MA VPU (Video Processing Unit)

English

The sMArt way of video control

MA VPU (Video Processing Unit) –
ease and power

The MA philosophy –
the familiar way of controlling video

MA Lighting's MA VPU (Video Processing Unit) provides the right toolset to control video just as if it were lighting. Nothing to change, nothing new to learn. Open the door to new fields of visual design and realise astonishingly creative ideas.

With the MA VPU, gone are the days of complicated setup procedures and endless references to the manual. Just connect the MA VPU to your console and experience state-of-the-art video control. The MA VPU reacts just like another lighting fixture.

There are many things you can do with the MA VPU that you cannot with a conventional media server – and some that you can do much better – as the MA VPU is massively more than just a computer with media server software.

MA VPU (Video Processing Unit)

- Configuration, programming, operation, content distribution and software updates via any grandMA2
- Plug-and-play for instant start
- Supports blind-mode and preview programming (switchable from the console)
- Built-in EDID manager to avoid wrong output configuration
- Advanced pixel mapping functionality – DVI out and Pixelmapper can be used simultaneously
- Frame and DMX synchronicity
- Very low latency live video input (optional)
- 3D keystoning and softedging
- Efficient backup solution – one additional MA VPU is capable of backing up several MA VPU
- **Implemented text ticker and test-pattern generator**
- **Layer reference option: this allows any layer as input for another**
- **Professional balanced sound playback (with or without ground lift)**
- **Best hardware components encapsulated and decoupled for outstanding performance and rock-solid reliability**

MA VPU plus MK2

MA VPU basic MK2

MA VPU light

MA Lighting has developed the MA VPU (Video Processing Unit) as a powerful range of solutions for controlling, live accessing and altering videos, 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 grandMA2 console. It is as simple as controlling any other fixture – the MA VPU just has to be added to the network session. There are no additional parameters needed to control an MA VPU. The whole operation relies on the highly intuitive well-established MA philosophy. So if you know grandMA2, you know the MA VPU.

Thanks to the power of the MA VPU all videos can be displayed in upto Full-HD. Furthermore, the internal output synchronization of the MA-Net2 ensures the highest frame and DMX synchronicity.

Horizontal and vertical softedge blending as well as keystone correction help to scale videos to any size desired. Size doesn't matter! More than that, the MA VPU offers a convenient 3D keystoning functionality and enables the user to fit content to any 3D objects, regardless of size and shape. Furthermore improvements to frame interpolation and smooth speed control can be used to adjust the playback speed.

Beyond that there is a myriad of functions, features and effects available like frame blending, colour boost, dynamic colour key, contrast, brightness, hue, saturation as well as blur, sepia, black/white, ocean and invert and many more. All can be easily accessed and are self-explanatory in their use. Combinations of videos and still images can be mixed and controlled, and JPEG images and standard windows bitmap images such as *.bmp as well as *.gif are supported. Up to 32 x 3D-video-layers are possible for content.

The MA VPU can be programmed via the grandMA2 console in blind and preview modes. This means that the MA VPU follows the console to blind and preview which simplifies programming considerably. Also the VPU has a new Single-Layer-Crossfade mode which allows the user to programm all content on the same layer and even take the cuelist timing instead.

Based on the rock-solid technology of MA Lighting, different versions of the MA VPU are available, that suit all your needs and are optimised for transportation, longevity and on-the-road use. Each MA VPU comes with a pre-installed content library comprising more than 17GB of professional content.

Article	
120146-1	MA VPU plus MK2 (Video Processing Unit)
120148-1	MA VPU plus MK2 (Video Processing Unit) with 2x SDI IN
120147-1	MA VPU basic MK2 (Video Processing Unit)
120149-1	MA VPU basic MK2 (Video Processing Unit) with 2x SDI IN
120144	MA VPU light (Video Processing Unit)

MA VPU features

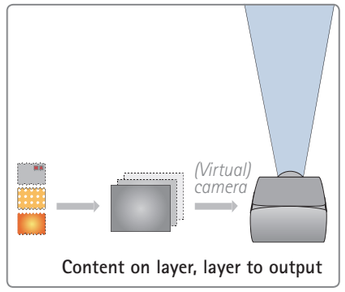
Simplicity meets performance

Basic functionality

The MA VPU was created to be as simple to use as any lighting fixture and deals with video content like moving or still images, so the lighting/visuals operators can easily create effects and pictures on stage the way they are used to.

