

# grandMA 3D

Operating Manual

Version 6.0.4.0

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#### **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 visualization software.

The ,grandMA 3D' software 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 It is therefore possible that the entire information printed in this manual is out-of-date.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 medium.

For the current software version refer to [www.malighting.com](http://www.malighting.com)

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 grandMA 3D team

## 1 Introduction

grandMA 3D is a unique new user interface, created for the visualization of three dimensional stage layouts to be utilized in conjunction with the grandMA product range. Series I and series II desks are supported.

The software is designed as a pre-programming tool for light designers. It simplifies the process of creating shows to save time and money.

grandMA 3D includes a library of basic graphical elements. Multiple windows with front/side/top view can be opened and updated at the same time. All the stage elements can be positioned in x/y/z directions and may also be rotated around the various axes. Custom textures for the surface of these elements can be imported in a bitmap format or may be chosen from a library.

The setup of lanterns, luminaries or moving lights can be simply retrieved from the grandMA console's or grandMA onPC show file per electronic transfer. There is no need to set DMX lines, DMX addresses or operation modes for the single fixtures, as these details are already pre-adjusted in the grandMA.

When switching to 3D rendering mode, the grandMA 3D software becomes an extremely powerful visualizer with real time rendering facilities. All drawing elements, fixtures and lanterns are shown with surface textures, as a kind of virtual reality. All functions of the installed lights are remotely controlled by a connected grandMA desk and onPC and displayed with realistic movements, colors and images. At the same time the viewing angle can be changed by just moving the virtual camera around with full control of zoom, position and rotation. Or just switch to another pre-defined camera position and start a new movement from there.

Several optical fixture parameters, like beam angle, color (even color mixing) and gobos can be displayed. Custom gobos can be inserted by simply assigning a color bitmap file to the gobo position of the related fixture.

All the show data can later be received "online" from the grandMA desk or onPC and displayed in real time rendering. It may also be recorded live and converted into one of the standard video compression formats. These files can be easily viewed on any personal computer or MAC with standard media player software and may even be sent by e-mail.

## 2 System Requirements

- IBM® compatible PC or notebook with 2GHz processor with at least 1 GB RAM
- Ethernet card
- High-speed 3D graphics card with hardware acceleration:
  - at least 512 MB video memory e.g. NVIDIA 9800 GTX
  - vertex shader >= 3.0
  - pixel shader >= 3.0
- 1024x768 pixel resolution or above
- 500 MB available disk space on hard disk
- Microsoft Windows® XP (recommended) or Windows Vista® operation system with latest service pack
- Microsoft DirectX® version 9 or above
- grandMA console or grandMA onPC (both series 1 or 2 are supported)

## 3 Installation

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

Please extract the downloaded file into a temporary folder and run the 'Setup' (gMAvideo\_xxx.exe) program.

**Note:** You should have administration rights to install the program.

### 3.1 Version of grandMA desk or grandMA onPC

You can determine by means of the version number of grandMA 3D if the software version of the visualizer fits to the software version of the desk or off-line.

grandMA 3D version number can be determined via:

- Filename of the setup:  
gMA3D\_{{GMA2-Streaming}}[{{GMA1-Streaming}}]\_v{3D-Version}
- Splash screen (appears while startup)
- Info box (Menu – Help – Info)
- Version info of '.exe' file (right click on grandMA3D.exe – Version – Comment)

Example: grandMA3D\_1[6.0]\_v6.1.0.0

1	<b>GMA2-Streaming Version</b>	This number should <b>correspond to</b> the <b>grandMA 2</b> onPC streaming version
6.0	<b>GMA1-Streaming Version</b>	This number should <b>correspond to</b> the <b>grandMA 1</b> onPC streaming version
v6.1.0.0	Version of grandMA 3D	

The grandMA onPC software can run on the same PC or on an external PC connected via Ethernet.

## 3.2 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.

grandMA 3D has to be restarted if the settings are changed. New addresses are read with the restart of grandMA 3D.

**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 grandMA 3D 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 grandMA 3D is 127.0.0.1 (the local host address of the PC).

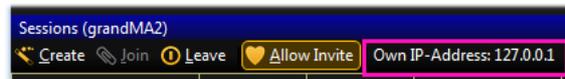
In this case grandMA 3D can be connected only with the onPC application running on the same PC.

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

If grandMA 3D is working in grandMA 1 mode no restart is necessary.

If grandMA 3D is working in grandMA 2 mode you must restart the application after changing the IP address.

The actual IP address is shown within the Sessions window:.



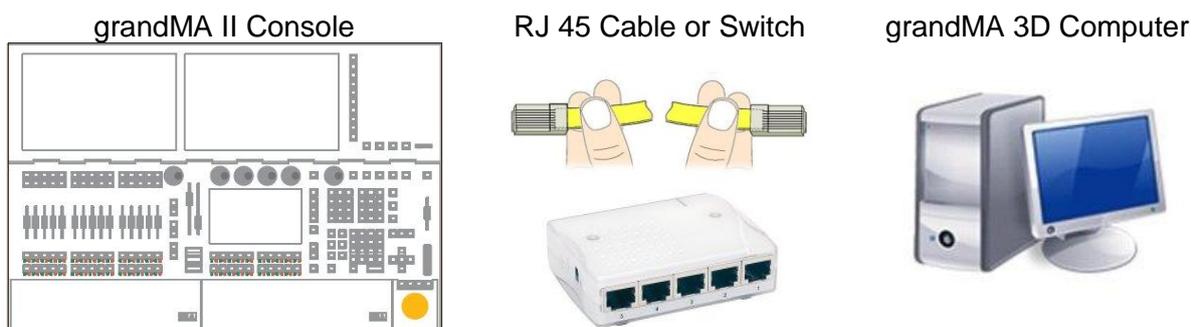
You can change the IP address via the menu entry: 'File – Settings – Network'.

### 3.3 Connection with the grandMA desk

Please make sure, that the program version of the grandMA desk meets the specifications described in: *Version of grandMA desk or grandMA onPC* .

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

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



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 show
- Start a new session at the desk
- Start the grandMA 3D application and join the session or invite the 3D from the desk

The application connects to the desk and receives the data of the current show. The received show will be visualized.

If you do not get a connection to the desk, make sure that grandMA 3D has the right IP address as described in '3.2 IP Addresses' and that the corresponding mode: grandMA 1 or grandMA 2 set accurate.

### 3.4 grandMA 1 or grandMA 2 mode

grandMA 3D supports series 1 and series 2 consoles. To switch between these modes it has to be restarted in the desired mode. This can be done via the menu entry 'File – Restart in series x Mode'. The actual mode is displayed in the Stage view, the session window and the Info Box (Menu – Help – Info).

**Note:** Show files of series 1 grandMA3D (.sl\_ files) cannot be imported!

To visualize a grandMA series 1 show connect with the desk and the fixtures and their positions will be visualized. The environment must be re-imported via the import function as .3ds file (menu 'File Import') or rebuilt if no .3ds file exists.

## 4 Data Management

This section describes how data is managed by the desk and the 3D visualizer.

Desk and visualizer software can work independently. Each package can be operated standalone. If they are connected in a MA network session the desk gets the master and 3D becomes the slave of a session. Data changed within 3D is transferred to the desk and vice versa. 3D and the desk use the same file format for show files (.gz files) in grandMA 2 mode.

**Note:**

In grandMA 1 mode (series 1 desk and .3d1 showfile) the environment (stage equipment like trusses, people...) is stored within the 3D only.

### 4.1 Master / Slave

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

Only if 3D is started as standalone it will be the master. If a desk is connected and a session is started within the 3D the 3D show file will be transferred to the desk and then this becomes the master. So the synchronization of desk and 3D data is guaranteed.

The three 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 grandMA 3D.



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



Heart is blinking green:  
grandMA 3D has joined a session as slave



Heart is blinking blue:  
GrandMA 3D has the Master function of a session. The creation of a session with grandMA 3D can be used to transfer all data of a show to a desk or onPC. If the loading is completed, the desk automatic becomes the master and grandMA 3D gets the slave.

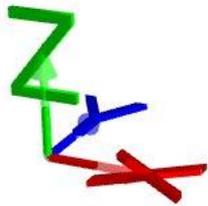
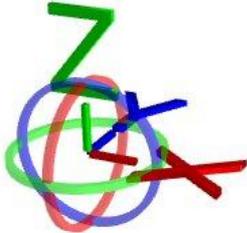
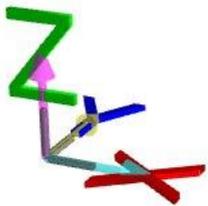
**ATTENTION:** With the start of a new session (Create) the session founder overwrites all data of the other members. I.e. if a new session is founded by the grandMA 3D **all** data in the desk will be overwritten!

Because the 3D file contains all data it may be helpful to use the 3D as backup. Therefore the 3D is started with the backup show as master and the desk is invited to the session.

## 4.2 Coordinate system

GrandMA 3D geometric system lets you define and manipulate objects in 3D space. It features a geometric system architecture that defines the X-Y plane as the ground area with the height as Z –axis.

All objects can be moved or rotated along the world- or their own object axis (if the object has been rotated) as described in chapter ‘6.3.1 Stage View’. You can switch between the world or object axis via a toolbar button or the keyboard as shown in the following list:

Operating Elements	Symbols in 3D View	Description
<b>World axis</b>  or Ctrl + W		 Objects can be <b>moved</b> along the <b>world axis</b> .
		 Objects can be <b>rotated</b> along the <b>world axis</b> .
<b>Object axis</b>  or Ctrl + O		 Objects can be <b>moved</b> along the <b>object axis</b> .
		 Objects can be <b>rotated</b> along the <b>object axis</b> .

