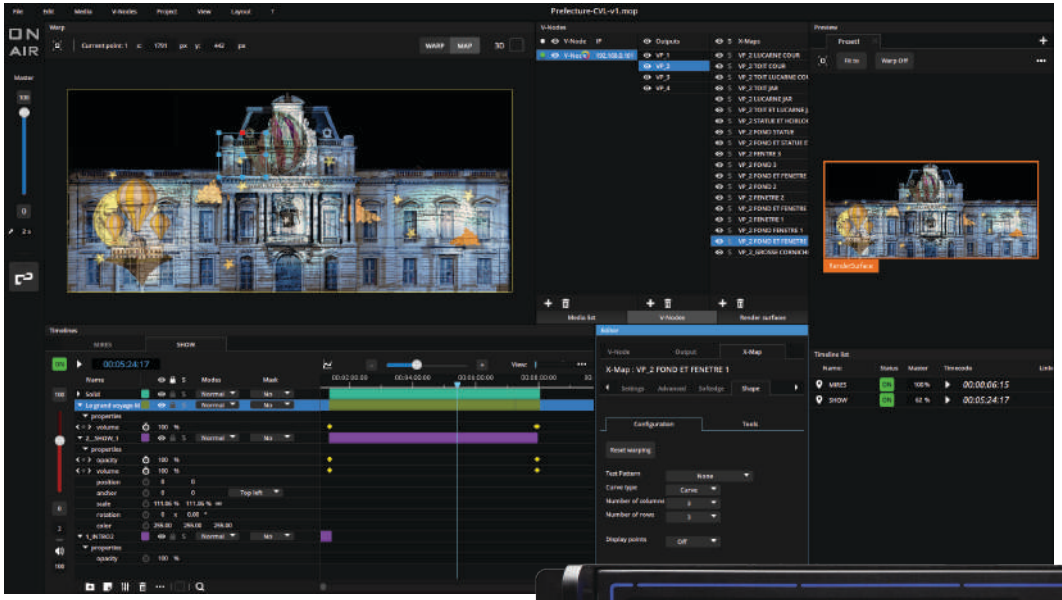
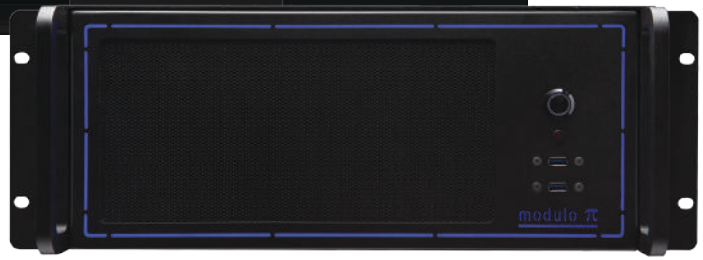
More than a Media Server

Modulo Kinetic, the ultimate video solution tailored for the most challenging projects



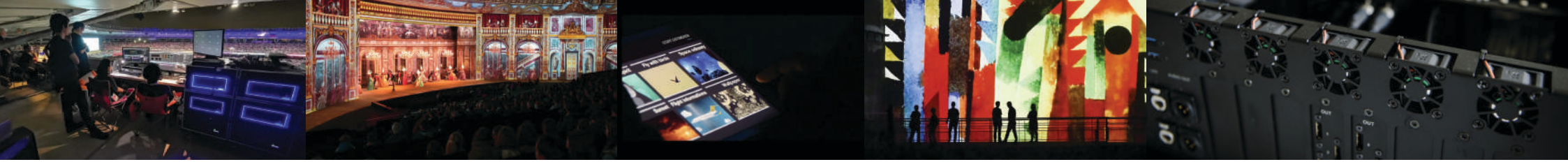


Hardware + Software designed & manufactured

Modulo Kinetic is a fully integrated media server reliable across the complete workflow: Study, simulation, encoding, playback, and show control. **Featuring** real-time 3D, interactivity, and tracking, **Modulo Kinetic also comes with an** embedded low-latency live mixer.
With Modulo Kinetic, enjoy utmost flexibility and performance through each stage of your project, from design to playback.

