a new DMX universe is taken. This happens because the DMX universe range reaches from 1 to 512.

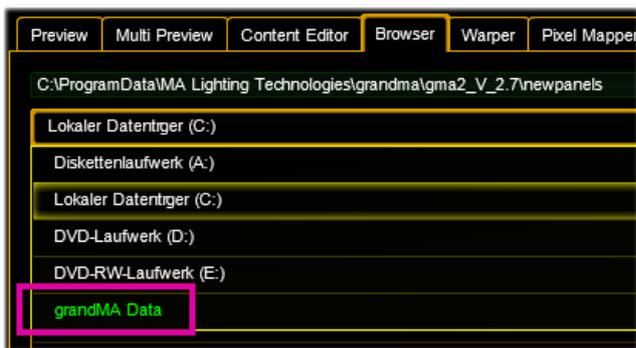
The following example shows the distribution of the DMX addresses on the DMX universes:



### 11.5 File Format of LED Panels

The properties of an LED panel are specified in a text file e.g. „5x5-25cm.txt“. This text files are located in the folder:

e.g. *drive:\ProgramFiles\MA Lighting Technologies\MA VPU Software\Data\newpanels*  
 Use the browser and navigate downwards from the entry 'grandMA Data':



Panel (Fixture) Import: New created panels can be copied via the browser into this folder.

Parallel to the text file is a bitmap (.bmp) with the same name in the folder for the visualization.

The file construction is similar to the fixture description file of the desk.

The LED panel file describes the physical dimensions of the panel, the optical visualization and the dimensions of the LEDs as well as the DMX channels and the patching order.

The file is structured hierarchically as a tree with single blocks. The blocks are described within {}.

They contain tags (Keywords or marks) beginning with a '\_'. A tag is followed by a set value.

Block	Tag Name	Description	Sample
_LEDTYPE {			
	_NAME	Displayed title of the LED Panel as text	5x5-25cm
	_PHYS_WIDTH	Physical width of the panel in cm	25.0
	_PHYS_HEIGHT	Physical height of the panel in cm	25.0
	_PHYS_WIDTH_LED	Physical width of one LED in cm	0.4
	_PHYS_HEIGHT_LED	Physical height of one LED in cm	0.4
	_LED_IS_ROUND	Flag for the visualization of the LED appearance (0 = false; 1 = true)  Other appearances may follow. At the moment only circular or square.	1
_LAYOUT {	_LED_SHIFT_X _LED_SHIFT_Y	1=> Shift the first line / column right and the second line / column left -1=> Shift the first line / column up and the second line / column down	See the sample below: curtain
	_COLS	Amount of LED columns	5
	_ROWS	Amount of LED rows	5
	_DELTAX	Counting direction for patching: 1 – left to right  -1 – right to left	1
	_DELTAY	Counting direction for patching: 1 – top down  -1 – down to top	1
_DIRECTION	Patch order:  0 – first X then Y  1 – first Y then X	0	
_MEANDER	Not supported yet	0	

Block	Tag Name	Description	Sample
}			
_CHANNELS {	_REPEAT	Count how often the following value is repeated. (Here Value = LED_UNIT 25 times)	25
	_VALUE	Patch rule for channel or following tag that is described in the following:  While patching this list is processed. For each detected _VALUE = LED_UNIT a new LED_UNIT is inserted.  The amount of '_COLS' multiplied with '_ROWS' complies with the number of 'SUBBLOCK' entries.  If _VALUE = NONE there is an DMX gap.	LED_UNIT or NONE
	}		
_LED_UNIT {	_VALUE	Function description of the channels. Valid values:  CYAN, MAGENTA, YELLOW, RED, GREEN, BLUE, WHITE or 0...255 for dimmer etc.	RED
	_VALUE		GREEN
	_VALUE		BLUE
	}		
}			

### 11.5.1 LED Panel Examples

Because LED Panels can take different shapes here some examples:

In the simplest case LEDs are numbered continuous:

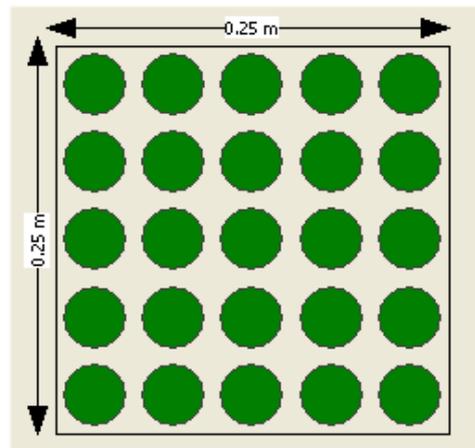
```
_LEDTYPE
```

```
{
```

```
    _NAME      "5x5-25cm"
```

```
    _WIDTH     25.000000          5 X 5 LED Matrix
```

```
_HEIGHT      25.000000
_PHYS_WIDTH   25.000000
_PHYS_HEIGHT  25.000000
_PHYS_WIDTH_LED 4.0
_PHYS_HEIGHT_LED 4.0
_LED_IS_ROUND 1
_LAYOUT
{
  _COLS      5
  _ROWS      5
  _DELTA_X   1
  _DELTA_Y   1
  _DIRECTION 0
  _MEANDER   0
}
_CHANNELS
{
  _REPEAT    25
  _VALUE     LED_UNIT
}
_LED_UNIT
{
  _VALUE     RED
  _VALUE     GREEN
  _VALUE     BLUE
}
}
```



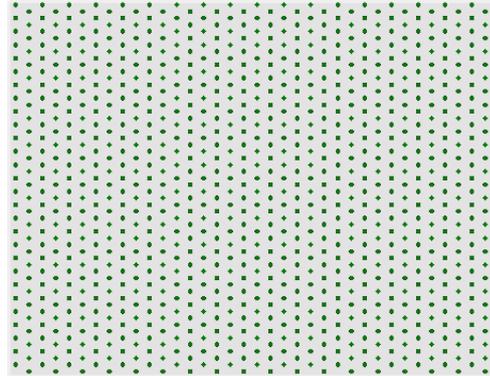
LED Curtain, LEDs have an offset in Y direction:

```
_LEDDTYPE
```

```
{
  _NAME          "Star Cloth"
  _PHYS_WIDTH    360.000000
  _PHYS_HEIGHT   280.000000
  _PHYS_WIDTH_LED 4.000000
  _PHYS_HEIGHT_LED 4.000000
  _LED_IS_ROUND 1
  _LED_SHIFT_Y   -1
  _LED_SHIFT_X   0
  _LAYOUT
```

LED curtain with 3072 channels and offset in Y-direction. This offset is described by the `_LED_SHIFT_Y = -1` tag.

Dimensions 3.6 m X 2.8 m



```
{
  _COLS  36
  _ROWS  28
  _DELTA_X  1
  _DELTA_Y  1
  _DIRECTION 1
  _MEANDER  0
}
```

Patch:

1.1	1.85	1.169	1.253	1.337	1.421	2.1	2.85	2.169	2.253	2.337
1.4	1.88	1.172	1.256	1.340	1.424	2.4	2.88	2.172	2.256	2.340
1.7	1.91	1.175	1.259	1.343	1.427	2.7	2.91	2.175	2.259	2.343
1.10	1.94	1.178	1.262	1.346	1.430	2.10	2.94	2.178	2.262	2.346
1.13	1.97	1.181	1.265	1.349	1.433	2.13	2.97	2.181	2.265	2.349
1.16	1.100	1.184	1.268	1.352	1.436	2.16	2.100	2.184	2.268	2.352
1.19						2.19		2.187		

```
_CHANNELS
{
  _REPEAT  168
  _VALUE   LED_UNIT
  _REPEAT  8
  _VALUE   NONE
  _REPEAT  168
  _VALUE   LED_UNIT
  :
  :
}
```

```

_LED_UNIT
{
    _VALUE RED
    _VALUE GREEN
    _VALUE BLUE
}
}

```

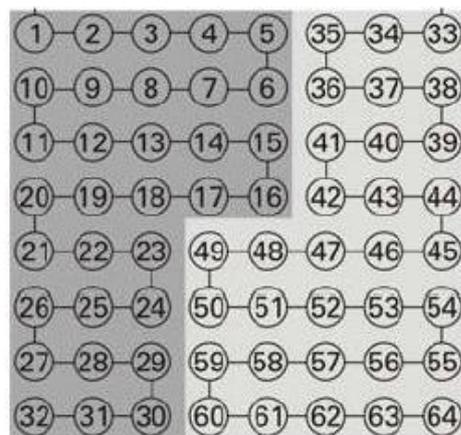
LED Panel unusual patching

```

_LEDTYPE
{
    _NAME "Crazy-Patch"
    _WIDTH 80.000000
    _HEIGHT 80.000000
    _PHYS_WIDTH 80.000000
    _PHYS_HEIGHT 80.000000
    _PHYS_WIDTH_LED 5.0
    _PHYS_HEIGHT_LED 5.0
    _LED_IS_ROUND 1
    _LAYOUT
    {
        _COLS 8
        _ROWS 8
        _DELTA_X 1
        _DELTA_Y 1
        _DIRECTION 0
        _MEANDER 0
    }
    _CHANNELS
    {

```

8 x 8 LED Panel with strange DMX-Patch



\_LEDUNIT 0  
\_LEDUNIT 3  
\_LEDUNIT 6  
\_LEDUNIT 9  
\_LEDUNIT 12  
\_LEDUNIT 102  
\_LEDUNIT 99  
\_LEDUNIT 96  
  
\_LEDUNIT 27  
\_LEDUNIT 24  
\_LEDUNIT 21  
\_LEDUNIT 18  
\_LEDUNIT 15  
\_LEDUNIT 105  
\_LEDUNIT 108  
\_LEDUNIT 111

etc.

## 12 Creation of customized 3D Objects

3D objects can be created with 3D CAD programs. Please note, that the amount of polygons affects the performance because for each polygon the projection has to be calculated. The lower the number of polygons the better is the framerate.