The MA VPU offers some basic functionality with which all lighting operators are familiar.

The "gobo" or "projection" that the operator is using is called 'content'. To make life as easy as possible a simple rule applies: Content needs to be added to a layer. A layer with content needs to be assigned to a camera which reflects the picture the camera is taking to an output. The user can change the content on the layer with timing and all applicable video effects ... and the show is ready.



Content on layer, layer to output

Video effects

The MA VPU offers a generous number of video effects which are categorized in sections for easier access. Numerous combinations are possible with 3D positioning on a layer to create many 3D effects. Simple image manipulations as well as splitting an image and animation of an image are on hand. Scaling in XYZ or all axes is possible. Also there are complete ranges of colour effects available to create either subtractive or additive colour effects. Also colour-keying and single colour channel manipulation is available.

Additionally numerous real video effects are implemented, of which up to four can be applied on a single layer. e.g.: Outlines, Sepia, Blur, Ambos, Black and White, Negative, Shapens, Sobel, Ocean, Water, Bloomhard, Tile, Colour-Shifting, Frost, Ghost, Pixel, Scratch, Halftone, Mirror, Posterize, Cartoon, Fresnel, Kaleidoscope, Threshold and many more.

Choose from myriads of options to alter your images and videos – here is a small extract:

Brightness

Saturation

Colour key

Colour boost

Iris image

Transparent

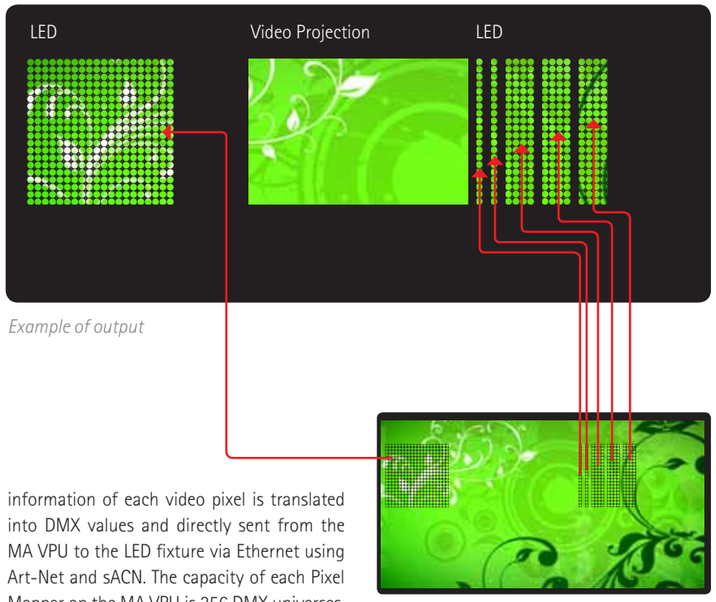
Pixel Mapper

Because of the Pixel Mapper there are no limits to using LED elements in your design in any creative way imaginable. With the Pixel Mapper it is possible to display video content on any DMX-Matrix – so you can put your LED-screens, LED-panels, LED-strips / battens / luminaires etc. everywhere on stage and control them easily.

While video on plasma screens or video walls is caught in a defined ratio, LED fixtures can use all kinds of measurements. The picture can also be aligned on pixels which don't have fixed aspect ratios.

Beside the arrangements of LEDs, the output of standard fixtures can be pixel-mapped and sent back to the console (or to the fixture directly) as DMX over Ethernet data. In this way your whole stage can become a giant screen for defined content.

Similar to the desk fixture types, the attributes of the LED panels are defined in text files located in a folder of the MA VPU. LED fixtures can be easily created. The intensity and colour information of each video pixel is translated into DMX values and directly sent from the MA VPU to the LED fixture via Ethernet using Art-Net and sACN. The capacity of each Pixel Mapper on the MA VPU is 256 DMX universes. With multiple MA VPU in session, the number of universes is multiplied.