- Non-linear, real-time timelines editing with keyframes
- Embedded low-latency Live Mixer **| INDUSTRY FIRST |**
- Advanced 2D & 3D warping tools incl. exclusive X-Map function
- Multi-projector Autocalibration module **| BY MODULO PI |**
- Real-time 3D engine with generative content, incl. particles
- Real-time study and simulation in 3D & VR
- 3D video-projector calibration
- Flexible node-based programming
- Easy, yet powerful Show Control
- User Interface Designer to easily create your own UI
- Powerful tools for interactive experiences **| NEW |**
- KineMotion, powerful optical tracking module **| BY MODULO PI |**
- Dedicated tools for Virtual Productions with AR & XR
- True multi-user mode for optimized set-up and operation

Modulo Pi | 113-121 avenue du Président Wilson 93210 La Plaine Saint Denis - France | +33 (0)1 7024 9964 | contact@modulo-pi.com | modulo-pi.com



Contents

Credits from left to right:
Rugby World Cup 2019 | S.C.Alliance
Le Dernier Panache | Puy du Fou
Cockpit mapping experience | SELA, Créav Communication
Bassins de Lumières | Culturespaces Digital, Cadmos

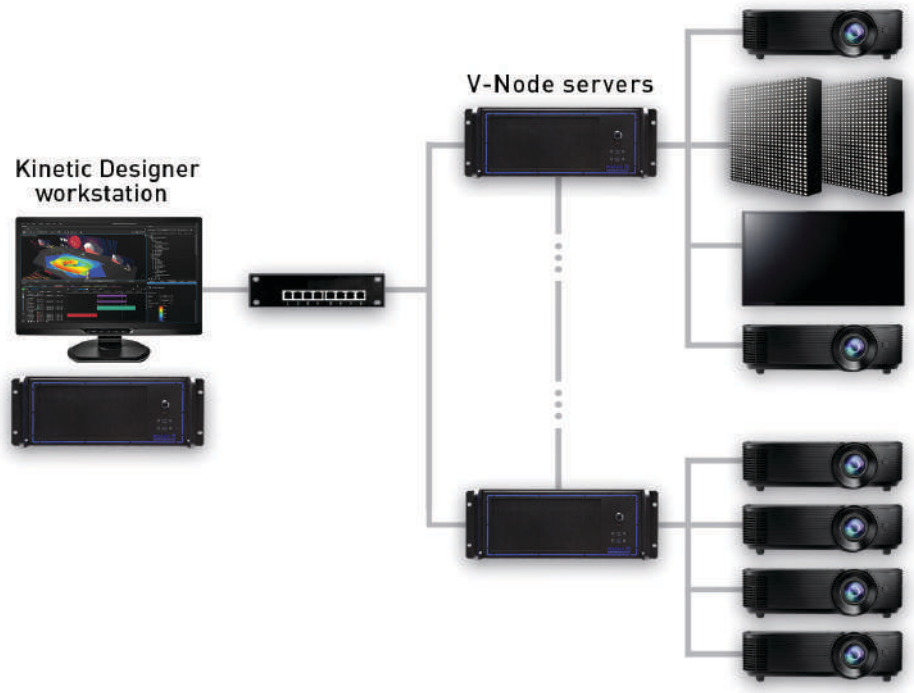
A fully integrated platform
to maximize efficiency and unleash creativity

Modulo Kinetic, a comprehensive scalable platform

Modulo Kinetic provides one logical and fully integrated ecosystem to reduce complexity, unleash power, and creativity.

Modulo Kinetic relies on **Kinetic Designer**, an intuitive user interface with dedicated workstation, connected to one or several **V-Node servers**.
When connected to the V-Node servers, Kinetic Designer will automatically distribute the media content to the servers on the network.

Fully scalable, the system can support any number of video-projectors.