MA VPU supports the following formats for 3D objects:

**.x** – DirectX file format

**.3ds** – Format for drawing 3 dimensional objects

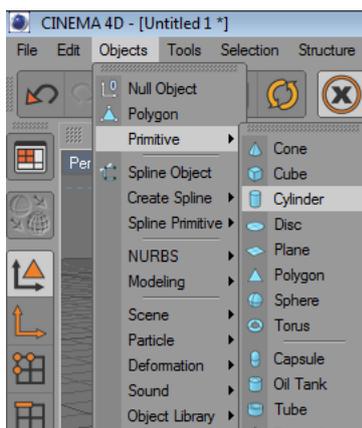
Note the following regulations:

The orientation of the object should fit

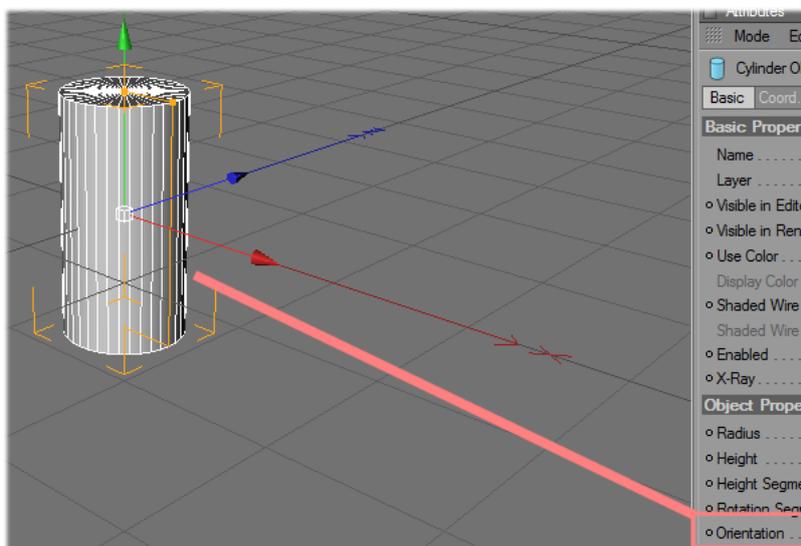
Normals have to be organized correctly

UV coordinates for the textures have to be setup correctly

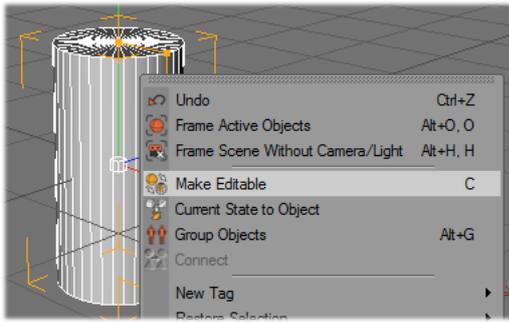
The following example shows the creation of a cylinder with the 'Cinema 4D' (Copyright by MAXON Computer GmbH) software.



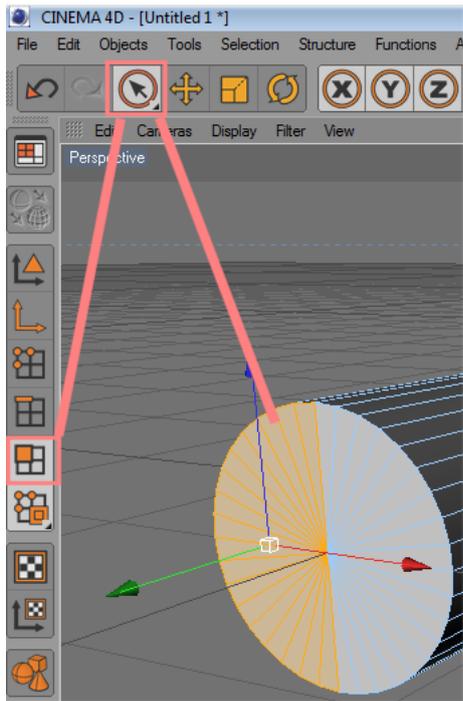
Insert an object of type  
'Cylinder'



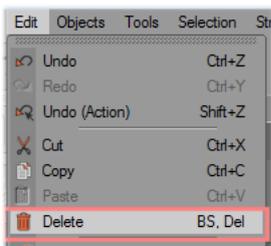
Set the orientation to 'Y+'.  
For a correct visualization in  
MA VPU Z is the depth, Y the  
vertical and X the horizontal  
axis



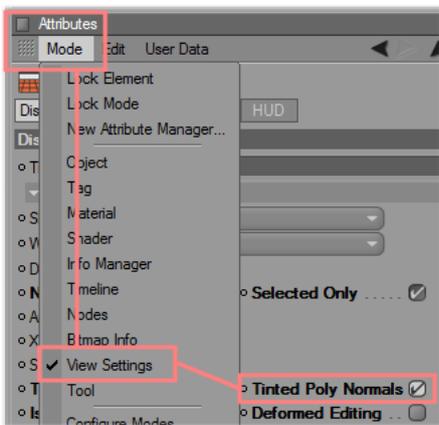
Make the object editable



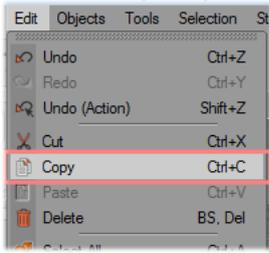
Select not used polygons...



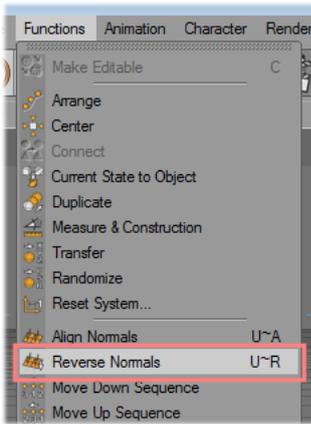
and delete them



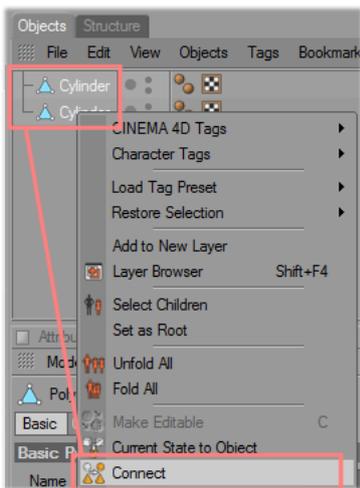
Set the visibility of normal on.



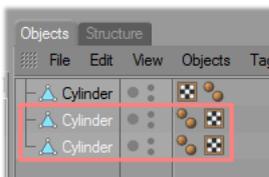
Copy the object...



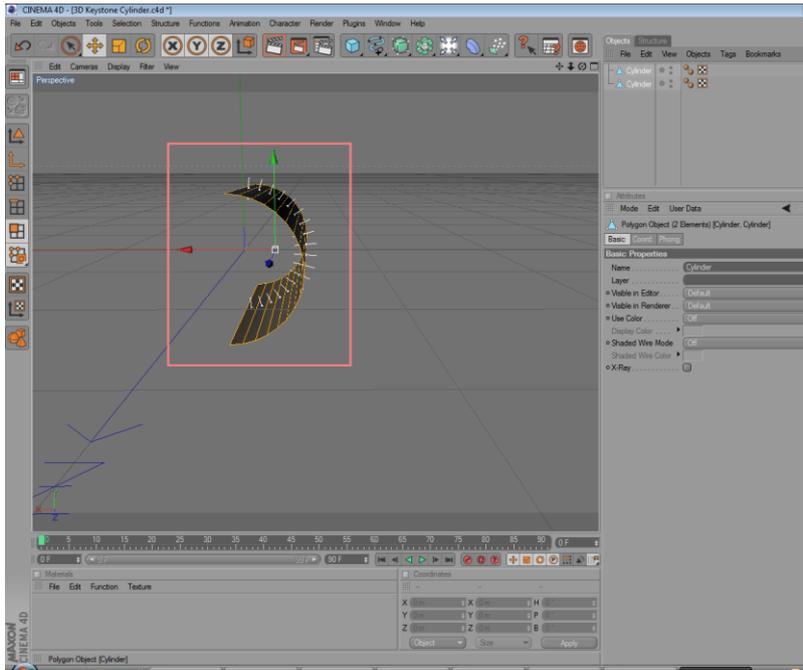
And reverse the normals of the copy.



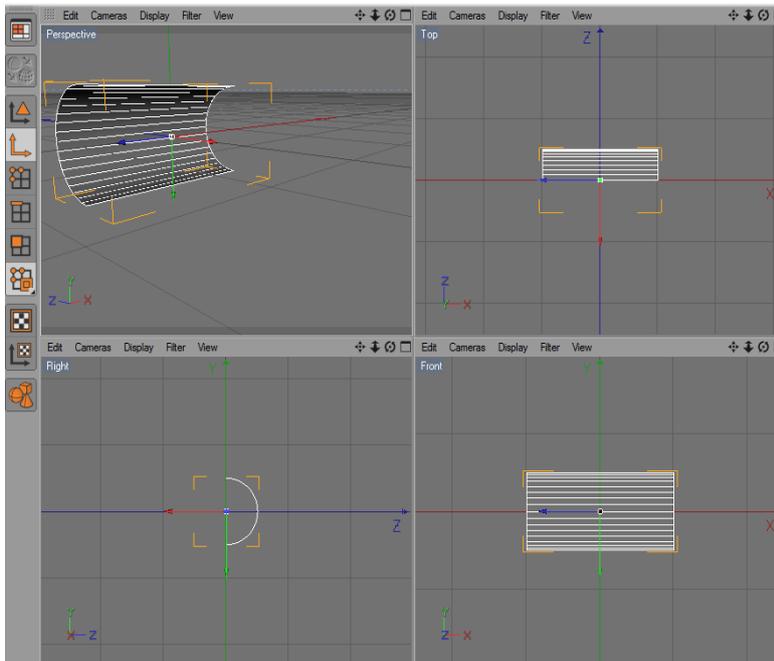
Select both cylinder objects and connect them to one new cylinder.



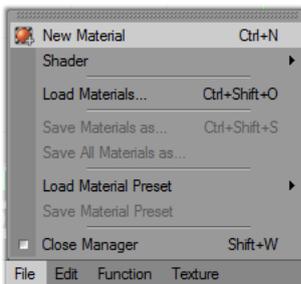
The old cylinder objects can be deleted.