Example of output

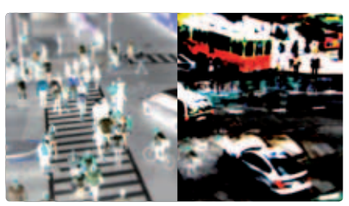
Screenshot of Pixel Mapper

Blur

Black/White; Sepia

Outlines

Invert; Shapens



Ambos

Ocean

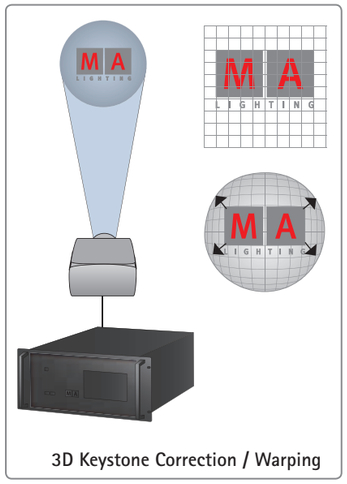
More MA VPU features

Image projection done right

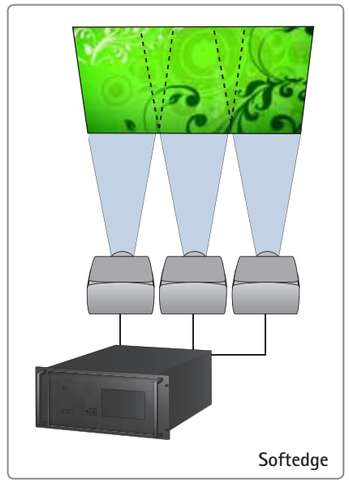
3D Keystone Correction, Softedge, Warping

With any media content / output, the problem often arises of how to twist and tweak the picture into the right position on stage. If an LED wall or any type of monitor is used the setup is quite simple and the MA VPU supports this with easy ways of setting up split-screens.

If projection is used it can be challenging if the screen surface does not fit the projection output. In these cases, the MA VPU offers 3D Keystone capabilities as well as Softedging to align two or more projectors. If the image still does not fit the screen surface because the screen itself is a 3D object, the Warping capabilities will help to easily map the projection output to the screen surface producing great image projection.



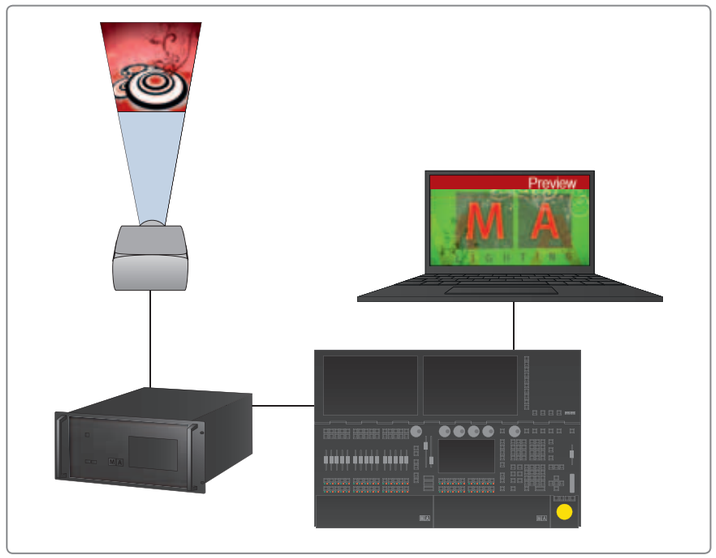
3D Keystone Correction / Warping



Softedge

The best things are free!

The MA VPU software is available for free and can be used as an "overview tool" at the FoH to show all layers of all MA VPU in the session. Not only the layers but also Content distribution and Blind programming or Preview are available via the grandMA2 console. While the MA VPU hardware keeps outputting the programmed show on the main screens, the MA VPU software at the console can show the next cues in Blind or Preview.