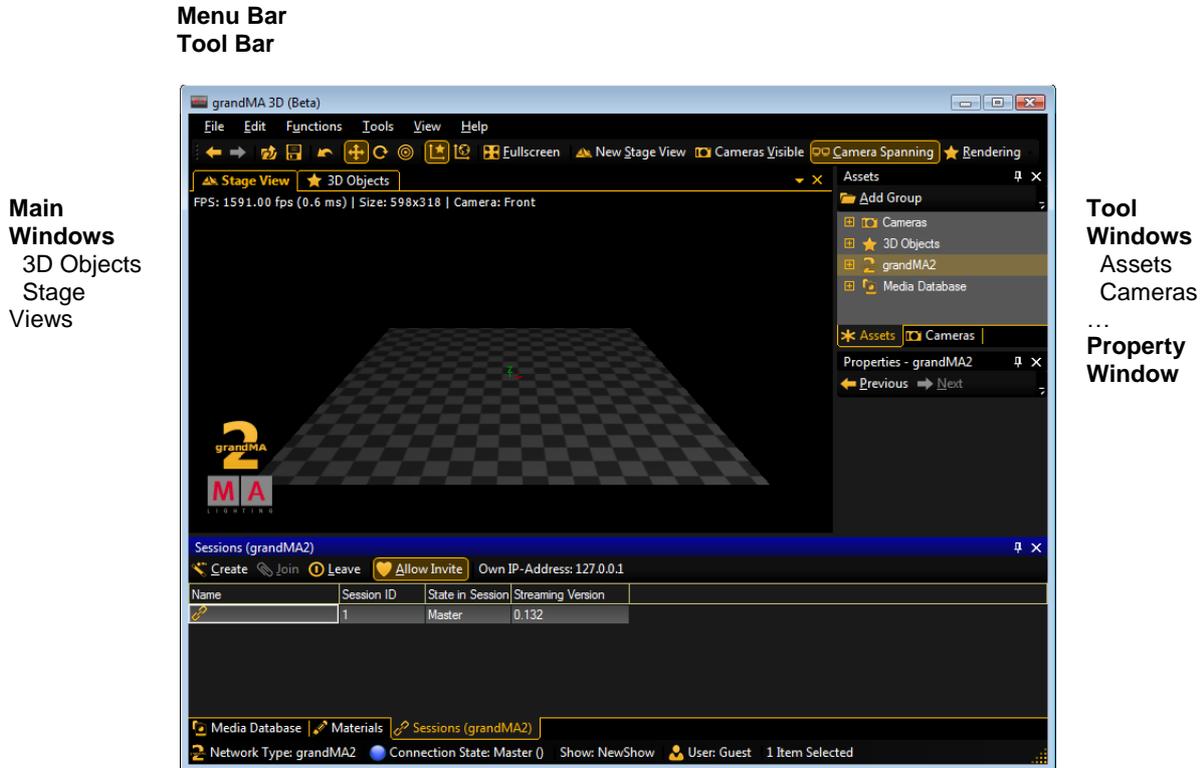
## 5 Quick Start

This chapter is a quick tutorial how to start a session at the desk and connect the 3D.

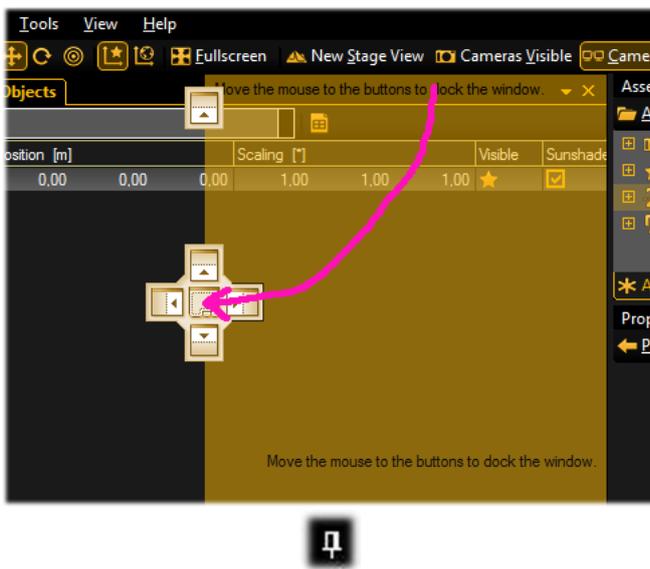
Coming soon.

## 6 Program Surface

After starting the program the following screen appears.  
Normally the windows are arranged in the following layout:



**Tool Windows**  
Media Database  
Materials  
...  
**Status Bar**



To arrange your own layout select the window and drag it while holding the left mouse button. A 'guide diamond' appears. The arrows of the diamond show the possible positions. Move the pointer to the desired new position of the 'guide diamond' and release the mouse button.

You can save or load these settings in a separate file via the menu entry: 'View – Window Layout – Save... / Load...'

The menu entry: 'View – Window Layout - Reset Window Layout' resets all windows to their default positions. When not in use you can 'Auto Hide' a Window via the pushpin.

## 6.1 Menu Bar

File   Edit   Functions   Tools   View   Help

Underlined characters mark the keyboard shortcuts pressed simultaneously with the 'Alt' key.

### File   File

New Show  
Load Show...  
Save Show  
 Save Show as...  
 Import ...

A new show will be created.

Load an existing show from file e.g. 'showname.gz'.

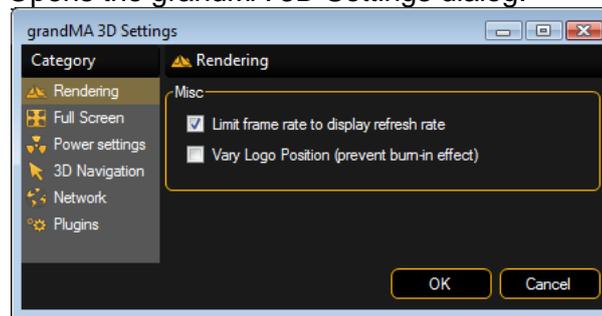
Saves the current show with the given filename.

Save the current show with a new filename.

Import a 3D model. This model for example a venue will be added to the showfile. At the moment the .3ds format (3ds Max known as 3D Studio Max) is supported. See: 8 3D Modeling and Import.

Settings...

Opens the grandMA 3D Settings dialog.



Within this dialog you can vary the settings for the several output modes and get information about the used plugins. Also you can change the IP address of the 3D.

Restart with  
 grandMA1  
 Network

Restarts grandMA 3D in **MA1 mode** to connect with a grandMA 1 network

Restart with grandMA2  
 Network

Restarts grandMA 3D in **MA2 mode**.

Exit

Leave the grandMA 3D program.

**Edit**    **Edit**

<u>O</u> ops: (Undo)	Last action is undone.
<u>C</u> ut	Cuts the selected object (to clipboard).
<u>C</u> opy	Copies the selected object to clipboard (expect 3D objects).
<u>P</u> aste	Pastes the object from clipboard into the view.
<u>D</u> elete: selected elements	Deletes the actual selected elements.
<u>R</u> eset selected Objects	Sets the selected elements to the origin, 0,0,0.
<u>S</u> elect <u>A</u> ll	Selects all objects in view.
<u>S</u> elect <u>P</u> arent	Selects the parent object.
<u>S</u> elect <u>C</u> hildren	Selects only the children of the selected object.
<u>S</u> elect <u>N</u> ext Object	Select the next object.
<u>S</u> elect <u>P</u> revious Object	Selects the previous object.
<u>S</u> imple <u>D</u> uplicate	Makes a simple duplicate of the selected object.
<u>A</u> dd Group Object	Adds a new object to build a group.
<u>G</u> roup Selected Objects	Creates a new object and adds all selected objects.
<u>R</u> ename	Rename the selected object.
<u>M</u> ove (Mode)	Switch to move mode.
<u>R</u> otate (Mode)	Switch to rotation mode.
<u>F</u> ollow (Mode)	Switch to follow spot mode
<u>O</u> bject Axis (Mode)	Move or rotate along the axis of the object.
<u>W</u> orld Axis (Mode)	Move or rotate along the world axis.
<u>P</u> revious	Selects the previous selected object.
<u>N</u> ext	If Previous was pressed the next object will be selected.

**Functions**    **Functions**

<u>A</u> rrangement	Opens the arrangement window to arrange objects in several orders as described in chapter: '6.3.3 Arrangement of Objects (Align Objects)'.
<u>D</u> uplicate	Opens the duplicate window to clone objects as described in chapter: '6.3.4 Duplicate (copy 3D Objects)'.
<u>C</u> hange Model...	Opens a dialog to change an existing 3D model.

**Tools**    **Tools**

<u>C</u> hange user	Opens a dialog to change the user of the session.
<u>C</u> reate Session	Creates a new session in MA network.
<u>J</u> oin Session	Joins to a session in MA network. The session has to be selected in the 'Sessions' window described in '6.9 Sessions'
<u>L</u> eave Session	Leaves the running session in MA network.
<u>A</u> llow Invite	Allows the master of the MA session to do an automatic invitation of the 3D to the session.
<u>S</u> ync Selection	If this function is switched on, the selection of fixtures between desk and 3D is synchronized. I.e. if fixtures are selected within 3D the selection is also highlighted at the desk and vice versa.
<u>F</u> ollow Into Blind	If selected 3D follows into the blind mode.
<u>T</u> ake <u>S</u> imple Screenshot...	Opens a dialog to take a screenshot of the Stage View. Images can be saved as .png files.
<u>D</u> iagnostics	Several diagnostic options if problems occur.
<u>D</u> iagnostics Window	You can save the diagnostics output and mail it to the MA

**Tools****Tools**

Save Diagnostics As...  
 Mail Diagnostics  
 Refresh Diagnostics

customer support to solve the problems.

**View****View**

Fullscreen  
 Open New Stage View  
 Assets Window  
 3D Objects Window  
 Materials Window  
 Media Database Window  
 Cameras  
 Add Front Camera  
 Add...  
 Add Front 2D View (2D)  
 Add at Current Position  
 Use Selected  
 Cameras Visible  
 Camera Spanning  
 Cameras Window  
 Properties Window  
 Sessions Window  
 Diagnostics Window  
 Screenshots  
 Open GMA2 Commandline  
 Render Info  
 Help Elements Visible  
 Window Layout  
 Load Window Layout...  
 Save Window Layout...  
 Reset Window Layout  
 Optimize Columns  
 Lock  
 Refresh Element  
 Go To  
 Previous  
 Next

Switch to the full screen view (Toggle with 'Alt + Enter')

Opens a new view for a stage window

Opens the Assets Window (tree view of objects)

Switch to the 3D Objects window

Opens the Materials window

Opens the Media Database window.