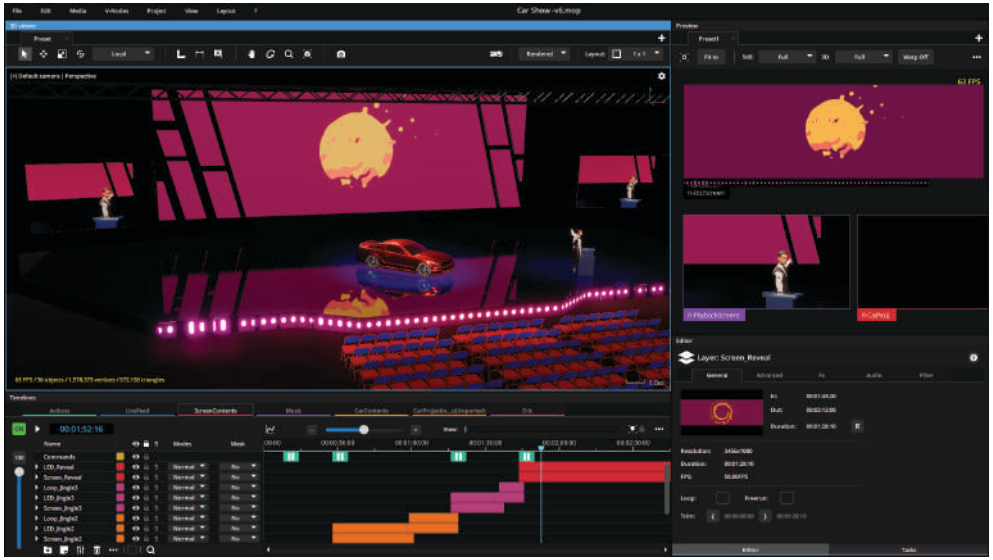


Kinetic Designer, a smart and powerful user interface

Modulo Kinetic's extensive capabilities are brought within Kinetic Designer, a consistent and user-friendly interface, the cornerstone of your workflow.

Kinetic Designer has been designed so that users focus on what's important. You can design your own interface layout based on your favorite features, or simply recall existing layout presets. Several themes are available to adapt the luminosity of Kinetic Designer to your working environment.

Available offline and with multi-user capabilities, Kinetic Designer is the perfect tool for artists, designers, project managers and technicians.



Rely on Modulo Kinetic across the complete workflow:

Show Study — Offline Encoding — Show Simulation — On-site Encoding — Show Control — Show Playback

Advanced yet user-friendly 3D
for show study and simulation

A versatile 3D environment

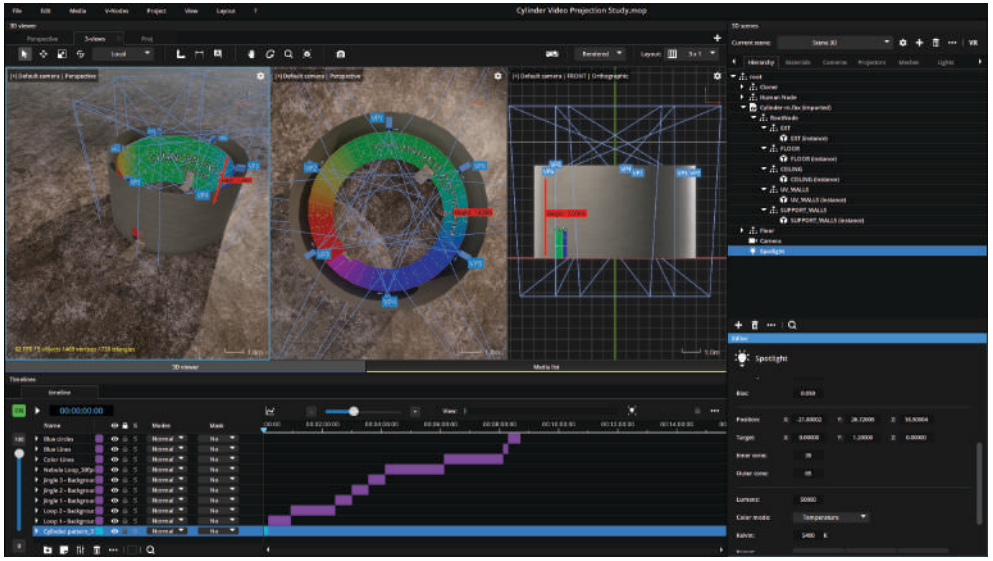
Modulo Kinetic's 3D workflow is inspired from renowned 3D software. It offers varied possibilities to answer any of your needs:

- Create an unlimited number of scenes
- Add objects through our internal library and modify their position, size...
- Import 3D scenes with full tree (cameras, lights, animations...)
- Import objects in a wide range of formats
- Import point cloud files from professionals 3D scanners

Video-projectors database: +680 references

Modulo Kinetic embeds an extensive library of video-projectors. Use the internal database to find the video-projectors best suited to your project.
Just drag and drop the projectors in your 3D scene, and configure them with their actual settings (lens, throw ratio...).

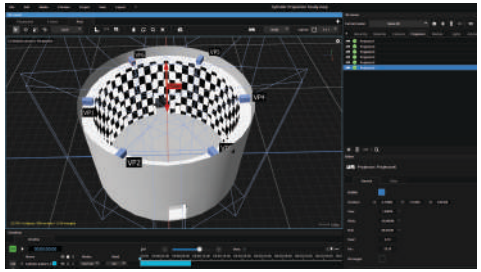
Alternatively, video-projectors can be simply imported into Kinetic Designer from a csv file.

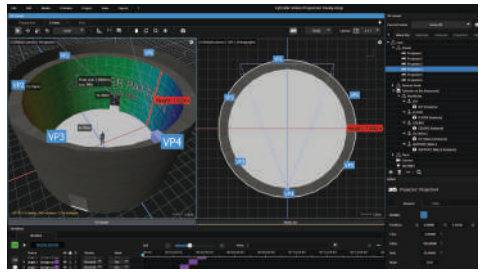


Extensive study tools

The distribution of video-projectors in 3D scenes is made fast and easy thanks to **clone and symmetry tools**. It is possible to bake the clone and symmetry modifiers to edit the projectors' parameters whenever needed.

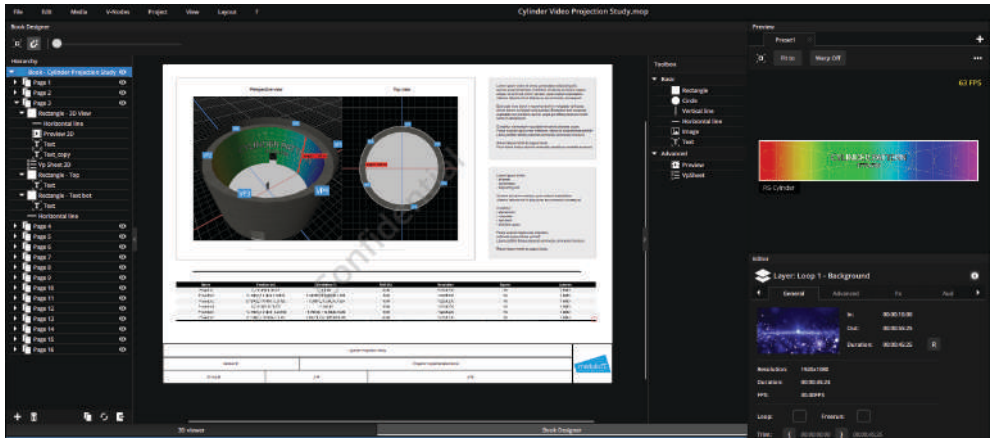
Design your entire projection using **any point of view** and choose from various settings such as pixel density or lux.