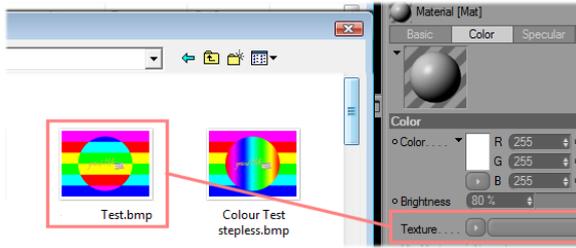
Now you can see two objects with normals in both directions



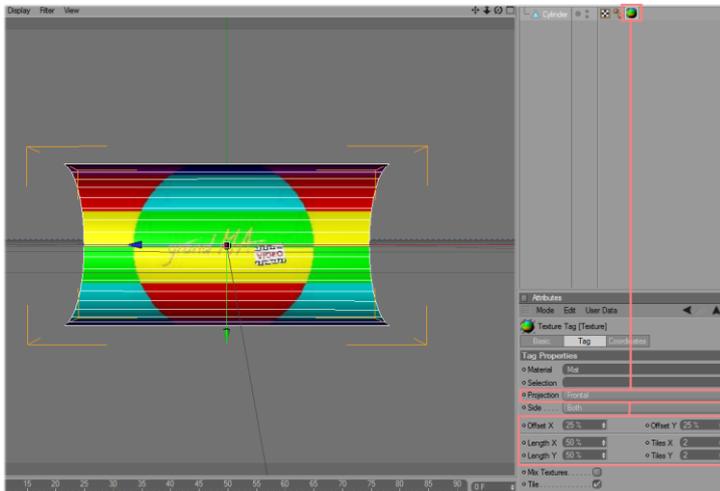
Check the orientation of the resulting object.



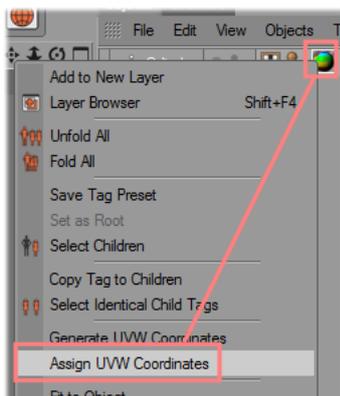
Insert a new material for the texturing.



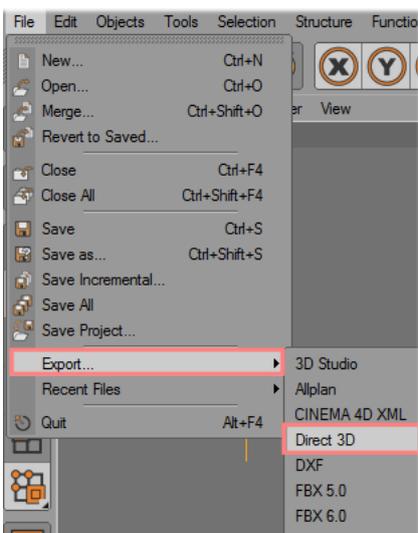
Assign an image to the texture and the material to the object.



Adjust the texture mapping parameter.



Assign the UV coordinates for the texture mapping.



Export the object to Direct 3D format.

Objects created in this way can be added to the 'Channel Set' via the context menu in the '3D Objects' view with the right mouse button.

## 13 Content Specifications

### General Note:

About MPEG-2:

MPEG stands for “Moving Pictures Expert Group” who created a couple of international standards. One important one is the MPEG-1/2 (ISO/IEC 13818-part x) standard which will be used for the MA VPU. As opposed to MPEG4 this standard keeps a good balance between file size and calculation power that is needed to decode the video information. The MPEG2 standard allows a couple of settings which will highly influence the quality of the picture and the way the VPU handles this data. They are defined to be able to run several resolutions like full HD for example. That influences also the bit rate which can vary from approx. 3 to over 80 MBit/s. The higher the bit rates the more workload for the CPU, RAM & so on. Because of that MA Lighting choose settings that form a good compromise between bit rate and resulting frame rate.

To gain safe and proper performance with the VPU, we strongly encourage encoding any content as described here. Non-linear Video Editing Systems and Compositing Tools such as Avid Composer / Adobe Premiere Pro / Adobe After Effects / Final Cut Pro do also feature high quality MPEG2 encoding tools that are very versatile and produce MPEG2 conform content. However: you have to test this content with the VPU for correct and stable performance before doing a production with this content. If you do not know the origin and quality of the MPEG2 encodings of your content, we strongly encourage you to re-encode the complete material even if you are afraid of slightly visible artefacts. If you want to gain the best quality, use un-encoded raw video and audio material as the source.

Since Rovi TotalCode Studio can be downloaded for free to do test encodings you can also use that tool to check your content by re-encoding it in case of problems (watermark is inserted into the video and audio is cut off after 30 seconds in the trial version). Video codecs other than MPEG2 are not installed on a VPU and not supported by MA Lighting. Former grandMA video dongle users that install the VPU software on their system should use a clean system and not install any other codec than the Main Concept MPEG2 Decoder Pack Version 8.2.

You cannot gain high performance of parallel video stream decoding with guaranteed performance with not conforming and correct encoded content.

VPU content should require the following specifications:

<b>Video</b>	
Video Format	MPEG
Video Codec	MPEG-2
Bit Rate	Constant Bit Rate (CBR) 10 – 30 Mbps (Mega bit per Second) <sup>1</sup>
Framerate	Progressive 24 fps, 25 fps, 29,97 fps, 30 fps, 50 fps, 60 fps <sup>2</sup>
GOP-STRUCTURE (Group of Pictures)	GOP 12, I-Frame only <sup>3</sup>
Container Format	Program Stream (with Sound) or Elementary Stream (without Sound)
Audio Stream	LPCM (uncompressed, 48 kHz, 16 Bit) or MPEG1 Layer2 (48 kHz, 384 kbps)
Color Space / Chroma Format	4:2:0
File Extension Video	.mpg, .mpeg, .m2v, .mpv <sup>4</sup>
Pixel Aspect Ratio	1:1

<sup>1</sup> We strongly recommend CBR. Please also note that the Bit rate heavily depends on the resolution of your video clip and on the content itself (e.g. lots of signal changes)

<sup>2</sup> Please note that Framerates above 30 fps are extremely resource-consuming and will increase the performance. Use these high frame rates only for specific reason. Since the play-out of the video is progressive scan in most of the cases, interlaced video is not suggested. The VPU can play back interlaced material by de-interlacing it. Avoid changing the frame rate of your source material since this will result in content that is not smooth any more

<sup>3</sup> GOP 12 is possible for simple Playback without jumping within the Frames (Indexing). The more B- and P-Frames are used the higher the compression, the smaller the file size. Use I Frame only if you need to jump a lot in the video files.

<sup>4</sup> Files with a leading "." e.g. ".\_test.mpeg" are ignored by the VPU software because these files are created by the MAC OSX operating system.

General notes:

Program Stream => contains Video and Audio files, typical file extension. mpg

Elementary Stream => contains Video or Audio files, file extension .mpv for video data and .mpa for audio data.

File names must not exceed 63 characters.

Please keep in mind: Aggressive compression (reducing the bit rate) causes loss of quality.

The less signal changes and information the video sequence contains, the more you might go down with the bit rate without necessarily having visible artefacts.

Compression artefacts: Loss of edge clarity, Tone fuzziness, Blocking / contouring artefacts

Recommended Bit Rates			
Resolution	4:3	16:9	Bit rate
PAL	720x576		10-20 Mbps
NTSC	720x480		10-20 Mbps
VGA	640x480		10-20 Mbps
SVGA	800x600		10-20 Mbps
XGA	1024x768		15-20 Mbps
HD 720p		1280x720	15-20 Mbps
HD 1080p (not for VPU Basic)		1920x1080	20-30 Mbps

Images	
IMAGE FORMAT	FILE EXTENSION
Bitmap	.BMP
Portable Network Graphics	.PNG
Graphics Interchange Format	.GIF
Joint Photographic Experts Group	.JPEG, .JPG, .TGA

Uncompressed images have be in RGB 24bit/ 32bit colourspace. CMY is not supported.

We recommend 32 Bit .png for Alpha Channel support. max. 8192 x 8192 resolution for still images.

### Audio

Audio Format FORMAT	FILE EXTENSION
16Bit 44,1kHz / 48kHz Stereo PCM	.WAV
32-320kbps 44,1kHz / 48kHz MPEG1 Layer 3 (MP3) Stereo	.MP3

### 3D Objects

3D OBJECT FORMAT	FILE EXTENSION
DirectX	.X

### 13.1 Rovi TotalCode Studio for converting your content into MPEG2

To convert your content (e.g. \*.avi or \*.mov) into the MA VPU conform MPEG2 format, we recommend to use the Rovi TotalCode Studio transcoding tool.

The free demo version of the application can be downloaded at the Rovi homepage:  
<http://www.rovicorp.com>

The demo version is fully functional, though it adds a watermark to processed video (without harming your source material). Moreover, it has an AAC Audio encoding limitation of 30 seconds. Then audio output is cut. When you are interested in obtaining the full version, you have to contact Rovi to obtain a license for the software. Unlike the previous version of the software, Main Concept Reference, you can only buy the complete version. The purchase of single codecs is not supported any more.

The documentation of Rovi TotalCode Studio is included in the demo version. Press F1 on you Keyboard to open it. An Adobe PDF Reader has to be installed.

A Preset File created by MA Lighting is available in the download section for the Rovi TotalCode Studio software, that does cover the most important applications. It is labelled "MA\_VPU\_Rovi\_TotalCode\_Studio\_Presets\_V\*.mps". Please note that this is not pre-installed on the VPU.

#### How to use Presets in Rovi TotalCode Studio

MA Lighting provides the most important presets to convert video and audio content in Rovi TotalCode Studio. These presets cover the most important applications. The next passage will cover how to import and use these presets. If the presets do not cover the needed purpose, the user can load and adjust the settings. These settings also regard to explanations in the Chapter 13 Content Specifications.

The preset files can be categorized in Program Stream (Video and Sound are within the encoded file) and Elementary Stream (only Video is encoded). So each preset has a \_PS (Program Stream) or \_ES ending.