Several options for camera settings to:

- Add new 3D cameras
- Same with other camera...
- Add new 2D cameras
- Add new camera at the current position
- Switch to the currently selected camera
- Make the cameras visible as 3D objects
- Span cameras in Stage Views see:  
chapter 6.2 Tool Bar – Camera Spanning
- Open a property window for the cameras

Opens Property windows for Assets, Cameras etc..

Opens Session window.

Opens Diagnostics window to analyze problems.

Opens a window to take screenshots.

Opens a window to enter desk commands via command line.

Switches the render information in the Stage View on/off

Help elements in Stage View like X,Y,Z axis on/off

Load or save a personalized window layout from / to file  
or reset the layout to the default setting.

Set the columns in the 3D Objects grid to optimal size.

Lock / unlock the current window

Refresh the elements in the view.

Select the previous (last selected) or next (if previous was  
selected before) element.

**Help****Help**

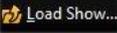
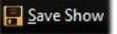
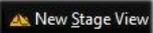
Documentation  
 Info

Opens a document with the help file.  
 Opens an information window with version numbers of 3D  
 and desk streaming version.

**6.2 Tool Bar**

Previous, Next

Select the previous or next object.

-  **Load Show**
-  **Save Show**
-   **Oops**
-  **Fullscreen**
-  **New Stage View**

Open a dialog to load a new show.

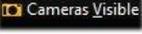
Saves the current show with the given filename.

(Undo, Redo) Recovers the previous action or vice versa

Switch to the full screen view. Toggle with 'Alt + Enter' key.

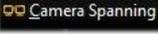
Opens a new Stage View window.

**Window**

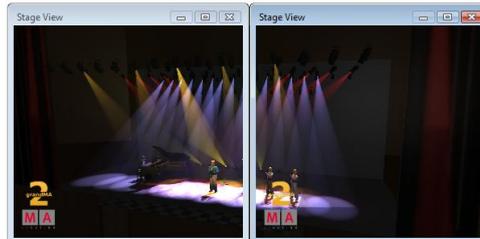
-  **Camera**

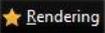
Sets the cameras to visible in the 3D view.

**Visible**

-  **Camera Spanning**

Span the camera view over several Stage View windows. So you can space a view from one camera on several monitors.



-  **Rendering**

**Settings for 3D renderings:**



Set the parameters for the 3D rendering output. Choose your preferred settings by shifting the sliders. The results can be checked immediately in the Stage View window.

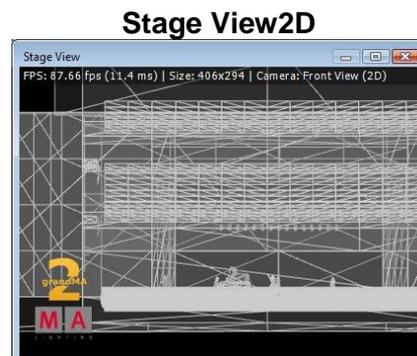
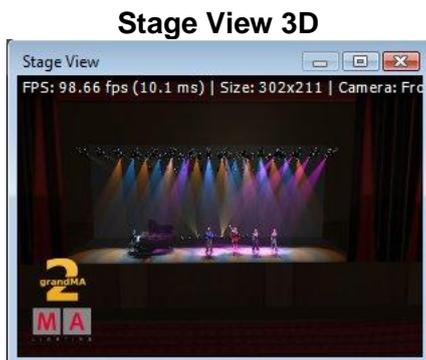
## 6.3 Main Windows (Stage View, 3D Objects View)

Main windows are represented as tabbed windows:



### 6.3.1 Stage View

The Stage View Window offers a photorealistic view from any camera perspective or a 2D draft view:



FPS: 75.63 fps (13.2 ms) | Size: 442x211 | Camera: Front

If the menu entry 'View – Render Info' is selected information about the frame rate (in **Frames Per Second**), the window size (in pixels) and the selected camera are shown.

### 6.3.2 Mouse + Keyboard Actions



Generally:  
**left mouse** button actions for **objects**,  
**right mouse** button actions for **camera**



#### Left Mouse Button: Moving and Rotating of Objects

**World axis**  
 Ctrl + W



**Object axis**  
 Ctrl + O



Objects can be moved or rotated along the world- or their own axis. Hold the **left mouse button** down to **change between Move and Rotate** and vice versa.

- Select the object
- Move or rotate it along the selected axis



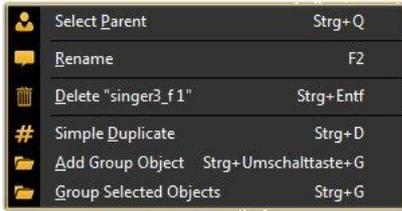
**Left mouse button down to move** object along world or object axis



**Left mouse button down to rotate** object around world or object axis



**Right Mouse Button: Context Menu + Camera Actions**



**Short right mouse click**

Menu for selecting, renaming deleting duplicating or grouping selected object



**Right mouse button down**

Select action with scroll wheel or 'Shift + Ctrl'



**Middle Mouse Button: Select Camera or Zoom**



**Mouse wheel click**

After that

**Set camera** for this view via the mouse **wheel turn**

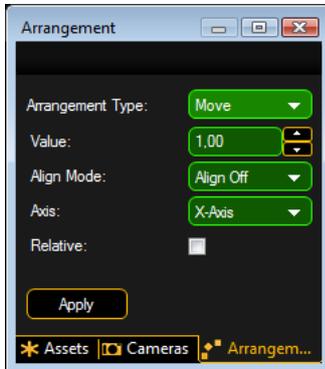
or keyboard **space** or **1...9..0** button

**Mouse wheel turn**

**Zoom** in or out

### 6.3.3 Arrangement of Objects (Align Objects)

grandMA 3D allows automatic arrangement of 3D objects. Therefore select the objects to arrange via 'Ctrl + mouse click' or multiple selections in the assets tree. Via the menu entry 'Functions – Arrangement' the Arrangement Window opens:



Objects can be arranged in several ways like:

- Moved along the X,Y,Z axis
- Moved along a circle line in X,Y,Z space
- Arrange in a 2D matrix

Corresponding to the desk alignment function objects can be arranged in relation to the origin object like:

- <, >, ><, and <>

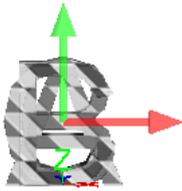
If the 'Relative' flag is set every push of the 'Apply' button increments the arrangement by the given value.

**Note:** The origin is 0,0,0 if the 'Relative' flag is off.

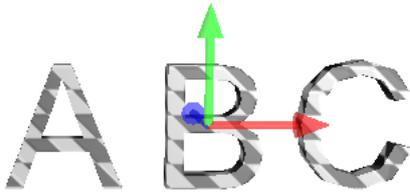
Otherwise it is the own position.

Example:

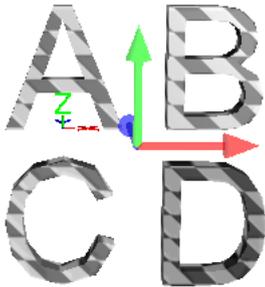
Several objects inserted into the Stage View at the origin (0,0,0).



Objects aligned via 'Move' and 'Align <' function along the X-axis.

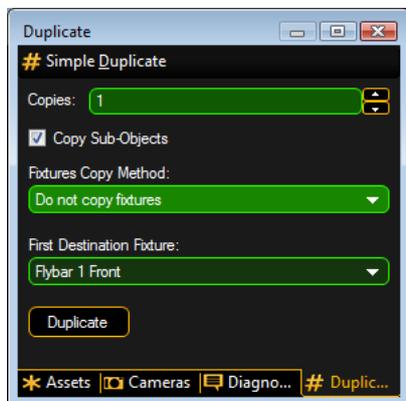


Objects aligned as a matrix via 'Matrix (2D)' function.



### 6.3.4 Duplicate (copy 3D Objects)

You can duplicate objects via a mechanism in a comfortably way. Therefore do a multi selection in any view via left mouse button + 'Ctrl or Shift' and select the menu entry 'Functions – Duplicate'. The Duplicate window appears:



You can set the number of desired copies. If the objects contain sub-objects select if these are copied too.

**Note:**

It is **not possible to create new fixtures within grandMA 3D!**

If fixtures are selected to duplicate it is possible to select 'Use other Fixtures'. Select the 'First Destination Fixture' inside the list box. After pressing the 'Duplicate' button the 'First Destination Fixture' will be moved to the X,Y,Z position of the source fixture and so on.

This mechanism is useful to create symmetrical stage sets. For example you have to setup the number of all used fixtures inside the set. Do the setup for the left side of trusses and lanterns. After that you can duplicate the left side and mirror it to the right side.

### 6.3.5 3D Objects

Name	Position [m]	Scaling [°]	Visible	Sunshade	Follow Ta	Fixture ID	Char
⚡ Floor Lights	0,33 -2,17 1,97	1,00 1,00 1,00	★	☑	○	96	96
⚡ Floor Lights	1,00 -2,17 1,97	1,00 1,00 1,00	★	☑	○	97	97
⚡ Floor Lights	1,67 -2,17 1,97	1,00 1,00 1,00	★	☑	○	98	98
⚡ Floor Lights	2,33 -2,17 1,97	1,00 1,00 1,00	★	☑	○	99	99
⚡ Floor Lights	3,00 -2,17 1,97	1,00 1,00 1,00	★	☑	○	100	100
★ Gray Plane 1	0,00 0,00 0,00	5,00 2,00 1,00	★	☑	○		
★ Gray Plane 2	0,00 4,00 4,00	5,00 2,00 1,00	★	☑	○		
📁 Band	0,00 0,00 0,00	1,00 1,00 1,00	★		○		
★ piano_m 1	-4,23 -0,55 0,00	1,00 1,00 1,00	★	☑	○		
★ singer1_m 1	0,00 -1,48 0,00	1,00 1,00 1,00	★	☑	○		
★ girl_singing 1	1,89 -0,78 0,00	1,00 1,00 1,00	★	☑	○		
★ singer2_f 1	3,28 -1,38 0,00	1,00 1,00 1,00	★	☑	○		
★ singer3_f 1	4,62 -1,42 0,00	1,00 1,00 1,00	★	☑	○		
★ potsdamertheater 1	-4,88 -12,09 10,97	1,00 1,00 1,00	★	☑	○		
★ Stage Plane	0,00 0,00 0,00	1,00 1,00 1,00	★	☑	⊙		

This view offers information about all used objects in a grid view. All used 3D objects and fixtures are listed in this grid. Single or multiple objects can be selected for manipulation or duplicating. The objects can be sorted by a left mouse click into the headline of a column.