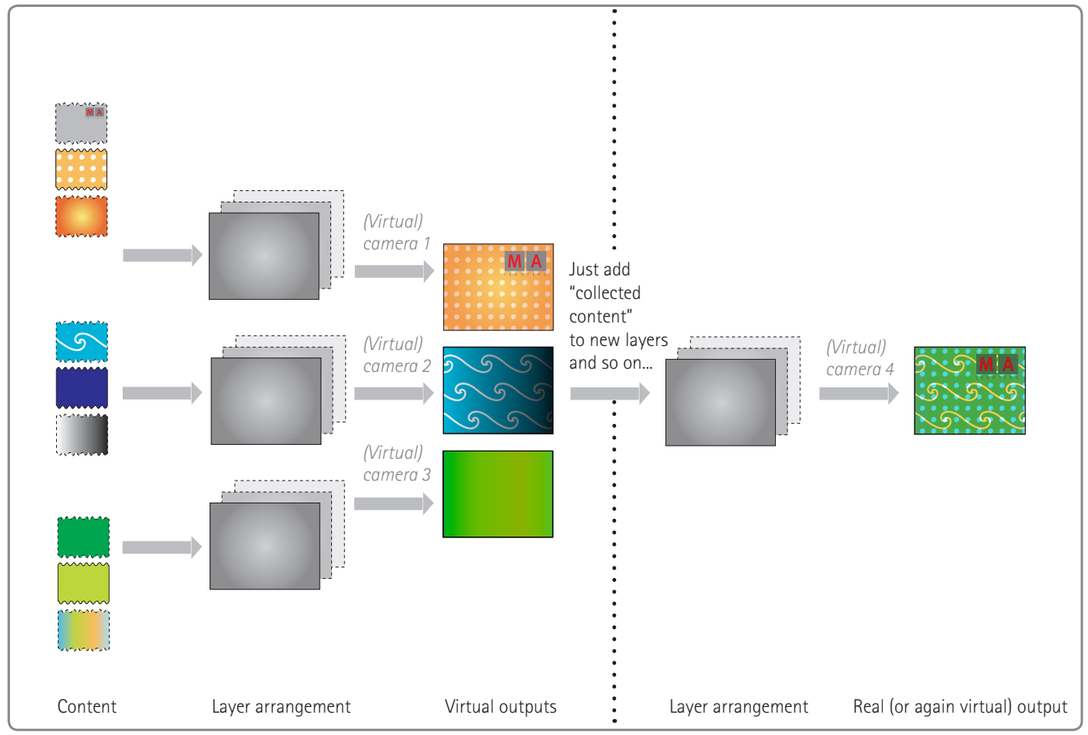


Virtual outputs multiply your possibilities

If the standard method of projection does not fit the needs of the real output being created, the MA VPU offers more sophisticated ways to solve it.

Following the basic rules: content on layer, layer to camera, camera to output – the output can be virtual and therefore be re-routed back into the MA VPU to be used again. This way the dynamic grouping of layers to one output can be realised as well as single layers via multiple virtual outputs to support multi-output-cards per physical connector.

Many variations are possible all due to the modular and simple re-routing of virtual outputs inside the MA VPU. Additionally, layer references are available to minimise the rendering performance and reduce any possible latency as well as frame blending and anti-aliasing.



Multiply your possibilities via grouping of layers

Art in Motion

All video effects on the TV show "X-Factor Arabia" were controlled by the MA VPU software.

For more information on our international projects, please see our news. These provide you with in-depth knowledge and offer you a detailed look. To read our news please visit our website: **www.malighting.com**

The real MA VPU benefit

Part of the MA System

Developed to extend the powerful MA System by integrating innovative video control, the MA VPU offers simple control from grandMA2 consoles – all synchronised in real time. For example, select the MA VPU content (pictures, videos) that you want to use, adjust colour, hue, saturation etc., by tapping on the touch-screen of your grandMA2. Everything you need for video control is displayed there. It's as easy as controlling a lighting fixture!

Furthermore the MA VPU is fast and easy to install: Just connect it to your network and start working. No need for time consuming setups, let the MA VPU handle your video parameters!