The following Resolutions are selectable from the list:

Description	Framerate	Resolution [Pixel]
PAL	25fps	720x576
NTSC	29.97fps	720x480
VGA	25 / 30fps	640x480
SVGA	25 / 30 fps	800x600
XGA	25 / 30 fps	1024x768
HD720p	25 / 30 fps	1280x720
HD1080p	25 / 30 fps	1920x1080

E.g. selecting the preset „MA\_VPU\_XGA\_30fps\_15MBits\_PS“ means:

Resolution XGA: 800x600 Pixel

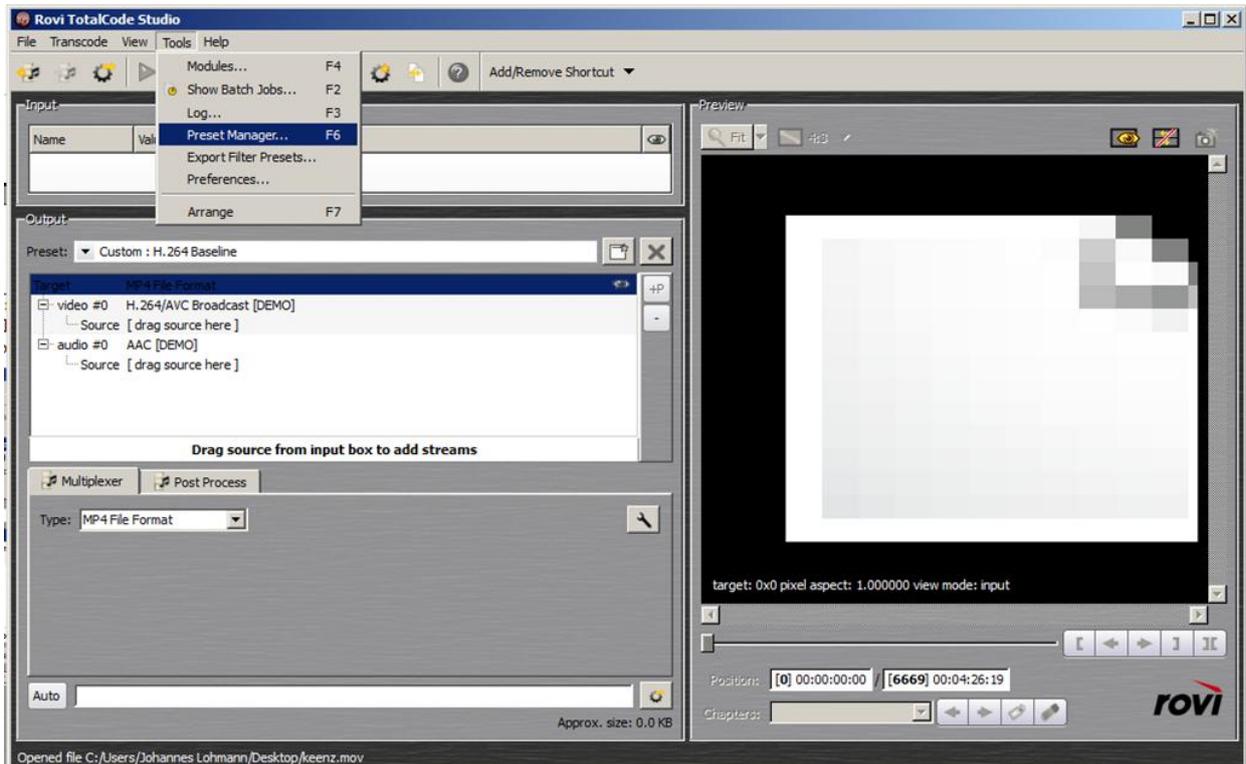
Frame Rate: 30fps progressive

Bitrate: 15 Mega Bit per Second

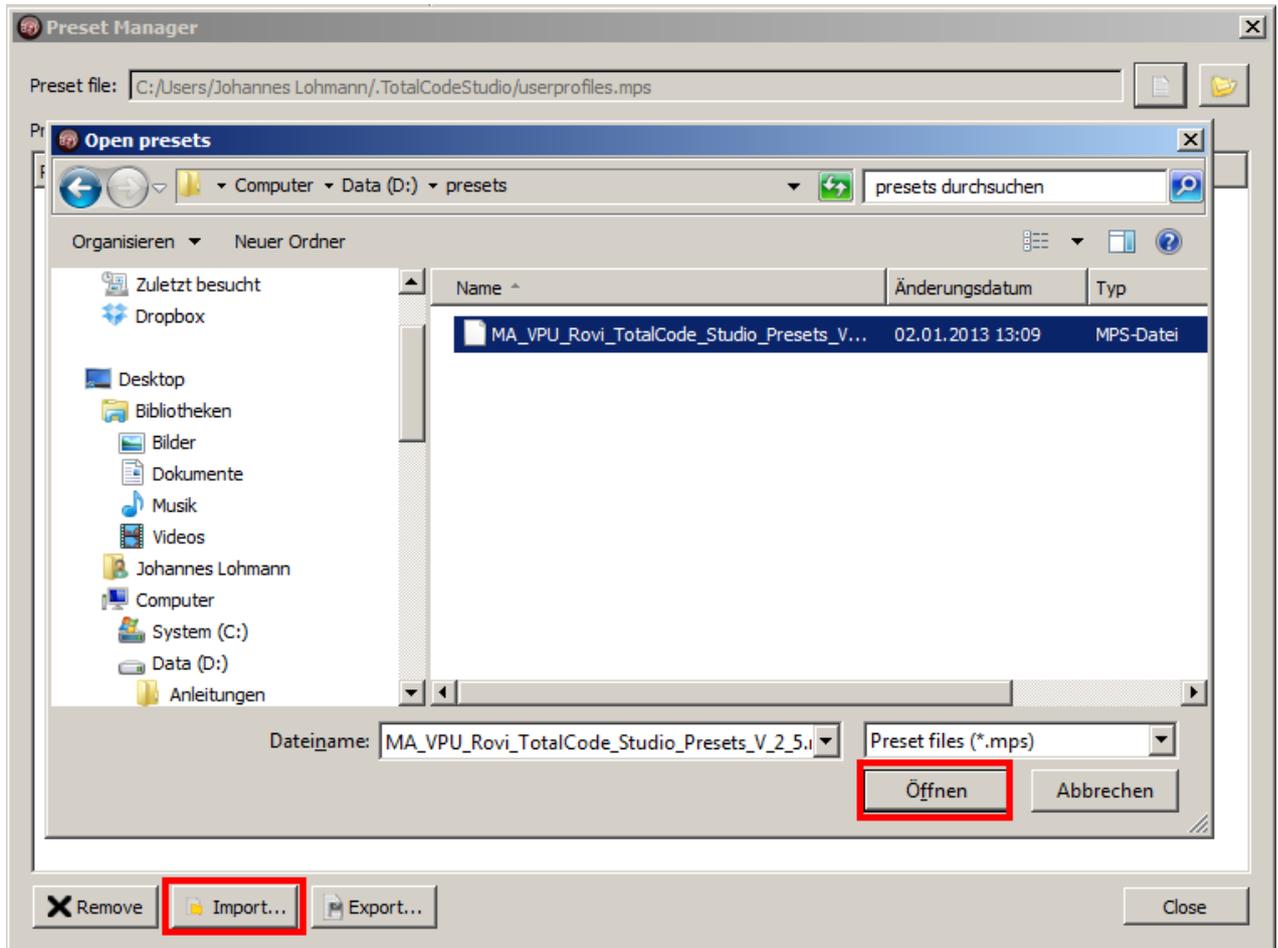
Stream Type: Program Stream

### Use of the MA Presets in Rovi TotalCode Studio:

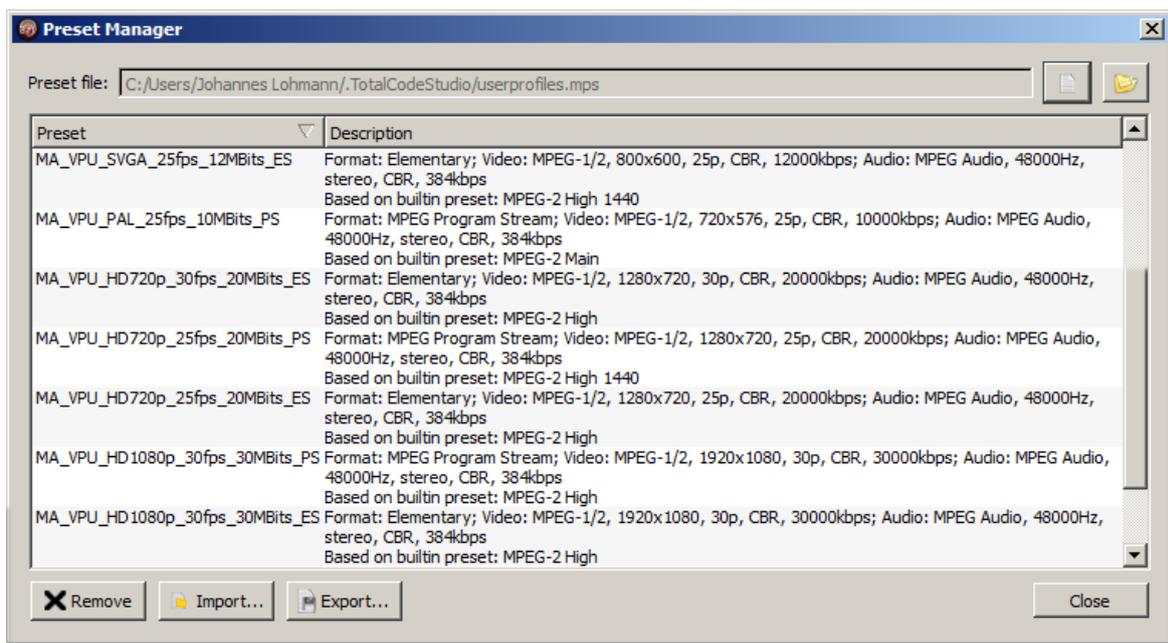
1. Start Rovi TotalCode Studio
2. Click on Tools / Preset Manager or Press F6 on your keyboard