The symbols inside the grid have the following meanings:

- Name**      **Meaning**
-  3D object
  -  Fixture object
  -  Grouping object

- Property**      **Meaning**
-   Object is visible or hidden in Stage View
  -   Sunshade is on or off
  -   Followspot is active or inactive on object surface

### 6.4 Assets (Information Window)

Assets	Cameras	Arrangement
📁 Add Group	📁 Group Objects	
📁 Cameras		
★ 3D Objects		
★ Stage Plane	⊙ ★	
📁 Band1	⊙ ★	
★ teatro 1	⊙ ★	
★ Martin - MAC600 1	⊙ ★	
★ Vari-Lite - VL1000 1	⊙ ★	
★ Vari-Lite - VL2000 1	⊙ ★	
★ Vari-Lite - VL2416 1	⊙ ★	
★ Vari-Lite - VL2C 1	⊙ ★	

The Assets window lists all used objects and fixtures in a tree. Select an object in the tree and the object will be marked in the Stage View and 3D Object grid too and vice versa. Additionally the properties of the object are shown in the Property window if this is switched on.

   You can build groups of objects by meaning of the toolbar buttons.

-  The followspot icon informs if Followspot is activated for the object.
-  The visible icon shows if the object is visible in the Stage view.

## 6.5 Properties

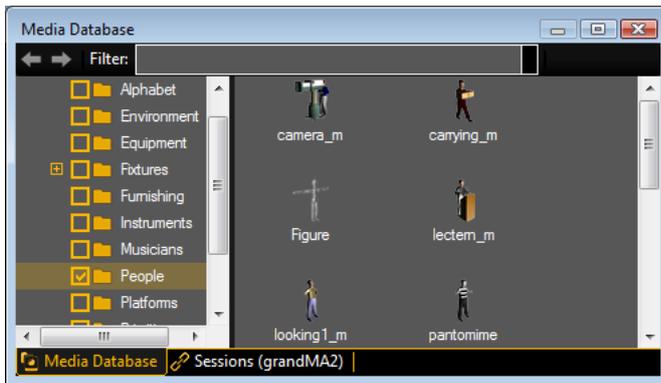


The Property window informs about the properties of the actual selected object like fixtures or 3D objects.

If several objects are selected e.g. via 'Ctrl + mouse' only the fields with equal information are filled, other fields are cross striped.

You can change the settings of one or all selected objects here.

## 6.6 Media Database

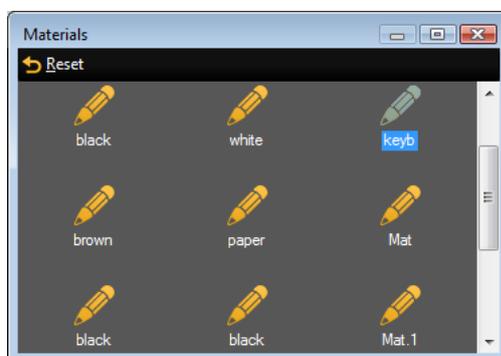


The Media Database offers lots of 3D objects ordered by their type in a tree view.

You can drag the objects from the database with the left mouse button into the Stage View window and place it to the desired position. All objects are scalable and the properties of the different materials can be changed in the Materials window if the object is selected.

If the showfile is stored the 3D objects are included in the showfile.

## 6.7 Materials



If an object is selected the Materials window shows all used materials (texture images) of the object. Select the material in the Material window and you can change its properties (diffuse color, emissive color, specular power, texture) in the property window. The results can be viewed directly in the Stage View window.

## 6.8 Moving Pathes

Moving Pathes allow the movement of objects like trusses with their attached sub objects like fixtures, trusses etc..



Moving Pathes are managed like fixture types in the desk. To setup a Moving Path, create a new fixture in the desk from the library. Choose the Manufacturer 'MA Lighting' and the type 'Moving Path...'

There are several types of Moving Pathes. The type (Rotate, Scale...) specifies the parameters controlled by the desk:



The object rotates once around the axes of the Moving Path.



The object is scaled in X,Y and Z dimensions.



The object rotates continuously around the axes of the Moving Path. The rotation speed can be set in rotations per minute at the desk.

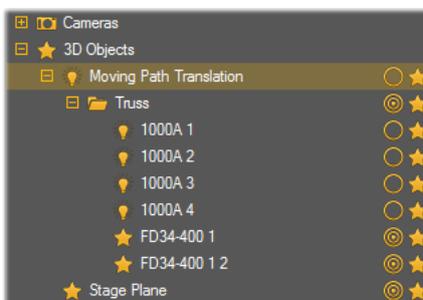


The object can be moved in X, Y and Z direction.



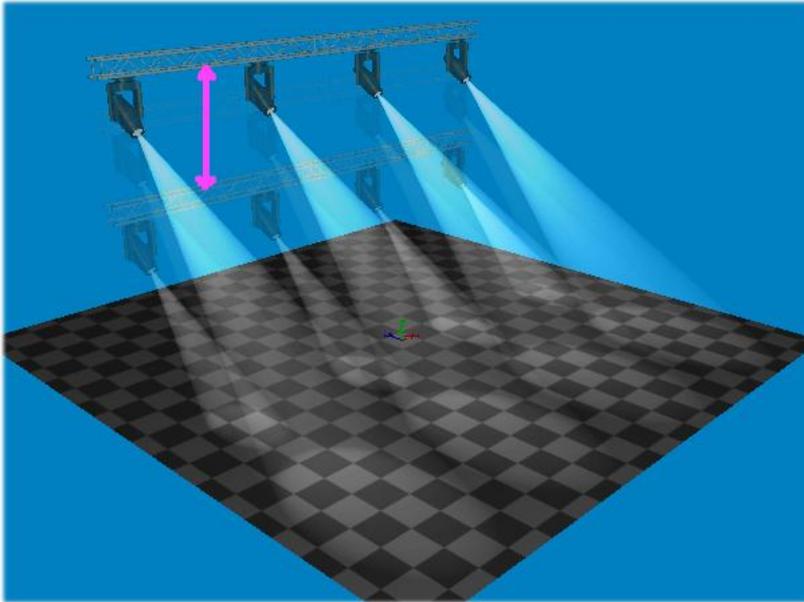
Combined Moving Path of Translation, Rotation and Scale. This type is more easy to use instead of concatenating the single types.

Controlling of the position is always done **relative** to the origin coordinates. I.e. if an object with moving pathes is moved manually, the tracks of the Moving Pathes are always moved parallel to the new object coordinates.



You can attach an object to a Moving Path via dragging the object in the tree. Drop it onto the desired Moving Path.

The pictured example shows a truss with 4 moving head fixtures (1000A 1...4) mounted on a truss (FS34-400 1...2).



The example shows a 'Translation' Moving Path controlled in Z-direction. The truss moves up and down controlled by the desk.

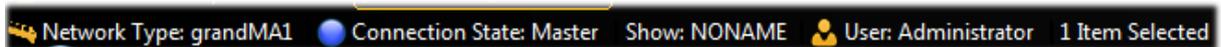
## 6.9 Sessions



The Session window gives an overview about all running sessions in MA net. Name, ID and the state of the sessions are displayed. The streaming version is important for the compatibility see chapter 'Version of grandMA desk or grandMA onPC'.

## 6.10 Status Bar

The Status Bar informs about the actual Network Type (grandMA1 or grandMA2 net), the Connection State (Master, Slave or Sniffer) and the name of the session. Also the name of the show file and the number of selected items are displayed:



## 7 Fixture Types

The following table gives an overview about the visualization effects in grandMA 3D.

Effect in grandMA 3D	Description	grandMA Series 1		grandMA Series 2	Physical Value in Function Set	Phys. Example
		Suggested Attribute	Visualizer Effect/Sub function			
Axis (axis of fixtures or moving paths) Note: Unlike other effects all of these axes must be included in the basing 3d-model. This a prerequisite for fixtures <b>and</b> moving paths. If the model has no axis nothing will move.						
Pan	Pan-axis of fixtures	Pan/Tilt → Pan/Tilt → Pan	Pan		Angle range in degrees	-180 thru 180
Tilt	Tilt-axis of fixtures	Pan/Tilt → Pan/Tilt → Tilt	Tilt		Angle range in degrees	-80 thru 80
Roll	Roll-axis of fixtures	Pan/Tilt → Pan/Tilt → Roll	Roll		Angle range in degrees	-80 thru 80
Translation X Translation Y Translation Z	Translation in x-, y- or z-direction, e.g. for moving paths	Control → MP Trans → X Control → MP Trans → Y Control → MP Trans → Z	Position/X Position/Y Position/Z		Translation range in meter	-5 thru 5
Scaling X Scaling Y Scaling Z	Scaling of objects in x-, y- or z-direction, e.g. for moving paths	Control → MP Scale → X Control → MP Scale → Y Control → MP Scale → Z	Scale/X Scale/Y Scale/Z		Scaling factor (must be >0!)	-0.1 thru 2
Rotation X Rotation Y Rotation Z	Rotation around x-, y- or z-axis, e.g. for moving paths	Control → MP Rot → X Control → MP Rot → Y Control → MP Rot → Z	Rotation/X Rotation/Y Rotation/Z		Angle range in degrees	-180 thru 180
Spin X Spin Y Spin Z	Continuous rotation around x-, y- or z-axis	Control → MP Spin → X Control → MP Spin → Y Control → MP Spin → Z	Rotate Animation/X Rotate Animation/Y Rotate Animation/Z		Rotation speed in rotations per minute (rpm)	-15 thru 15
Clamp	Pitch of the clamp	Control → MP Rot → Clamp	Clamp		Angle range in degrees	-90 thru 90
Barndoor 1 Barndoor 2 Barndoor 3 Barndoor 4	Pitch of barndoors in front of the lens	Shaper → Barndoor → DB1 Shaper → Barndoor → DB2 Shaper → Barndoor → DB3 Shaper → Barndoor → DB4	Barndoor/Barndoor 1 Barndoor/Barndoor 2 Barndoor/Barndoor 3 Barndoor/Barndoor 4		Angle range in degrees 0° = barndoor is in same position like in model > 0° = close barndoor	0 thru 90
Shaper Rotation	Rotation of visible blades in front of the lens	Shapers → Shaper2 → Shaper Rot	Shaper Rotation		Angle range in degrees	-90 thru 90