What about safety? As all components share the same showfile, just one additional MA VPU can backup your complete system. Even better: The showfile is exactly the same as in the console – you read the showfile into every grandMA2 and proceed from there. This will save huge amounts of time!

Heaps of preinstalled content

Just start programming

Multiple preinstalled content and easy importing of own content

Your system is ready, your MA VPU is setup and running – what about your content to be used? The MA VPU first of all delivers a lot of content to immediately start programming your show. Also for easy change overs or just some creative testing, multiple content is pre-installed.

Importing your own content is as easy as using the standard content delivered with your MA VPU. The definition of MA VPU content is to use standardized MPEG2-files.* The manual describes in detail how to create or transform to this format. Also there is a description of how to use the given tools to bring any other content to the needed format.

After transferring all content to the MPEG-2 format you can easily distribute it to all MA VPU in the network. Just use your grandMA2 or grandMA2 onPC on your notebook to initialize content distribution. This will be handled in the background so that you can keep programming. Also, the availability of the MA VPU software as a free "overview tool" on any hardware device gives you additional capacity to transfer and organise content whilst all other MA VPU are still being used to program the show. Nothing interrupts your workflow and all content is organised in your hands.

* For more details to codec see also page 14.

Stay on top of things

Simple setup and monitoring via the 7" touchscreen display

Video Output Control

The preview screen of the MA VPU plus MK2 lets you perfectly supervise the content which is currently being sent to any of the three outputs.

System Monitoring & Diagnosis

The MA VPU plus MK2 features a screen for real-time monitoring of the System Monitor. In this way the user is always up to date about the current situation of showfile and network.

Network Overview

Whenever needed, the network screen gives a quick overview of all MA components in the network and their current status. This allows you to check the installed software versions or monitor whether all components are up and working.

Priorising Fixtures

Thanks to the smart MA-Net2/MA-Net you can assign each of the connected MA VPU to output to your screens. If an MA VPU fails, it is possible to easily select your backup MA VPU via the MA VPU touchscreen and use it instead. If you have no backup MA VPU, you can select a less important MA VPU from your system and assign it to a more relevant screen. The video output must of course be re-routed as well. This can be easily done via a crossbar.

MA VPU series

Three sophisticated solutions

	MA VPU plus MK2	MA VPU basic MK2	MA VPU light
DVI-Output with switchable EDID Manager (back panel)	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)
Full-HD resolution (1080p/60Hz)	6*	4*	2*
SD resolution (576p/60Hz)	12*	8*	6*
19"-Rugged housing made for touring	5HU	5HU	2HU
Internal 7" Touch Screen (800 x 480 Pixel)	•		
2"-Color-TFT-Display providing status information			•
Power Up switch (front panel)	•	•	•
SDI IN	2**	2**	
powerCON IN (back panel)	•	•	•
powerCON OUT (back panel)	•	•	
Menu button (front panel)			•
RJ45 etherCON Gigabit network connector (back panel)	2	2	2
XLR-male balanced transformer isolated audio outputs at studio level (back panel)	2	2	2
S/PDIF-Cinch Connector – Digital Audio OUT			1
USB-Ports (front panel)	2 x USB2.0	2 x USB2.0	2 x USB2.0
USB-Ports (back panel)	2 x USB3.0 1 x USB2.0	2 x USB3.0 1 x USB2.0	2 x USB3.0
Connection for external harddrives, etc. (back panel)	1 x eSATA 6G	1 x eSATA 6G	1 x eSATA V3.0
Processor	I7-Quad-Core-Processor	I5-Quad-Core-Processor	Quad-Core-Processor
Dual Channel RAM	8GB@2,4GHz	8GB@1,65GHz	8GB@2,1GHz
Fast SATA – Solid State Drive	240GB	120GB	120GB

*layers simultaneously **Option

Codecs

The MA VPU uses the MPEG-1/2 (ISO/IEC 13818-part x) standard. As MA Lighting uses Microsoft®'s DirectShow to render the textures (pictures) it will need a codec to be able to read in these pictures. This codec is MPEG2 from MainConcept.