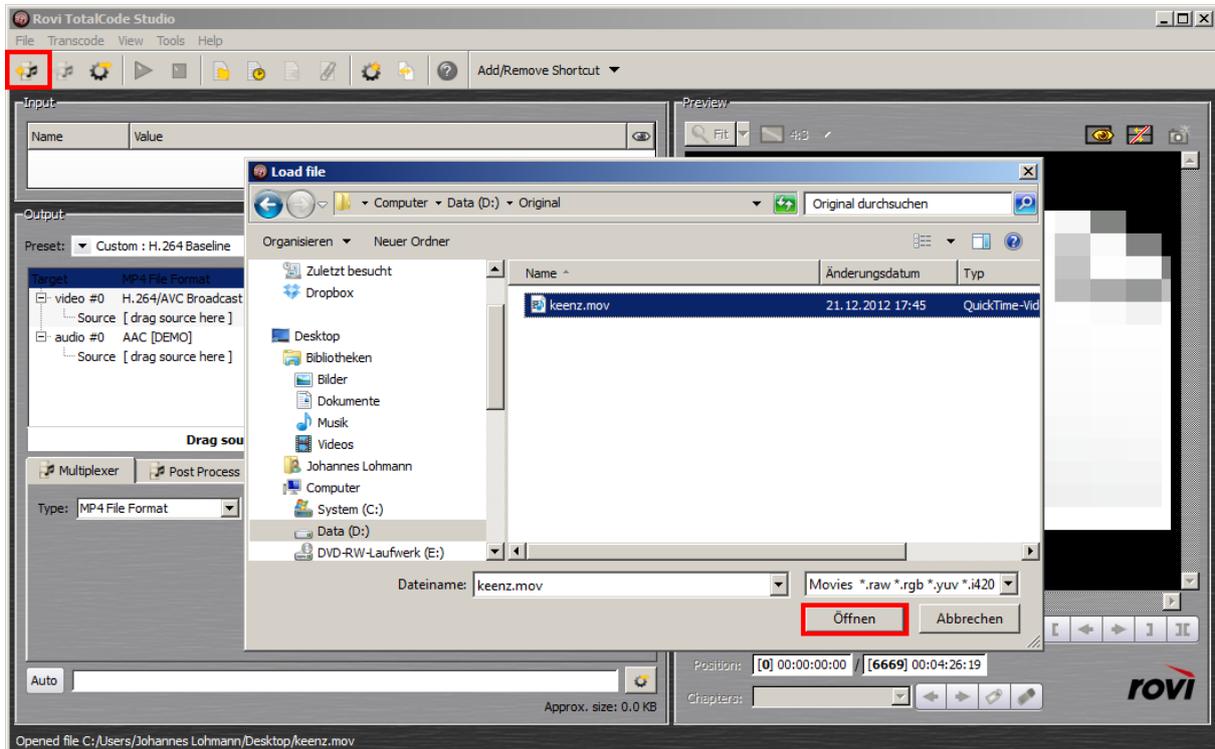
3. Import the file „MA\_VPU\_Rovi\_TotalCode\_Studio\_Presets\_V\_2\_5“



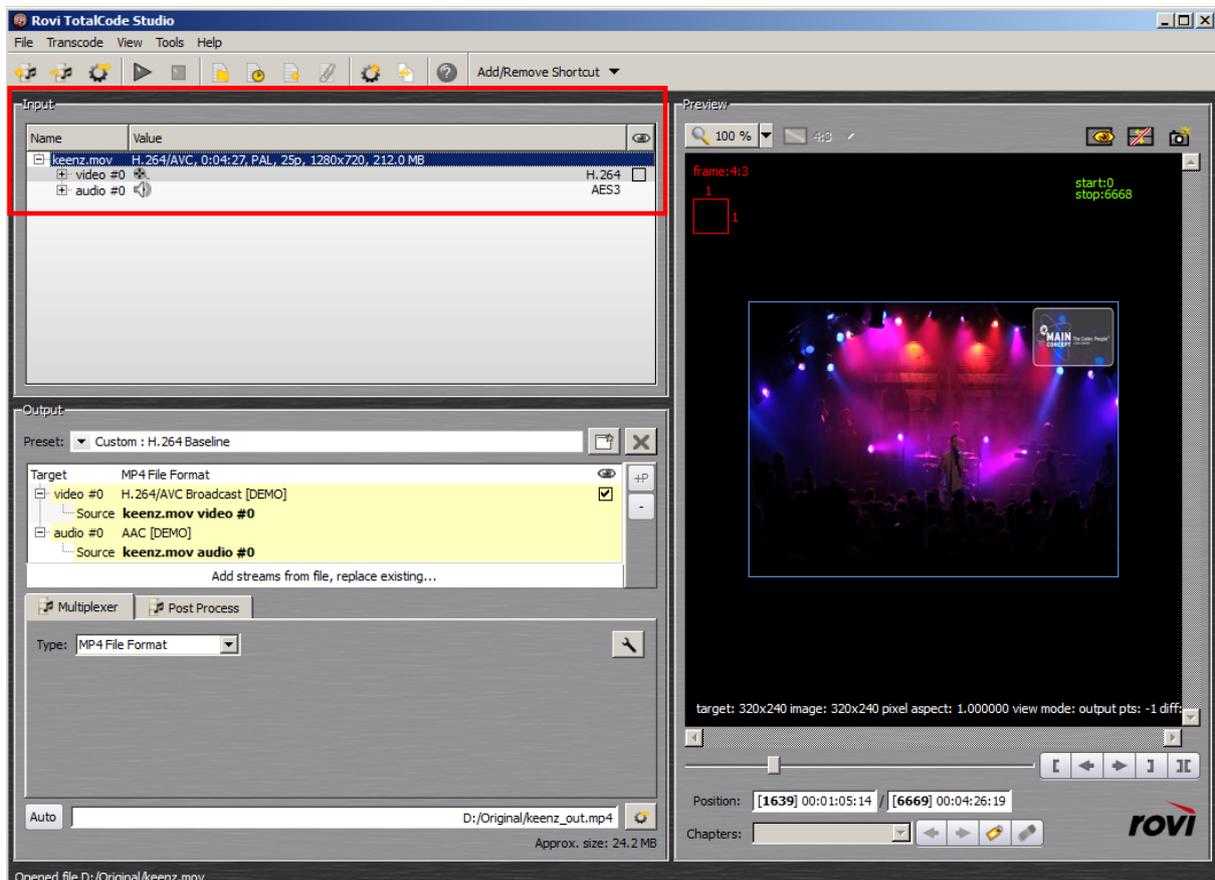
4. All presets are now listed in the Preset Manager



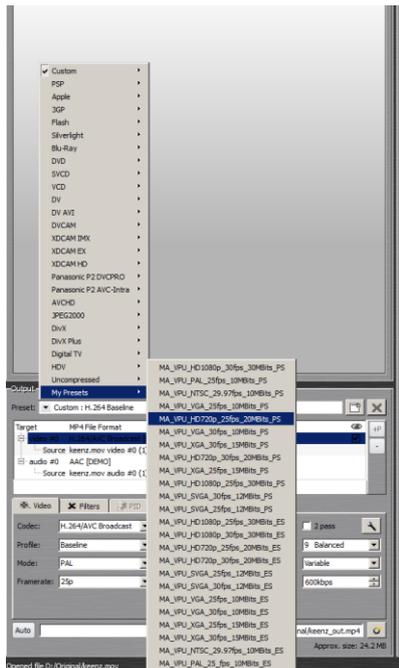
5. Open Media, load the video file you want to transcode from your hard drive



6. Drag the File Container of that file in the lower (output) part to assign it the encoder.



7. Select the corresponding Preset that fits the original file properties

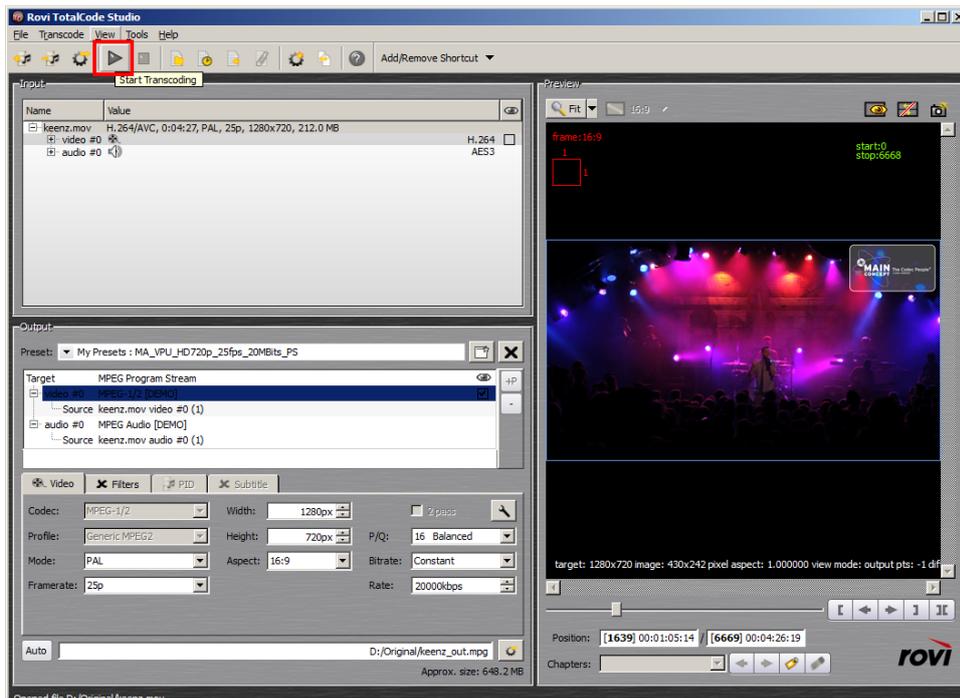


8. Check if the settings are corresponding to your input format and that they match your wanted output format. If necessary adjust the resolution or framerate