Effect in grandMA 3D	Description	grandMA Series 1		grandMA Series 2	Physical Value in Function Set	Phys. Example
		Suggested Attribute	Visualizer Effect/Sub function			
	e.g. barndoors					
Light Output						
Shutter		Dimmer → Strobe	Strobe/Strobe		grandMA1: 0 = Shutter closed 65535 = Shutter opened	
Strobe/Strobe Frequency	Strobe effects with random and soft opening/closing option	Dimmer → Strobe	Strobe/Strobe Strobe/Random Strobe/Pulse Strobe/Pulse Open Strobe/Pulse Close Strobe/Pulse Random Strobe/Pulse Random Open Strobe/Pulse Random Close		Strobe frequency in Hz (bigger than 0)	0.5 thru 10
Strobe Ratio		Beam → Beam1 → Strobe R	Strobe/Ratio		Slice of 1. 0.5 means that the shutter is opened half the strobe interval.	0.2 thru 0.8
Dimmer	Intensity of the light source	Dimmer → Dim	Dimmer		Factor on the fixture type intensity 0.0 = off 1.0 = maximum	0.0 thru 1.0
Light Effects						
Color	Color of beam or led surfaces	Color → Color1 → C1 Color → Color2 → C2 Color → Color3 → C3 Color → Color Mix → [Color] Color → RGB → [Color]	Color Wheel Color Mix/[Color]		Color	-
Color Wheel Rotate	[Not yet implemented] Continuous rotation of the color wheel	Color → Color1 → C1 rot Color → Color2 → C2 rot Color → Color3 → C3 rot	Color Rotate/Wheel 1 Color Rotate/Wheel 2 Color Rotate/Wheel 3		Rotation speed in rotations per minute (rpm)	-15 thru 15
Zoom		Focus → Zoom	Zoom		Factor on the beam angle range of the	0 thru 1

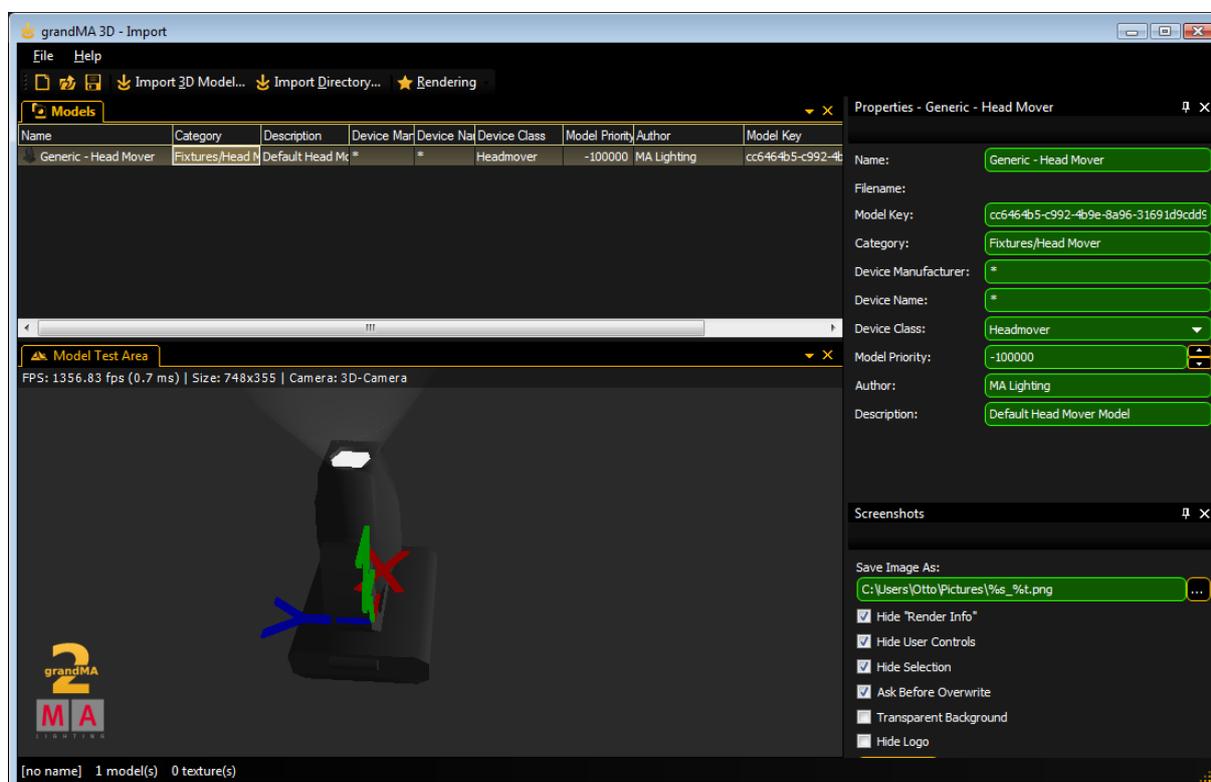
Effect in grandMA 3D	Description	grandMA Series 1		grandMA Series 2	Physical Value in Function Set	Phys. Example
		Suggested Attribute	Visualizer Effect/Sub function			
					fixture type 0.0 = Beam has the minimum beam angle of the fixture type. 1.0 = Beam has the maximum beam angle of the fixture type.	
Iris		Beam → Beam1 → Iris	Iris		Factor 0.0 = iris completely closed 1.0 = iris opened	0.2 thru 1.0
Prism		Beam → Beam1 → P1	Prism/2 Beams Prism/3 Beams Prism/4 Beams Prism/5 Beams		Prism angle in degrees (angle between center of beam without prism and center of beam with prism)	30
Prism Position	Rotation of the prism	Beam → Beam1 → P1 Pos	Prism Position		Angle range in degrees	-180 thru 180
Prism Rotation	continuous rotation of the prism	Beam → Beam1 → P1 Rot	Prism Rotation		Rotation speed in rotations per minute (rpm)	-15 thru 15
Frost		Focus → Frost	Frost		0.0 = no frost 1.0 = maximum	0.0 thru 1.0
<b>Gobo (3 Wheels Maximum)</b>						
Gobo X (Wheel Position)	Selects gobo from values inside functional block	Gobo → Gobo → G1 Gobo → Gobo → G2 Gobo → Gobo → G3	Gobo Wheel/Wheel 1 Gobo Wheel/Wheel 2 Gobo Wheel/Wheel 3		-	-
Gobo X - Wheel	Continuous rotation of the	Gobo → Gobo → G1 Wheel Rot Gobo → Gobo → G2 Wheel Rot	Gobo Wheel Rotate/Wheel 1 Gobo Wheel		Rotation speed in rotations per	-15 thru 15

Effect in grandMA 3D	Description	grandMA Series 1		grandMA Series 2	Physical Value in Function Set	Phys. Example
		Suggested Attribute	Visualizer Effect/Sub function			
Rotation	gobo wheel	Gobo → Gobo → G3 Wheel Rot	Rotate/Wheel 2 Gobo Wheel Rotate/Wheel 3		minute (rpm)	
Gobo X - Position	Rotation of the current gobo	Gobo → G-Rot. → G1 Pos Gobo → G-Rot. → G2 Pos Gobo → G-Rot. → G3 Pos	Gobo Angle/Wheel 1 Gobo Angle/Wheel 2 Gobo Angle/Wheel 3		Angle range in degrees	-180 thru 180
Gobo X - Rotation	Continuous rotation of the current gobo	Gobo → G-Rot. → G1 Rot Gobo → G-Rot. → G2 Rot Gobo → G-Rot. → G3 Rot	Gobo Rotate/Wheel 1 Gobo Rotate/Wheel 2 Gobo Rotate/Wheel 3		Rotation speed in rotations per minute (rpm)	-15 thru 15
<b>Blades (4 Blades Maximum)</b>						
Blade X - Insertion (A)	Insertion of the Blade into the beam This Attribute must be present to visualize any blade.	Shapers → Shaper1 → 1A Shapers → Shaper1 → 2A Shapers → Shaper1 → 3A Shapers → Shaper1 → 4A	Shutter/Blade 1A Shutter/Blade 2A Shutter/Blade 3A Shutter/Blade 4A		0.0 = no insertion 1.0 = full covering	0.0 thru 0.5
Blade X - Insertion (B)	Second insertion range for every blade for rotating If this option is used you must not use the "Blade X - Rotation"-option.	Shapers → Shaper1 → 1B Shapers → Shaper1 → 2B Shapers → Shaper1 → 3B Shapers → Shaper1 → 4B	Shutter/Blade 1B Shutter/Blade 2B Shutter/Blade 3B Shutter/Blade 4B		0.0 = no insertion 1.0 = full covering	0.0 thru 0.5
Blade X - Rotation	Rotation of the blade If this option is used you must not use the "Blade X - Insertion (B)"-option.	Shapers → Shaper1 → 1B Shapers → Shaper1 → 2B Shapers → Shaper1 → 3B Shapers → Shaper1 → 4B	Shutter/Blade 1 Angle Shutter/Blade 2 Angle Shutter/Blade 3 Angle Shutter/Blade 4 Angle		Angle range in degrees	-45 thru 45
Blade X - Rotation around Beam	Rotation of a blade around the beam	[must be defined by user]	Shutter/Blade 1 Rot Shutter/Blade 2 Rot Shutter/Blade 3 Rot Shutter/Blade 4 Rot		Angle range in degrees	-180 thru 180

Effect in grandMA 3D	Description	grandMA Series 1		grandMA Series 2	Physical Value in Function Set	Phys. Example
		Suggested Attribute	Visualizer Effect/Sub function			
Rotation of all Blades		Shapers → Shaper2 → Sh Rot	Shaper Rotation		Angle range in degrees	-180 thru 180

## 8 3D Modeling and Import

3D models created with 3D design programs like 'Cinema 4D' can be imported via the import tool. The import tool can be found via the menu entry: 'File – Import – Import 3D Model...'. Single files as well as complete directories can be imported.