Connectivity

Hardware facts

MA VPU plus MK2 and MA VPU basic MK2

1. 3 x EDID-Manager
2. 3 x DVI
3. 2 x SDI in
4. powerCON in and out
5. 2 x EtherCon
6. 2 x USB3.0
7. 2 x XLR 3pin
8. 1 x USB2.0
9. 1 x eSATA

MA VPU light

1. 3 x EDID-Manager
2. 2 x DVI
3. 1 x VGA
4. 2 x EtherCon
5. 2 x USB3.0
6. 1 x SPDIF
7. 2 x XLR 3pin
8. 1 x eSATA
9. powerCON in

MA Content Package

With the MA Content Package you'll get more than 40 percent 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.

How it works: enter your voucher-code – after your registration under "Ihr Konto" (on the upperside right) – into the designated field. Then you can choose your clips and start downloading themin the desired format.

The voucher is valid for one year, and you'll be constantly updated on theremaining credit! As a special offer, you can download six video clips for free from www.showfootage.com.

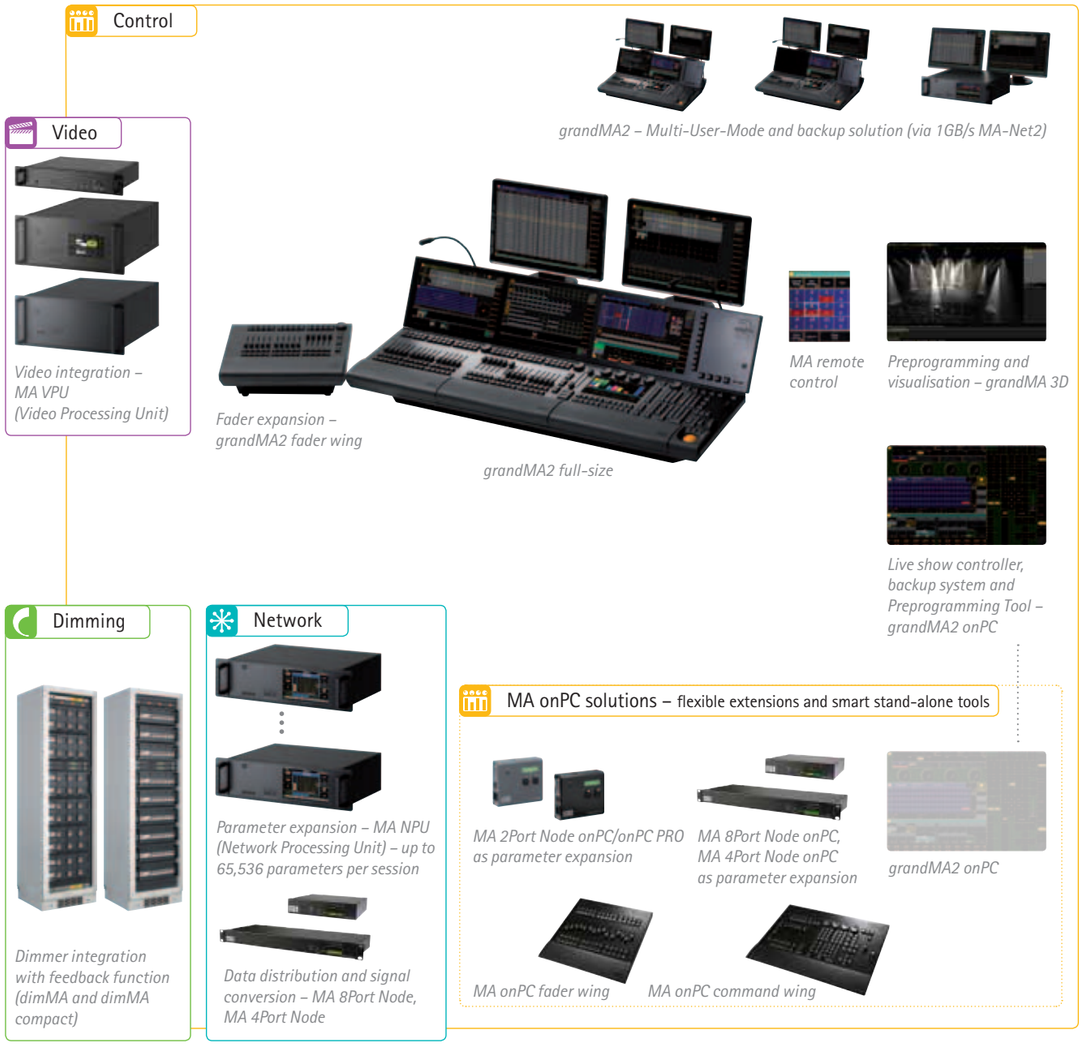
Article	
120374	MA Content Package, incl. SD and HD Video Clips