9. Set name and location of the Output File (transcoded clip)



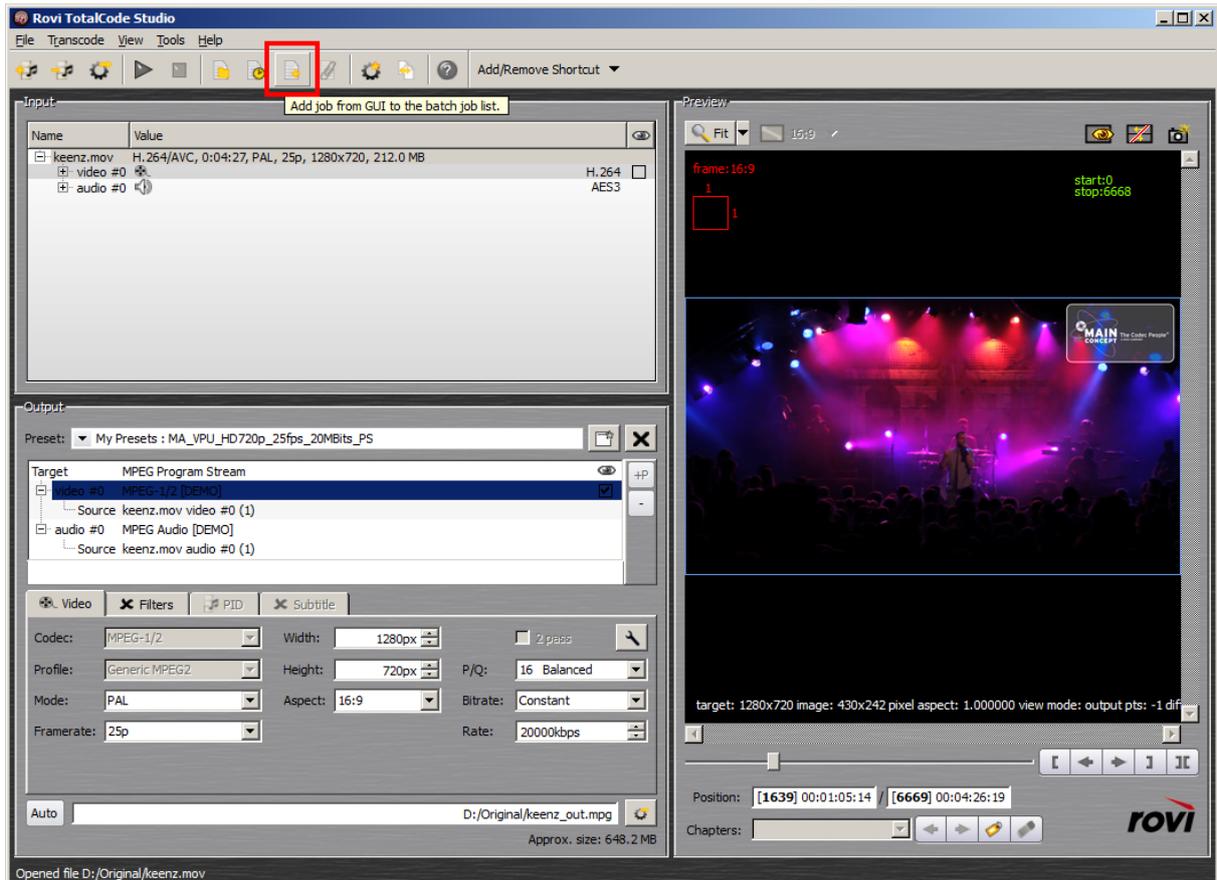
10. Start Transcoding by pressing the Play button



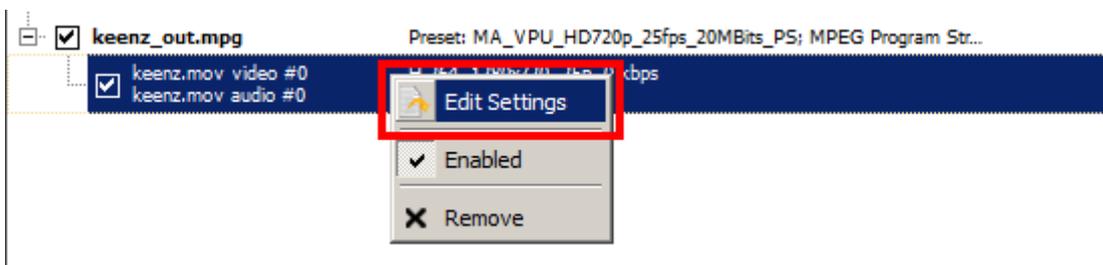
Rovi Totalcode Studio does allow several methods to automatically encode videos. This will be the batch converter and the watch folder. We will now go deeper into the batch converter. The watch folder is explained in the Tocalcode Studio manual.

### Batch conversion in Rovi Total Code

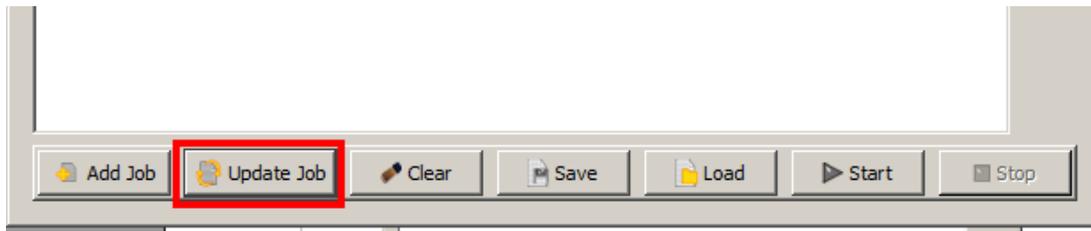
1. If you have already imported and assigned a video to be transcoded as described before, you can add this job to a queue. Simply press the „add to batch job list“ button.



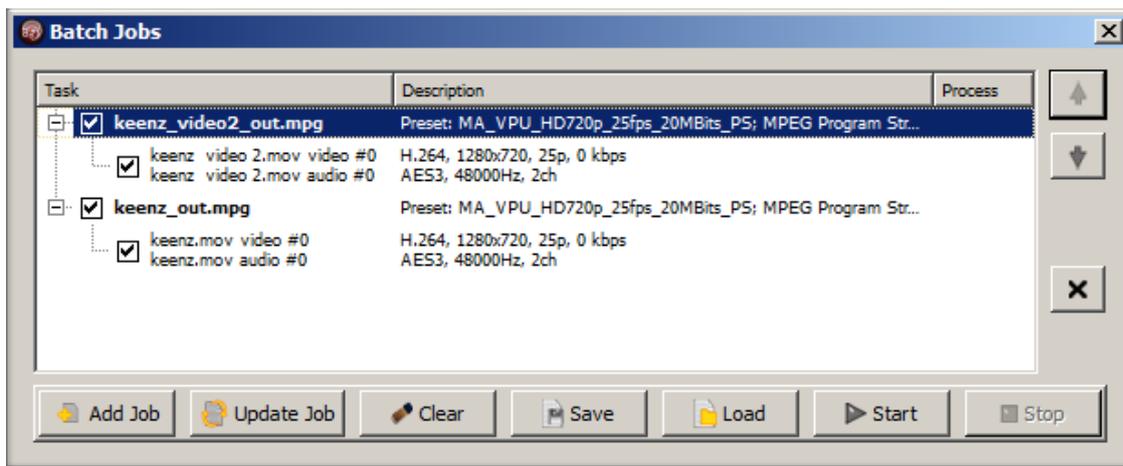
2. If needed, entries in the batch list can be selected and edited again in the main window of the application by using a right click on the entry and then selecting „Edit Settings“.



3. When all settings are adjusted, use the function „Update Job“ in the Batch Window to update the batch list entry.



4. When all files are set into the batch list, press the „Start“ button to activate the process.



## 14 Warnings

### SEIZURE WARNING

Some people (about 1 in 4000) may have seizures or blackouts triggered by light flashes or patterns, such as while watching TV or playing video games, even if they have never had a seizure before.

Anyone who has had a seizure, loss of awareness, or other symptom linked to an epileptic condition should consult a doctor before working with the application.

Parents should watch when their children while using the program. Stop working immediately and consult a doctor if you or your child has any of the following symptoms: **Convulsions, Eye or muscle twitching, Loss of awareness, Altered vision, Involuntary movements, Disorientation.**

TO REDUCE THE LIKELIHOOD OF A SEIZURE WHEN WORKING WITH THE PROGRAM:

1. Sit or stand as far from the screen as possible.
2. Use the smallest available screen.
3. Do not work if you are tired or need sleep.
4. Work in a well-lit room.
5. Take a 10 to 15 minute break every hour.

### REPETITIVE MOTION INJURIES WARNING

Working with the application can make your muscles, joints or skin hurt after a few hours. Follow these instructions to avoid problems such as Tendonitis, Carpal Tunnel Syndrome or skin irritation:

Take a 10 to 15 minute break every hour, even if you don't think you need it.

If your hands, wrists or arms become tired or sore while working, stop and rest them for several hours before playing again.

If you continue to have sore hands, wrists or arms during or after play, stop working and see a doctor.

## 15 Keyboard Shortcuts

Common shortcuts:

View	Key	Function
Preview / Fullscreen	Alt +Enter	Fullscreen / Windowed Mode (only dongle users)
	Shift + Enter	GUI on/off (Graphical User Interface on / off)
	Shift + Mouse	Rotation of selected objects
	Shift + Ctrl + Mouse	Rotation of the selected objects around their centre
Content Editor	Ctrl + X	Cut
	Ctrl + C	Copy
	Ctrl + V	Paste
	Delete	Delete
Warper	Ctrl + Enter	Toggle Warper GUI
	Ctrl + Z	Undo
	Ctrl + Y	Redo
	M	Move
	R	Rotate
	S	Scale
	Shift or Ctrl	Increase or decrease the resolution while mouse movement
	Delete	Delete faces
Pixelmapper	Arrow Key	If a panel is selected in the Graphical View it can be moved
	Arrow + Ctrl	Move panel by 1/10 grid
	Ctrl + C	Copy cells in Grid View
	Ctrl + V	Paste cells in Grid View
Startup	F 11 (# < 87) F12 (# >= 87)	Acronis software starts for backup purposes (Not for dongle users of former grand MA video)

## 16 FAQ and Troubleshooting

Please note, that possible installed drivers for example for graphic cards affect the keyboard shortcuts as well.