The imported model can be viewed in the 'Model Test Area' window that can be operated similar to the 3D 'Stage View'. Properties like 'Name'; 'Category' etc. can be edited. After that the model can be stored in the media database and is ready to be used in grandMA 3D.

### 8.1 3D Models Principles

The import tool offers no functionality to edit the 3D-Model afterwards. So the imported 3D model must contain all information.

To avoid the determination on a specific modeling tool we choose the '3DS' file format that can be exported by most applications.

All parameters can be referred to by the names of the simple objects.

#### Important restrictions for 3D objects:

- Names of objects max. 8 characters (incl. parameter)
- No special characters allowed
- Names must be unique, each object must have a unique name.  
Note that some modeling applications shorten names while exporting to 3ds.  
The name must stay unique after exporting
- All objects must consist of triangles  
(e.g. Cinema 4D 'Functions – Make Editable' & 'Functions – Triangulate')
- Only one material can be assigned to an object
- Only one texture can be assigned to a material

These limitations must be abided even in future when other file formats are allowed. Furthermore 3D objects should consist of as few triangles as possible. Curves can be pictured realistically with little triangles if the normals simulate this (Cinema 4D: 'Phong Tag').

**Note:** The max. angle for curves is set to 89.5° in Cinema 4D (in 3ds)

## 8.2 Parameters

Parameters can be added to the names of objects to set further properties of the object.

Example: The object name ,Test\_XAP' is a pan-axis.

A parameter block must start with ' \_X' followed by the (sub) parameters without separators as shown in the following table:

Parameter	Sub-Parameter	Description
<b>V</b>	-	<b>Available for user</b> The Object can be manipulated by the user. Per default the top object in the tree structure can <b>always</b> be manipulated by the user, sub objects not.
<b>N</b>	-	<b>Not available for the user.</b> Object cannot be manipulated by the user. (Can only be used for sub objects.)
<b>D</b>	-	<b>Delete</b> Object will not be imported.
<b>A</b>		<b>Axis (also see: 8.2.1 Axes)</b> Object will be transformed to a movement axis. The parameter is only valid in association with one of the following sub parameters. The sub parameter specifies the type of axis.
	<b>P</b>	<b>Pan axis</b>
	<b>T</b>	<b>Tilt axis</b>
	<b>R</b>	<b>Roll</b>
	<b>X</b>	Shift ( <b>X</b> axis)
	<b>Y</b>	Shift ( <b>Y</b> axis)
	<b>Z</b>	Shift ( <b>Z</b> axis)
	<b>U</b>	Scale (X axis)
	<b>V</b>	Scale (Y axis)
	<b>W</b>	Scale (Z axis)
	<b>J</b>	Rotation (round X axis)
	<b>K</b>	Rotation (round Y axis)
	<b>L</b>	Rotation (round Z axis)
	<b>1</b>	Axis of <b>1.</b> barndoor
	<b>2</b>	Axis of <b>2.</b> barndoor
	<b>3</b>	Axis of <b>3.</b> barndoor
	<b>4</b>	Axis of <b>4.</b> barndoor
	<b>G</b>	Continuous rotation round (X axis)
	<b>H</b>	Continuous rotation round (Y axis)
	<b>I</b>	Continuous rotation round (Z axis)
	<b>C</b>	<b>Clamp</b> Rotation axis of the clamp
<b>S</b>		<b>Sunshade type</b> Specifies how the object casts a shadow or how gobos are shown on the object.
	<b>N</b>	<b>None</b> Has no influence on the object. Neither the beam is affected nor gobos are projected on the object. For example the object is a lens of a fixture. The lens does not balk the beam, and no gobos are projected on the lens. The lens is fixed in the case so it doesn't cast a shadow if it is hit by an external beam.
	<b>R</b>	<b>Regular</b> The object casts a shadow and gobos are projected on the object. Default setting if nothing else is parameterized.

Parameter	Sub-Parameter	Description
	X	<b>Exclude own beam</b> Compared to other fixtures the object behaves like option ,R' and compared to the own source of light like option 'N'. This parameter should be set for example for the body of moving heads and the clamp, meaning the parts that are never lighted by the own beam. This simplifies the rendering and avoids the casting of a shadow by the own beam.
	G	<b>Ghost (Currently not implemented)</b> The object casts a shadow and gobos are projected on the object. The object itself is not visible, only if it is hit by a beam. For example an LED panel consisting of several LEDs with one body. The LEDs can be excluded from the shadow via parameter 'N'. The body for the LEDs has the parameter 'G' for the common shadow. Note that color mixing will only work correctly if the diffuse color of the ghost object and of the covered objects is the same.
B		<b>Beam</b> Marks the origin of the beam. (See:8.2.4 <b>Beam of Light</b> )
I		<b>Diffuse Inking *</b> Extension parameter for other materials. The color specifies the ratio of the diffuse color to the fixture color. White means: the diffuse color gets brighter by 100% of the fixture color.
E		<b>Emissive Color *</b> Extension parameter for other materials. Specifies the color/texture of the object's self shine.
J		<b>Emissive Inking *</b> Extension parameter for other materials. The color specifies the ratio of the emissive color to the fixture color. White means that the emissive color gets 100% brighter with the fixture color.
C		<b>Children</b> Sub controls, to be placed in grandMA 3D below the object of a model. Other sub objects in grandMA 3D will be inserted below this item. Used for moving paths to create sub objects below an axis.

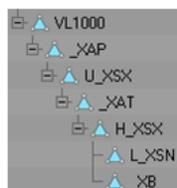
\*This parameter can be used only for materials. The material with the parameter extends the other material.

For example 'Lens\_XJ' describes the emissive inking color for the material (without parameter) with the same name 'Lens'. The extended material must not be assigned to an object. This detour is necessary because the modeling software does support this functionality.

### 8.2.1 Axes

Objects can be configured with movement axes. The position of the axis is marked with an auxiliary object.

Objects ordered below the auxiliary object in the tree structure can be moved in the appropriate manner:



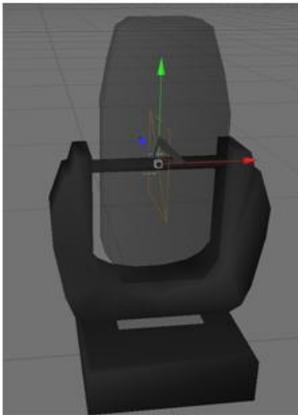
The image shows an object tree of a moving head fixture. The object 'VL1000' is the root of the fixture. '\_XAP' is the pan axis of the model. All objects below are rotated around this axis.

## 8.2.2 Rotation Axes

Rotation axes are marked with a square (consisting of two triangles). The name of this object must contain the appropriate parameter for the desired axis see Parameter. Furthermore all normals of this object should point in the same direction.

When importing the object it is converted into an axis. It is aligned along the direction of the normals (vertical on the square) positioned in the center of the square.

In case of movement the right-hand rule is applicable: Thumb shows into direction of normals, objects will rotate into the direction of the fingers (with positive values).



The image shows the tilt axis of a moving head fixture. The normals of the square show to the left direction.

The lens will move away from the viewer if the tilt axis is driven with values bigger than 0°.

## 8.2.3 Linear Axes

Linear axes are marked in the same manner as rotation axes. The normal of the square shows the direction of movement.

## 8.2.4 Beam of Light

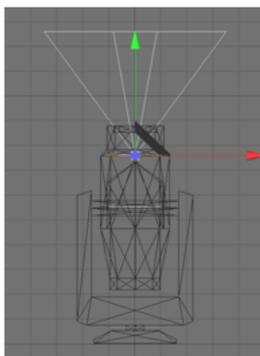
Similar to the rotation axes the position of the beam (cone) is marked with a square. The center of the square marks the origin of the cone. The normals mark the direction.

The position inside the fixture body can be determined with an auxiliary cone that is placed temporarily into the body.

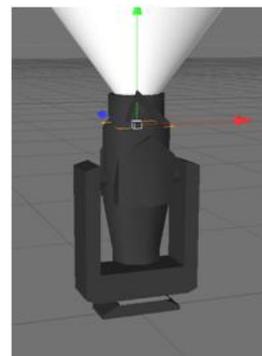
The radius (r) of the cone can be calculated with the following formula:

$$r = \tan([\text{max. open radius} / 2]) * [\text{height of the cone}]$$

Normally the cone uses the complete lens hole of the fixture. The square is placed at the top of the cone:



Placement of the cone 2D



Placement of the cone 2D

### 8.3 Automated Import

Meta data of a 3D model can be left appropriately for the import. Later editing with the import tool is not required.