- **The exclusive MA Content Package from www.showfootage.com – the online contentshop – offers you a variety of more than 500 free selectable clips. You can download 320 SD clips, 120 HD720 clips and 100 HD1080 clips within a year from a huge content library with video material of renowned designers.**

Get connected
MA System Integration

From the beginning the MA VPU has been designed as a high-capacity networking product that is a component of the MA System – like the grandMA2 consoles, grandMA 3D, MA NPU (Network Processing Unit) and the whole dimMA range. All of these elements are more than just the sum of the relevant parts.

As a complete MA System the MA components build a synergy that is absolutely unequalled on the market, thanks to the MA-Net2's enormous speed and capacity.



MA Net2
Powerful backbone of the MA System

The MA-Net2 is the powerful backbone of the MA System and the common language of all MA System components.

However, the MA-Net2 is far more than just a protocol ... It is an integral part of the MA System architecture. All consoles, MA NPU (Network Processing Units), the MA Digital Dimmers as well as the MA VPU (Video Processing Units) are connected via the MA-Net2 as if they were one device. All of these components contain the full system data needed to control the processes and to synchronise the outputs in real-time.

After the information is distributed to all the MA System components (show upload), the showfile containing all the data is available in all of them. The MA-Net2 is designed to synchronise all components without creating unnecessary data traffic.

This is true for all existing data as well as for outputting data (DMX, etc.) even in combination with the output of the MA VPU (in fps). Because of the MA-Net2 architecture, the MA System is scalable from the tiniest back-up solution to the largest, all-encompassing multi-user/multi-console setup. MA guarantees the completely synchronous control of fixtures with up-to 256 DMX-universes per session. This includes continuous backup solutions and minimum configuration work whilst giving a full view of the system from the console.

To ensure the best possible performance, the MA System is regularly stress tested to prove reliability and optimise system performance. This is how we can guarantee that the MA system is capable of withstanding several external disturbance issues as well as simple occurrences like losing network connections whilst simply performing what you are asking to do for your show!

MA system stress test – to prove reliability and optimise system performance

grandMA 3D

MA Lighting's visualiser and pre-programming studio – the PC software grandMA 3D – is an extremely powerful tool to visualise and design three-dimensional stage layouts. In conjunction with any grandMA2 console or the grandMA2 onPC program conventional and moving light fixtures can be displayed.

grandMA 3D allows a straight forward design and set up of any custom stage or scenery layout with its 2D drawing facilities and a library of basic graphical elements. Multiple windows both in 2D or 3D view with any camera angle can be opened at the same time and will be updated in real-time. All the stage elements can be positioned in x/y/z directions and can also be rotated around the various axes. Textures to design these elements' surfaces can be chosen from the huge built-in library, or you may import your own graphic files and even video clips and use them as textures.
Position and rotation parameters of objects and cameras on the virtual stage can be controlled via DMX and the equipment can be moved freely in the 3D space via the connected grandMA2 console.

Another big advantage is that the 3D environment is stored in the same showfile in the grandMA2 system. No matter where you are and which type of grandMA2 console and other MA equipment is being used – you always have the complete showfile with you!

The grandMA 3D application runs on powerful Windows® PCs and communicates with the grandMA2 console via network.