Should you have any problems with the application, you can refer to the frequently asked questions below:

### 16.1 Software Questions:

Nr.	Question	Answer
	problems with the communication PC <-> desk	<p>Check the TCP/IP settings:</p> <ul style="list-style-type: none"> <li>- Is a network card installed?</li> <li>- Is the TCP/IP protocol configured?</li> <li>- The TCP/IP subnet mask of the PC must be equal with the subnet mask of the desk for example 255.255.255.0</li> <li>- The first 3 numbers of the IP address of the PC must be equal to the first three numbers of the desk for example:</li> </ul> <p>PC: 192.168.0.10 Desk: 192.168.0.5</p> <ul style="list-style-type: none"> <li>- The last number of the IP address must be unique in the complete network.</li> <li>- Please don't use the automatic distribution of IP settings as offered by Windows because this IPs doesn't fit the requirements.</li> <li>- Check the version. Is it corresponding with the desk version?</li> <li>- Check the VPU mode. Does it match the desk you are using?</li> </ul>
	Two network cards installed – no communication with the console	<p>Select the IP address belonging to the network card attached to the grandMA desk.</p> <p>See: 3.4 Connection</p>
	Cannot find the connected grandMA desk	<p>Check the IP Settings.</p> <p>See: 3.4 Connection</p> <p>Check version</p>

Nr.	Question	Answer
		Check VPU mode
	Video codec's	Recommended Video Codec's: At the moment we get the best results with the "MPEG2" codec.
	Fullscreen black	Check dongle  The "Fullscreen" mode requires the dongle.  Check connectivity. No output out of session.
	Fullscreen shuts off	Disable the screensaver and power management
	Firewalls and Antivirus Software.  Program won't start or  PC loses connection	The MS firewall that comes with SP 2 makes no problems. After the installation you must allow MA VPU and onPC the access to the network.  Third party firewalls and anti virus software must be configured. If this doesn't help, the programs have to be disabled or de-installed. Note that in this case the virus protection etc. doesn't work.  (To configure your firewall enable the Remote Call TCP Port 7003 in your Firewall Options)
	Bad Performance	Disable virus checks on the content files like .AVI; .IMG or .MOV files! Change the Device Settings from, RGB Emulation to HAL: Settings/Options/Driver
	Content Browsing from desk doesn't work	Check the IP-address (same subnet!) and configure or disable the firewall.  Properties of Hardware Interface - disable Checksum Offload in the advanced Setting of the Network Adapter.
	Black output screen	- May be your graphics board has too less memory (64 MB or less) and you are using a high display resolution (e.g. 1400 *1050).  Reduce the screen resolution. DMX channels are not patched Check DMX sheet Check grandmaster Check shapers Dimmer, Grandmaster, Blades closed 3D Object moved out of focus or wrong scaled

Nr.	Question	Answer
		Keystoning parameter stupid No valid Fixture Layer Output device (for example a projector) doesn't support the high resolution
	(Only for users with dongle!) Video Capture Cards: The Decklink Blackmagic SDI Capture Cards can support two SDI Inputs. Does this work with MA VPU?  Live Input (BM DeckLink Card) Stream freezes:	If the card works with the Windows Direct Show this should work. We have tested the small SDI-In card and the PCI Express Extreme. Here we only have the possibility to choose one video (from the Decklink driver) – As mentioned, if there is a card that supports two interfaces via the driver we'll support this.  Enable the "Watchdog" (Settings/Options/Video)
	Is the smallest Blackmagic SDI Capture card sufficient, I mean the card that does not support HDTV ?	See 0
	PCI or PCIe SDI capturing? The bus type is irrelevant?	Yes
	No administration rights	To work with MA VPU without administration rights you have to arrange the administration rights by the administrator on the installation path e.g.:  C:\Program Files\MA Lighting Technologies\MA VPU Software
	System crashes or stocks	The Widows XP Service Pack 2 must be installed
	Video cannot be shown	Maybe codec problems.
	Timing problems with Dual Core processors	The use of Dual Core processors can cause timing problems. Please use the actual drivers of the processor manufacturer.  If you have further problems set the switch via the menu entry 'Settings – Options – Dual Core'.
	No layers displayed in Multi Preview	No fixture Layer is selected

## 17 Supplement MA Lighting

### 17.1 Intended use

The MA Video Processing Unit (VPU) is an element of the MA system family. Intended use is output of audio and video via DVI or ArtNet. Three different versions of the MA VPU are available to suit all needs: MA VPU plus, MA VPU basic and MA VPU light. With a huge amount of functions, features and effects together with any console of the grandMA family these will be the most innovative tool available to control visual effects independent of the type of fixtures needing control.



Video processing unit

Manufacturer: MA Lighting Technology GmbH

Dachdeckerstraße 16

D – 97297 Waldbüttelbrunn

Germany

## 17.2 Data

VPU plus + basic	Dimensions: 485 x 211 x 627 mm / 19.1 x 8.3 x 24.7 inch 5 Height Units / 5 HE (for rack installation)
	Weight: 15,0 kg / 33 lbs + 0,8kg / 1.7 lbs screen protector (only for transport)
VPU light	Dimensions: 19" / 483mm (Front cover) respectively. 15.9" / 403mm (only the casing) x 3.5" / 88,1mm (2 Rack units / Rack mount space) x 16.4" / 416mm (incl. handle)
	Weight: 6,1 kg (13.5 pounds) + screen protector (only for transport)

Voltage: 230 V ~ 50Hz 120 V ~ 60 Hz (USA, Canada)  
No switching necessary!

Cable type: Only adequately protected cables may be used (min. Ø 3 x 1,0mm<sup>2</sup>)  
(Power supply cable and connector not included ex works)

Socket type Power In: PowerCon (blue) by NEUTRIK AG, Liechtenstein  
Socket type Power Out: PowerCon (grey) by NEUTRIK AG, Liechtenstein  
(only VPU plus + VPU basic)

**ATTENTION!** The total current power consumption of the units connected in series must not exceed the maximum of the power source!

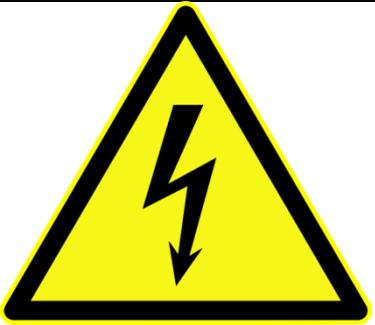
Rated Power Consumption:

VPU plus: max. 400 VA

VPU basic: max. 300 VA

VPU light: max. 200 VA

## 17.3 Symbols and warning labels

		I 0	~
Warning Danger Area	Warning Danger of electric shock	Supply voltage ON/OFF	Alternating current (AC)

## 17.4 LIMITATIONS

The screens of grandMA2 series and other units of the new generation are subject to conditions of failure class 2. Following items are acceptable and no reason to worry:

ITEMS:            ACCEPTABLE COUNTS:

Permanent bright dots                            max 2 (minimum distance between bright dots  $\geq$  15mm)

2 dots adjacent permanent bright            max 1

Permanent dark dots                            max 5 (minimum distance between dark dots  $\geq$  15mm)

2 dots adjacent permanent dark            max 1

Total bright and dark dots                    max 5

## 17.5 Transport

Please be aware of the weight of the product. Be careful when moving it; otherwise you may injure your back or other parts of your body.

Video processing unit (VPU plus + basic) approx. 15 kg (+ 0,8 kg transport protector)

Video processing unit (VPU light) approx. 6,1 kg 13.5 pounds

Secure all covers prior to transport. Remove all cables on the back cover and the USB connectors on the front panel

Handles on the products are designed exclusively for personnel to hold or carry the product. It is therefore not permissible to use handles for fastening the product to or on means of transport such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport and for observing the safety regulations of the manufacturer of the means of transport. Noncompliance can result in personal injury or material damage.

Use original MA-Case for transport and storage or comparable transport device.

If the front of the VPU cannot be protected with a transport case, install the protection cover.



Do not place the unit on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Do not twist the body.



Check the apparatus after transport before installation!  
If body of the apparatus is damaged (bend or broken), monitor is broken or connectors are damaged do not connect the apparatus to power! Call our hotline for technical support!

## 17.6 General Safety Instructions

Read all the instructions in the user's manual, especially the safety requirements see Safety requirements

Follow all instructions. Keep the user's manual for later use.

Follow all cautions and warnings indicated on the unit.

Disconnect the mains plug before cleaning the unit; don't use any liquid or spray cleanser. Clean with a dry cloth.

Do not use the unit near water. Do not expose it to a humid environment. Do not spill any liquid over the unit.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Do not block or cover any ventilation slots in the housing - they guarantee the reliable functioning of the unit and protect it against overheating. Do not install the unit into a frame unless sufficient ventilation is guaranteed. Install in accordance with the manufacturer's instructions.

Do not insert any objects through the slots of the unit, as these could get in contact with live parts or could cause short circuits. This may cause a fire and an electric shock.

Do not place the unit on unstable surfaces. It may fall and get damaged.

Do not place any objects on the power cord. Protect it from being walked on or pinched particularly at plugs and the point where they exit from the apparatus.

If using an extension cord, make sure the rated output of all units connected in aggregate does not exceed the maximum rated output of the extension cord. The rated output of the units plugged into the socket should in aggregate not exceed 10 amperes.

**If the power cord or the mains plug is damaged, let a qualified technician replace it immediately.**

**Only use power cords which are marked as safety-proof.**

**All service work should be exclusively performed by qualified service technicians.**

**Do not use any high-power walkie-talkies or cellular phones near the unit.**

The unit is provided with a safety plug. This plug can only be used with safety sockets. These precautions should by all means be followed. If the plug should not fit into a given socket (e.g. the case with old sockets), the socket should be replaced by an electrician.

Do not ignore the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

As with all industrially manufactured goods, the use of substances that induce an allergic reaction such as aluminium cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties), consult a physician immediately to determine the cause.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped. Besides others, you run the risk of suffering an electric shock.

**If one of the following conditions occurs, please disconnect the mains plug and call your dealer or technical support!**

Power cord or mains plug is damaged or worn.

Liquid penetrated the unit.

The unit was exposed to rain or high ambient humidity.

**The unit does not function properly, even when following all the instructions in the manual. Only manipulate the controls as stated in the manual, wrong settings on the controls may damage the unit.**

The unit fell and the housing was damaged.

**WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE**

## 17.7 IMPORTANT SAFETY INSTRUCTIONS

Read these instructions.

Keep these instructions.

Heed all warnings.

Do not use this apparatus near water.

Clean only with dry cloth.

Do not block any ventilation openings.

Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

Protect the power cord (not included) from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exist from the apparatus.

Only use attachments / accessories specified by the manufacturer.

When a cart is used, use caution when moving the cart / apparatus combination to avoid injury from tip-over.

Unplug this apparatus during lightning storms or when used for long period of time.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

## 17.8 Electric shock warning on the rear of the *grandMA*

The unit should be serviced by qualified personnel only, as live parts may be exposed when opening and/or removing coverings; besides others, you run the risk of suffering an electric shock.