The placeholder [file] stands for the filename (without extension) that has to be imported. For example if the file 'test.3ds' has to be imported, '[file]' stands for 'test':

File	Description
_global.import.xml	Global import setting valid for the complete directory. Structure like [file].import.xml.
[file].import.xml	XML file with meta data for the model. If this file does not exist, it will be created automatically to store the model key.
[file].import.png	Preview image of the model. Size is 32x32 pixel (32 Bit RGBA). Will be created if not exists.
[file].png	If no preview image exists the import tool tries to create it. It searches in the given order on the side.
[file].tif	
[file].bmp	
[file].jpg	

Example for an '\*.import.xml' file:

```
<?xml version="1.0"?>
<GrandMA3DImportSettings xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="http://schemas.malighting.de/GrandMA3D/GrandMA3DImportSettings/1.0">
  <Name>Generic - Head Mover</Name>
  <Category>Fixtures/Head Mover</Category>
  <ModelKey>cc6464b5-c992-4b9e-8a96-31691d9cdd90</ModelKey>
  <DeviceManufacturer>*</DeviceManufacturer>
  <DeviceName>*</DeviceName>
  <DeviceClass>Headmover</DeviceClass>
  <ModelPriority>-100000</ModelPriority>
  <ModelManufacturer>MA Lighting</ModelManufacturer>
  <Description>Default Head Mover Model</Description>
  <Scale>0.01</Scale>
  <Move>MoveBottomToZ0</Move>
  <AmbientFlare>0.02</AmbientFlare>
</GrandMA3DImportSettings>
```

Field	Description
Name	Name of the model 'filename' will be replaced with the filename of the import file (without extension)
Category	Category in the 'Media Database' Sub categories can be separated with a '/'. e.g. 'Fixtures/Head Mover'
ModelKey	[see: 8.4 Assigning of Models to Fixture Types]

Field	Description
DeviceManufacturer	[see: 8.4 Assigning of Models to Fixture Types]
DeviceName	[see: 8.4 Assigning of Models to Fixture Types]
DeviceClass	[see: 8.4 Assigning of Models to Fixture Types] Possible values: None, Mirror, Headmover, Conventional, LED, MovingPath
ModelPriority	[see: 8.4 Assigning of Models to Fixture Types]
ModelManufacturer	Designer of the model.
Description	Short description.
Scale	Object will be scaled by this factor.
Move	Moves the object after the import. None: No movement MoveBottomToZ0: Model is placed on XY plane Z = 0 MoveCenterToZ0: Center of the object is placed to Z = 0
AmbientFlare	Clarification grade of the fixture environment.

Not used (necessary) fields can be omitted.

## 8.4 Assigning of Models to Fixture Types

Field	Description
ModelKey	Unique key of the model. This key is created with the first importing of the model and saved in the XML file (*.ImportSettings.xml). The key identifies exactly the model. If the model is imported again the same key will be used from the XML file.
DeviceManufacturer	Manufacturer of the fixture that is represented by the model.
DeviceName	Name of the fixture that is represented by the model.
DeviceClass	Type of the model if it represents a fixture. E.g. 'Headmover'
ModelPriority	Priority for selecting this model. High numbers are more probable. The standard value '0' should only be used if the meaning is clear, see description below.

At best the fixture type of a device is left in the data base. If the very same type is found by grandMA 3D (ModelKey == Model.ModelKey) it will be used without any validation. In this case a fixture type always will be assigned to the same model.

If no model key is found the application searches for a more suitable model, like same 'DeviceManufacturer', 'DeviceName' etc..

### Note:

The fields 'DeviceManufacturer' and 'DeviceName' can be placeholders to find the right model for variant spellings. For example: 'Vari\*Lite' is often spelled as 'Vari-Lite', or a 'VL1000 AS' should use the same model as 'VL1000 AI'. In this case both fields should contain a 'Vari?Lite' and 'VL1000\*'.  
Possible placeholders:

*	0-n any characters
+	1-n any characters
?	0-1 any characters
#	1 arbitrary character

Often there are several variants of fixture types in a model range. So the attachment of a '\*' is recommended – for example: 'VL1000\*'. The spelling is not case sensitive.

If a special 3D object shall be used for a model even though a model with the notation exists the 'ModelPriority' can be increased (in steps of 100). For example a 'VL1000AS' with the priority of 100 would be preferred instead of 'VL1000\*' with a standard priority of 0.

grandMA 3D is delivered with standard models for every 'DeviceClass' type. The standard model has the following setting: DeviceManufacturer = '\*', DeviceName = '\*' and ModelPriority = -100000. These models have a low priority and are used only if no other model with higher priority is found.

## 8.5 Checklist for 3D Modeling

- ✓ Sunshade type settings for all objects are correct?  
For example shadow calculations for the own source of light of the fixture body, clamp and head are excluded?
- ✓ Names of objects don't exceed 8 characters (.3ds files)?
- ✓ Names of object are unique?
- ✓ Objects exclusively are composed of triangles?
- ✓ No information has been lost while exporting? To check this, open the exported file with the modeling tool.

## 8.6 Creation of a 3D Model

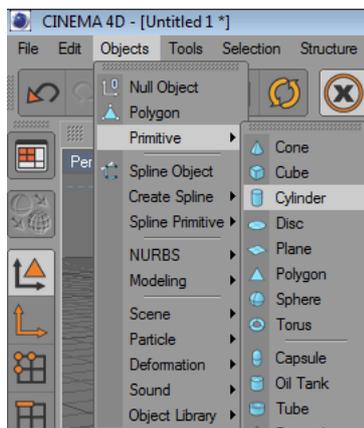
3D objects can be created with 3D CAD programs. Please note, that the amount of polygons affects the performance because for each polygon the projection has to be calculated. The lower the number of polygons the better is the frame rate.  
grandMA 3D supports the following formats for 3D objects:

- .3ds – Format for drawing 3 dimensional objects

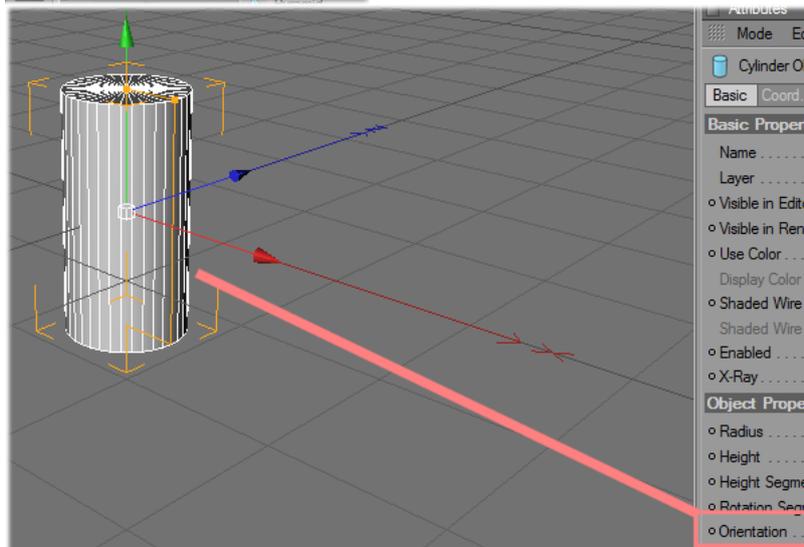
Note the following regulations:

- 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 halved cylinder, created with 'Cinema 4D':

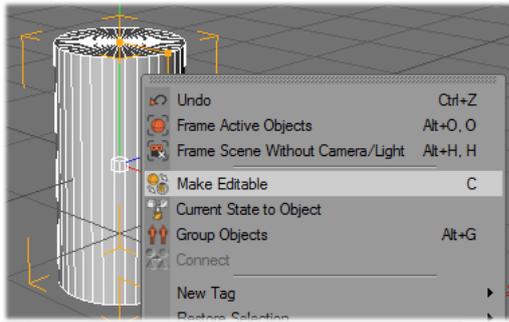


Insert an object of type  
'Cylinder'

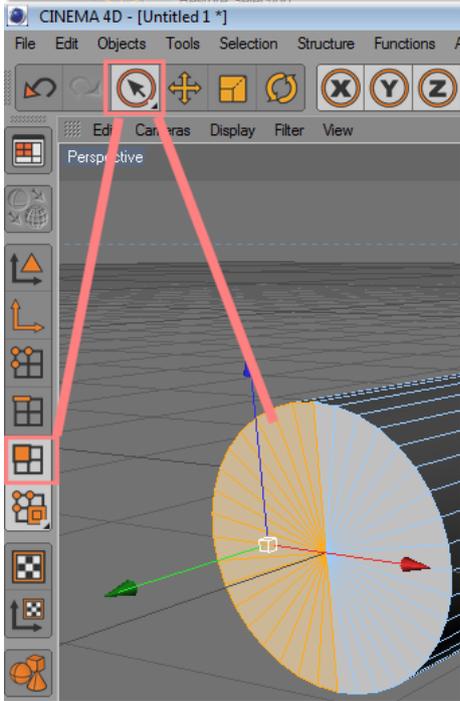


Set the orientation to 'Y+'.  
For a correct visualization in  
grandMA 3D is the depth, Y  
the vertical and X the  
horizontal axis

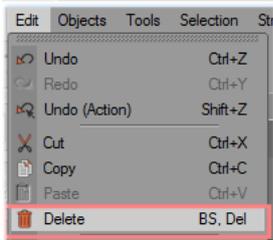
Make the object editable



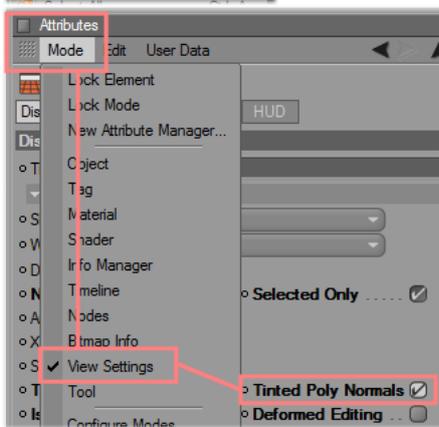
Select not used polygons...

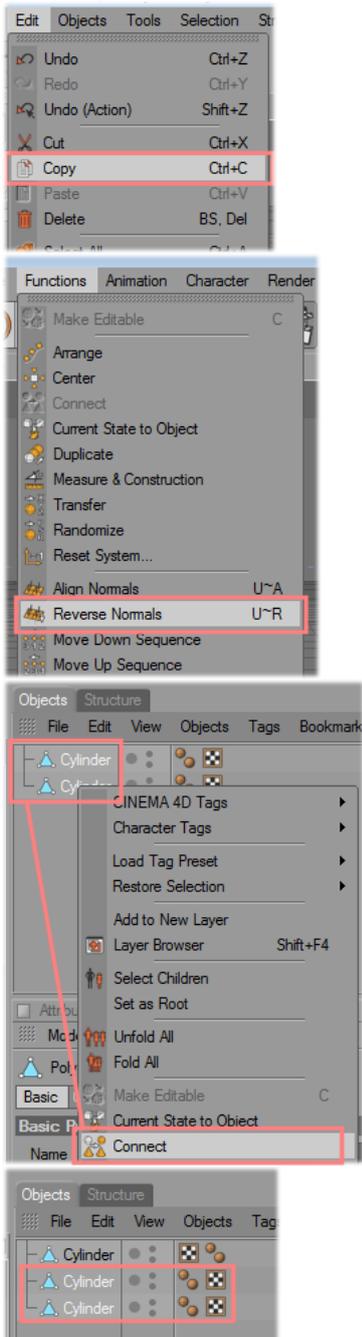


and delete them.