- **Real-time 3D visualisation of all important functions and effects of luminaires and moving lights**
- **Bi-directional data exchange with the grandMA2 consoles – using the same setups**
- **Live and blind programming modes and preview**
- **Follow mode for live-positioning of fixtures from the grandMA 3D program to the console**
- **Multiple cameras are available that can be selected and independently positioned during visualisation**
- **Pre-programming of entire shows just with grandMA2 onPC and grandMA 3D**
- **Precise and realistic reproduction of shadows & colour beams in realtime**
- **grandMA 3D is available free of charge**
- **Further information can be found at www.malighting.com/software**

Your benefits at a glance:

Hardware

* MA VPU – Rock solid

Renowned MA quality with all inputs and outputs clearly arranged and accessible on the back. Rock'n'Roll proven 19" housing. The complete motherboard, solid state drive and all other parts of the MA VPU are enclosed within a shock mounted frame for optimal protection.

* Connectivity

Built-in EDID-Manager (Extended Display Identification Data) gives information about the manufacturer, display size, pixel mapping data etc. of the screens and the ability to manage the output correctly. Due to the high qualitative HD SDI-Inputs, there is virtually no latency. A USB flash drive for restoring the delivery status guarantees being able to reset a MA VPU back to its original conditions at each point in time. This also means that any performance lost through wrong adjustments can be restored again.

* Easy access

The display at the front of the MA VPU plus is a big advantage as the whole setup can be completed here. The MA VPU light display also informs about all relevant data.

* Sound

The MA VPU plays back the sound of video clips and can be controlled by an individual sound master per 3D video layer.

Software

* Easy back-up solution

Intelligent back-up solution, within the network. Any MA VPU can back up any other MA VPU.

* Comfortable set-up

The whole MA VPU set-up and all functions can be accessed directly from the grandMA2 console, a separate management computer is not required.

* Sophisticated content distribution

The complete content distribution is carried out via the grandMA2 console. Video-input-settings, as well as other adjustments are also possible via the grandMA2.

Service and Support

* 24/7

24 hour support, accessible worldwide: **www.malighting.com/support**

System

* Blind programming

Blind and preview cues including MA VPU state are possible.

* Free software

All software for the MA VPU is available for download free from the internet and usable as a pre-programming tool.

* Standard codec application

Only the MainConcept MPEG2 codec is applied. This way high performance and quality are ensured. Required conversion tools are available on the MA Lighting website.

* No additional parameters needed

If used in a network, the MA VPU does not need any further parameters. This means, if all 4.096 parameters of a grandMA2 light are occupied (e.g. by moving lights), you can still add numerous MA VPUs to the network.

* Intuitive interface

The complete interface of the MA VPU is arranged very intuitively to allows users to orientate themselves fast. A standard show can be played out quickly.

* 256 DMX universes

Refreshrate DMX 30Hz are possible via the MA VPU (pixel mapping, output of pixel RGB to DMX).

* Integrated warper

The MA VPU features an integrated warper, which can be used for placing all warped objects into the output as well as on each individual layer. Amongst others, warping means the output of clips on three-dimensional objects. Live warping over the complete network is also possible, all objects are available directly on each MA VPU within the network.

* Advanced networking

Advanced networking features over MA-Net2 allow content distribution between the MA VPU.

* Shutdown via console

You can create a master fixture, which can shut down the MA VPU via the console. Also a restart, changing to windowed mode or to the full screen mode is possible via the console.

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MA Lighting International GmbH
An der Talle 24 – 28
33102 Paderborn / Germany

Phone: +49 5251 688865 -10
Fax: +49 5251 688865 -88

info@malighting.com
http://www.malighting.com

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MA Lighting Latin America · Rua Margarida 350. Barra Funda · 01154-030 · São Paulo · Brazil · Phone: +55 11 2359 0470 · infoLATINOAMERICA@malighting.com

MA Lighting Middle East / India · Phone: +971-50 55 26 27 8 · infoARABIA@malighting.com

MA Lighting Asia Pacific Pte Ltd. · 195 Pearl's Hill Terrace #01-18 · Singapore 168976 · Phone: +65-6513-1897 · infoASIA@malighting.com

MA Lighting Eastern Europe, Russia, Scandinavia · Vanha Talvitie 11 C, 4th floor · 00580 Helsinki, Finland · Phone: +35-8400 376 792 · riku.kauppinen@malighting.com