## 17.9 Safety and Environment

### Operating Limits



**Temperature:** 0°C - 30°C / 32°F – 86°F (recommended 10°C – 25°C / 50°F – 77°F, due to extreme processing power)

Deeper temperature can cause failure of the displays, higher temperature can overcharge the cooling system of the apparatus and can destroy hardware components.

**Humidity:** Operation: 20% - 80% relative humidity (no condensation)

Storage: 10% - 80% relative humidity (no condensation)

### Environment

Follow all the IMPORTANT SAFETY INSRUCTIONS.

Use the apparatus only within the environment operating limits.

Use the apparatus only indoor.

Air must be free of dust and hazardous and explosive substances.

Avoid vibrating support, and extreme loud environment

This apparatus is not protectet against splash water. Do not use this apparatus near water

Do not use the apparatus in rain or moisture.

## 17.10 Quickstart Connect VPU plus



**2x DVI OUT + EDID Switches**

**Mains switch ON / OFF** (In standby mode – switch on “I”, the AC power voltage is present within the instrument, even if the apparatus is switched off by the push button on the front)

**Mains Input** (blue) 120 / 230V, 50/60Hz no switching of voltage necessary (Cable not included ex works)

**Mains Output** (grey) 120 / 230V, 50/60Hz no switching of voltage necessary (Cable not included ex works)

**2x Ethernet**  
(for connecting MA-consoles, grandMA onPC ....)

**SDI In 1 + 2** (option)

2x USB e.g. mouse, keyboard, storage device  
(+ 2 more USB at the front panel)

**Audio OUT** Left / Right

**eSATA** – port for connecting external drive  
Use only cable with max length 0,5m!  
Do not disconnect drive when at work!

## 17.11 Quickstart Connect VPU light



**2x DVI OUT and 1x VGA OUT**

**2x Ethernet (for connecting MA-consoles, grandMA onPC ....)**

**2x 3.0 USB e.g. mouse, keyboard, storage device + 2 x USB 2.0 at the front panel**

**SPDIF** Digital audio output

**Audio OUT** Left/Right Ground On/Off

**eSATA** port for connecting extern drive  
Use only cable with max length 0,5m! Do not disconnect drive when at work!

**Mains switch ON / OFF**  
(In standby mode – switch on “I”, the AC power voltage is present within the instrument, even if the apparatus switched off by the push button on the front)

**Mains Input (blue)**  
120 / 230V, 50/60Hz no switching of voltage necessary  
(Cable and connector not included ex works)

## 17.12 Switching the apparatus On/Off



**Caution: Do not power down during booting.** Such a switch-off may lead to corruption of the solid state disk files.

### Power connector

AC power switch on the rear panel

#### Position I = ON

In the I position, the instrument is in standby mode or in operation, depending on the position of the ON/STANDBY key at the front panel.



#### Note:

The AC power switch may remain ON continuously.

Switching to OFF is only required when the instrument must be completely removed from the AC power source.

#### Position O = OFF

The O position implies an all-pole disconnection of the instrument from the AC power source.

### Standby switch

ON/STANDBY button on the front panel

The ON/STANDBY switch activates two different operating Modes:

#### Operation ON –

**First push on ON/STANDBY – button**

The apparatus starts booting.

#### STANDBY –

**Second push on ON/STANDBY – button**

The apparatus switch to standby - mode



**Caution:**

In standby mode, the AC power voltage is present within the apparatus

### Switching On the Instrument

In order to switch on the apparatus, set the power switch on the rear panel to position I. Set the apparatus to operating mode by pressing the ON/STANDBY button on the front panel.

## Switching Off the Instrument

In order to switch off the apparatus, push the ON / STANDBY button on the front panel and confirm with the soft button "YES". In this standby mode, the AC power voltage is present within the instrument. For longer non use switch the power switch to "0"

### Cleaning

The VPU demands only minor attention. Clean the surface only with dry soft cloth and look for proper condition of ventilation. Do not use any liquid cleaner or compressed air.

## 17.13 Maintenance

Electric shock warning: The unit should be serviced by qualified personnel only, as live parts may be exposed when opening and/or removing coverings; besides others, you run the risk of suffering an electric shock.

## 17.14 Conformity

Declaration of Conformity according to directives 2004 / 108 / EG

**Manufacturer's name:** MA Lighting Technology GmbH

Manufacturer's address: Dachdeckerstraße 16  
D-97297 Waldbüttelbrunn  
Germany

*declares that the product*

**Product category:** Control unit

**Name of product:** Video Processing Unit (VPU)

*complies with the following product specifications:*

**Safety:** EN60065, EN60950-1

**EMV (EMC):** EN55103-1:2009 (E1)

EN55103-2:2009 (E2)

**Additional information:** DMX512, Ethernet, USB, Malink, DVI, LTC, Audio IN, Midi and analogue inputs must be shielded and the shielding must be connected to the earthing resp. to the housing of the corresponding plug.

Waldbüttelbrunn, September 6th 2013

Dipl. Ing. Michael Adenau



## 18 Index

### 3

3D Objects ..... 92

3D objects customizing..... 141

3D Objects format ..... 149

### A

Access VPU via Network..... 30

Acronis ..... 19

**Anti Alias**..... 77

ArtNET ..... 127

Artnet IP Address ..... 32

**Art-Net Out Mode**..... 128

Aspect Ratio..... 92

Audio Codec..... 149

auto start ..... 12

### B

Backup ..... 18

**Bezier function** ..... 99

Bit Rates ..... 148

Blind Preview ..... 85

Borders ..... 105

### C

Camera Cam 1..... 107

**Camera Features and Attributes** ..... 115

Camera Layer ..... 47

Capture Device ..... 80

Codecs..... 146

**Colorboost**..... 115

ColorBoost ..... 105

Colorkey ..... 104

**ColorMix** ..... 104

Comparison VPU plus / VPU basic / VPU light..... 9

Connection States..... 37

Content Editor..... 88

**Content Redirection**..... 77, 88

Content Specifications ..... 146

Copy & Paste..... 130

### D

Data management ..... 41

**Dimmer** ..... 103

distribute content..... 12

### E

EDID Manager ..... 33

Eff1 Type ..... 93, 112, 117

Effects..... 103

Excel Sheet..... 130

**Export and Import Function Blocks**... 90

**Export- Import to Excel**..... 130

### F

Fade between images..... 106

FAQ ..... 159

File Browser..... 94

File Format of LED Panels ..... 134

Fixture Layers..... 44

fixture type version..... 45

FOH Features ..... 76, 78

*founder*..... 37

*Frame Blending*..... 76

**Full screen**..... 85

**G**

*grandMA 1/2 Network*..... 81

*grandMA I or grandMA II mode* ..... 36

**H**

**HSB+C**..... 104, 115

**I**

*Image Format*..... 148

*Image Pool*..... 89

*Installation*..... 12, 36

*Internal Screen VPU light*..... 73

*Internal Touch Screen* ..... 71

*IP* ..... 38

*IP address*..... 32

*I-Pool*..... 89

**Iris** ..... 113, 115

**K**

*Keyboard Shortcuts*..... 158

**Keystone**..... 118

*Keystoning* ..... 122

**L**

*Layer Effects*..... 103

*Layer properties* ..... 44

*Layer Reference*..... 48, 89

*LED Panel Examples* ..... 136

**Linear function** ..... 99

**Local Sound**..... 77

**M**

*Master*..... 41

**Master control**..... 113

*Master Features and Attributes*..... 113

*Master Layer*..... 46

*Menu bar* ..... 74

*Multi Preview* ..... 87

*Multiselection* ..... 129

**N**

*Network* ..... 38, 76

**O**

*Order of Effect Execution*..... 120

*Output Layer*..... 47

**P**

*Pixel Mapper*..... 124

*Pixel Mapper Editor*..... 127

*Pixel Mapper Graphical View*..... 125

*Pixel Mapper Toolbar*..... 126

*Predefined Constellations (.PED Files)* . 58

*Preview*..... 86

*Principle function diagram*..... 42

*Program surface* ..... 70

**Q**

*Quickstart with grandMA1*..... 61

*Quickstart with grandMA2* ..... 65

**R**

*Render*..... 84

**Render IP**..... 127

*Reset Windows*..... 85, 87

*Restoring an image with Acronis*..... 20

<i>Rovi TotalCode Studio</i> .....	150	<i>Storing an Image with Acronis</i> .....	24
<i>Rovi TotalCode Studio</i> .....	151	<i>streaming dialog</i> .....	81
<b>S</b>		<b>T</b>	
<i>sACN protocol</i> .....	127	<i>Text Ticker</i> .....	91
<i>Screen Layout</i> .....	39	<i>Toolbar</i> .....	85
<i>Service Packs</i> .....	13	<b>Trace Files</b> .....	77, 78
<i>session</i> .....	37	<i>Transistion Time</i> .....	106
<b>Session ID</b> .....	38	<i>Transistion Type</i> .....	106
<i>Settings Network</i> .....	38	<i>Transition from grandMA video to MA VPU</i> .....	10
<i>Setup dialog</i> .....	72	<i>TripleHead2Go</i> .....	50
<i>Several grandMA VPU applications in one grandMA show</i> .....	59	<i>Troubleshooting</i> .....	159
<b>Shaper</b> .....	114, 116	<b>U</b>	
<i>Show Mode</i> .....	76, 85	<i>Update of Fixture Types</i> .....	14
<i>shut down the PC via the desk</i> .....	113	<b>V</b>	
<b>Single Layer Transistion</b> .....	106	<i>Video Codec</i> .....	147
<i>slave</i> .....	41	<b>Video In</b> .....	80
<i>Slave</i> .....	38	<i>Video Layer</i> .....	45
<i>Sniffer</i> .....	38	<b>Virt Out</b> .....	127
<i>Sniffer mode</i> .....	37	<i>Virtual Output</i> .....	48
<i>Softedge</i> .....	119	<i>VPU Loader</i> .....	12
<i>Softedging</i> .....	121	<i>VPU Startup</i> .....	12
<i>Software Update</i> .....	13	<b>W</b>	
<b>Sound</b> .....	112	<i>Warnings</i> .....	157
<b>Start in Full screen</b> .....	82	<i>Warper 3D Objects</i> .....	96, 102
<i>Status Bar</i> .....	86	<i>Warper Basic Operation</i> .....	96
<i>Store Alignment</i> .....	85	<i>Warper Fullscreen View</i> .....	95
		<i>Warping</i> .....	99