Set the visibility of normal on.





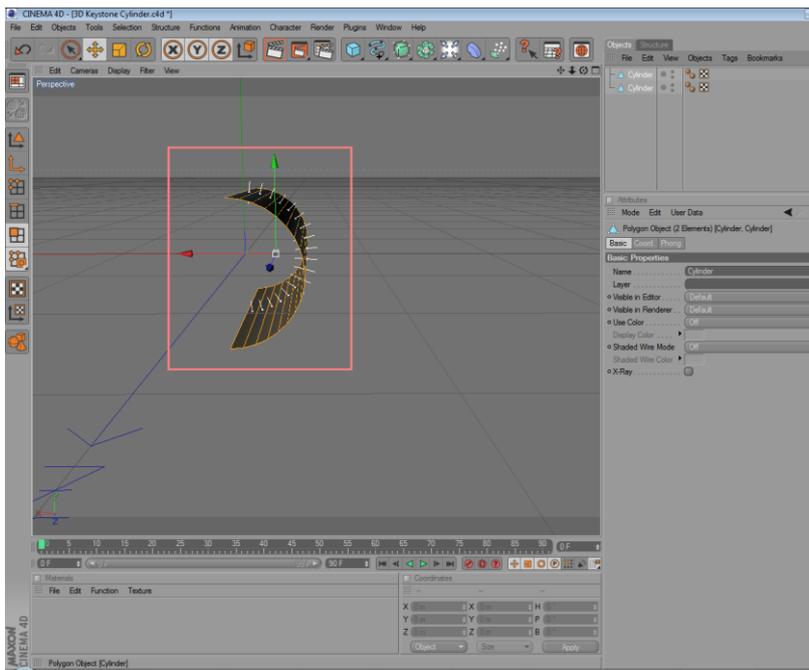
The next copy steps are only necessary if the object should be visible from both sides. Therefore it is duplicated and the normals are set in both directions.

Copy the object...

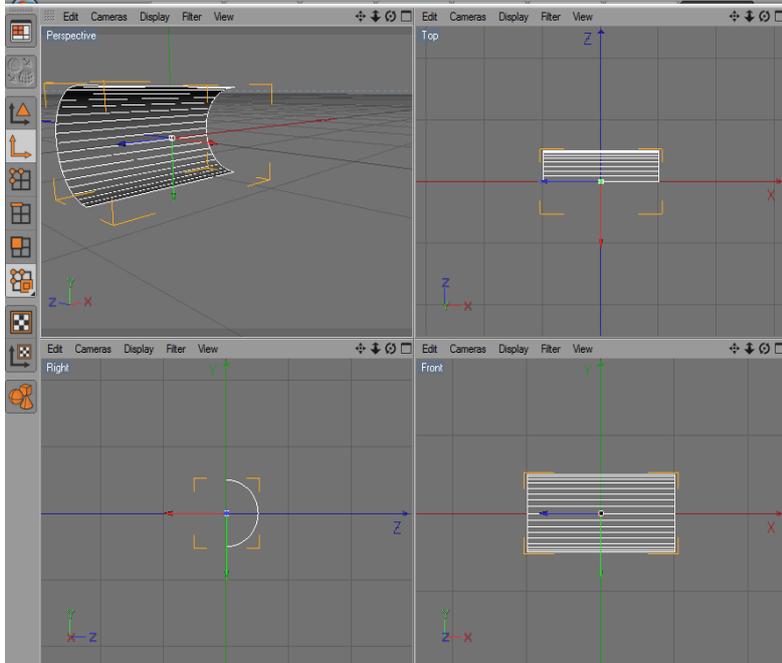
And reverse the normals of the copy.

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

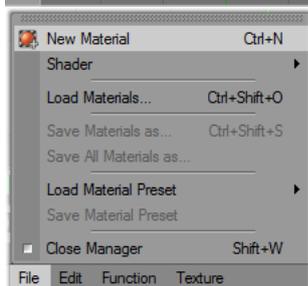
The old cylinder objects can be deleted.



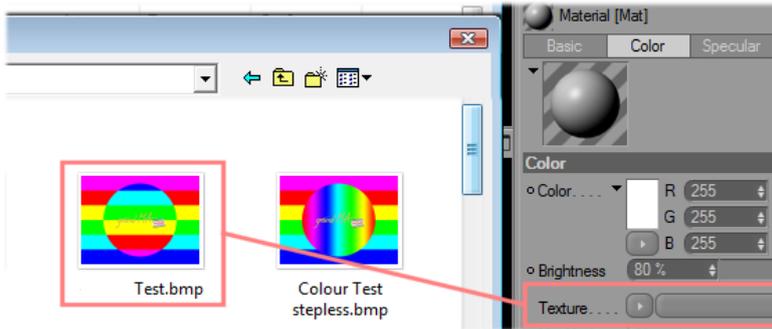
Now you can see two objects with normals in both directions



Check the orientation of the resulting object.

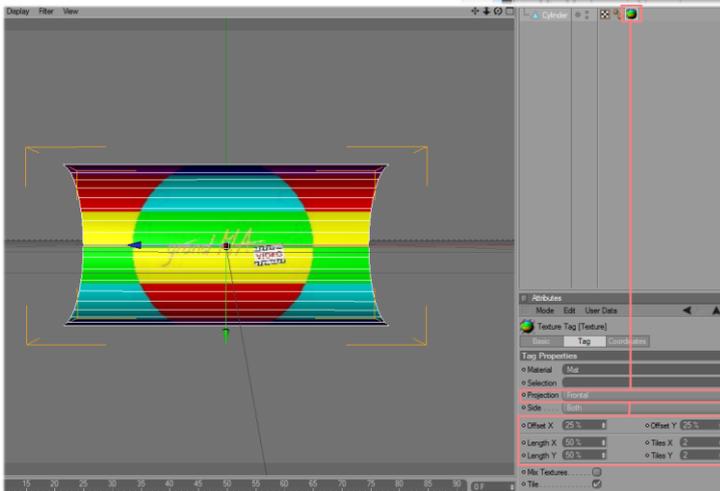


Insert a new material for the texturing.

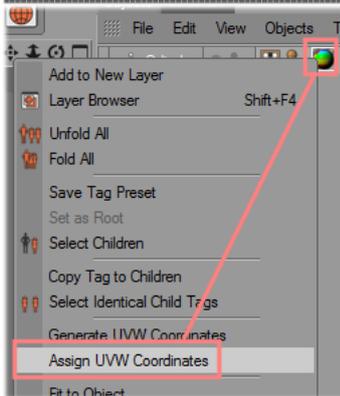


Assign an image to the texture and the material to the object.

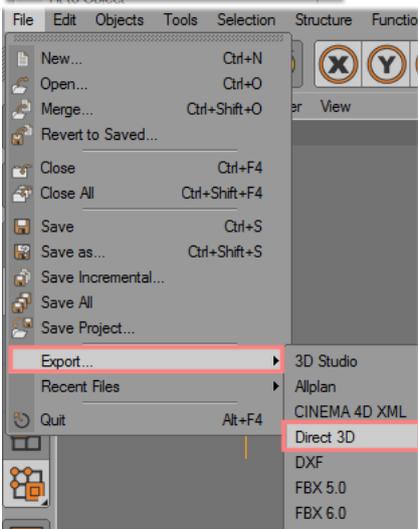
(Mind the restriction of max. 8 characters + extension for the image name!)



Adjust the texture mapping parameter.

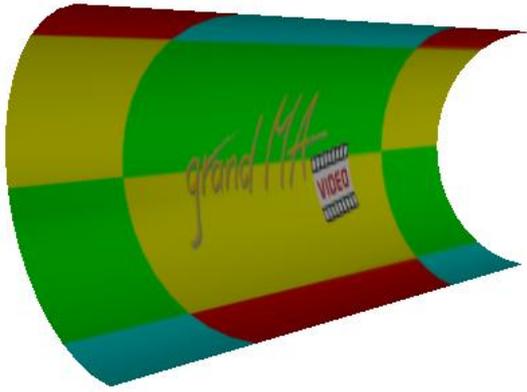


Assign the UV coordinates for the texture mapping.



Export the object to 3D Studio format (.3ds).

Objects created in this way can be added via the import tool.



The resulting 3D Object looks like this.

## 9 Video Creation

Will come soon.

## 10 FAQ

Question	Answer

## 11 Keyboard Shortcuts

Many functions that can be reached via the menu entry are listed directly in the menu. Underlined characters in the menu mark the shortcuts that can be reached by pressing the 'Alt' + 'underlined character' simultaneously.

Depending on the window the keyboard shortcuts have different effects:

Shortcut	Window		Effect
<b>Shift + Ctrl + right mouse</b>	Stage View		Several combinations of camera movements while mouse button is pressed
<b>Ctrl+ left mouse</b>	::		Move or rotate object with left mouse button
<b>Esc</b>	::		Deselect objects
<b>Arrows or Page up-down</b>	::		Move camera or + 'Ctrl' turn camera + 'Shift' faster
<b>Middle mouse button - Mouse wheel</b>	::		Wheel menu on/off If menu is on: - select entry via mouse wheel - 1...9...0 select menu entry - 'Space' next menu entry - 'Shift + Space' one menu entry back
<b>Ctrl + 1...9...0</b>	All views		Change to camera 1...9...0 If focus is in Stage View no 'Ctrl' necessary
<b>Ctrl + Space</b>	::		Next camera. If focus is in Stage View no 'Ctrl' necessary
<b>Ctrl + change camera with mouse</b>	::		No soft camera changing
<b>Shift + camera change</b>	::		Spanning windows will not change their camera
<b>Ctrl + Return</b>	::		Switch to fullscreen or leave fullscreen view

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