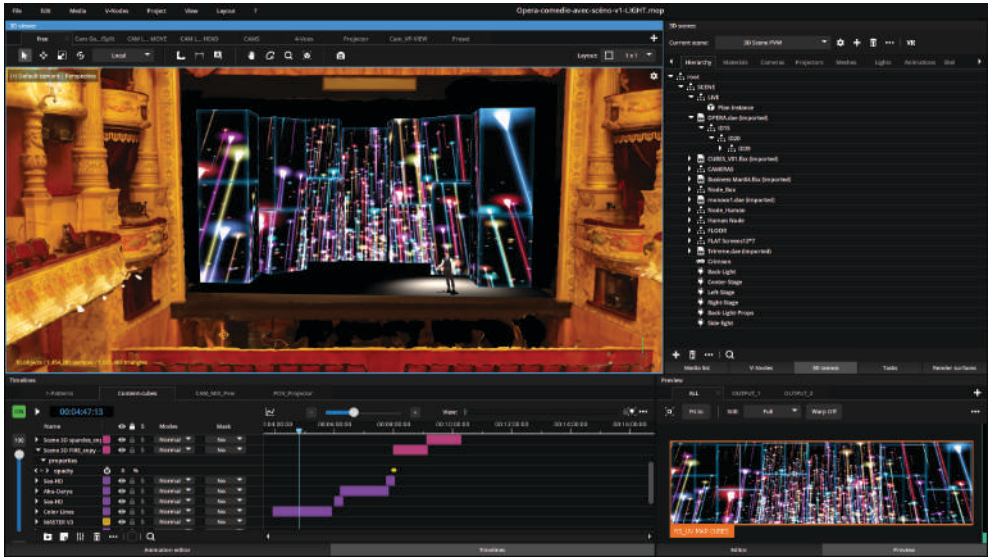
Easily prepare and export study documentation

Create the perfect study documentation effortlessly. Add measures and annotations to your 3D scenes, export any view or information: **3D view snapshots, lux and pixel density views with captions, sheet list of projectors with their specs...** An editor allows organizing snapshots, and **export book as PDF**.

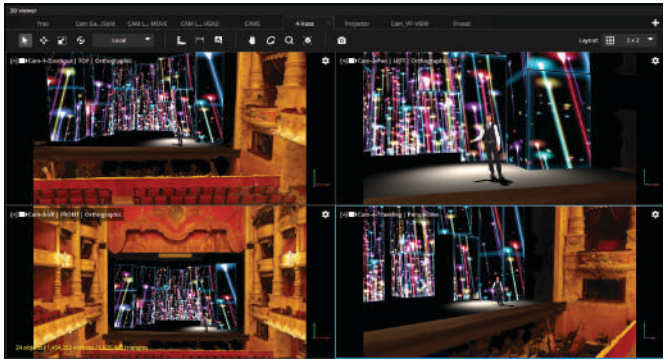


Real-time previzualisation

Sharing your project vision with your client may be key to make a difference. Thanks to Modulo Kinetic's 3D scene visualizer, you can previsualize your project real-time.



To deliver a flawless preview, proxies - lower resolution video files - are automatically generated in Modulo Kinetic Designer.



Real-time VR

Go even further with an immersion in Virtual Reality. One single button in Kinetic Designer allows to **visualize a show scene from any angle with a VR headset.**
No coding is needed to enjoy all the benefits of Modulo Kinetic's real-time VR.

Real-time VR from a VR headset

Smooth media playback for a variety of formats

Modulo Kinetic is designed to process media seamlessly and provide the best image quality, while running on a streamlined hardware configuration.
All supported media formats were selected so that they always run smoothly, and can be synchronized on all servers.

Image:
JPEG
PNG [1]
TIFF [1]

Audio:
AIFF
FLACC
OGG
WAV

Video:
Apple ProRes 10-bit support
GoPro Cineform 10-bit support
H.264 - 4:2:0
HAP, HAP Alpha [1], HAP Q, HAP R
MPEG2 - 4:2:2
NotchLC 10-bit support

Uncompressed Video:
DPX 10-bit sequence
QuickTime uncompressed RGB [1]
QuickTime uncompressed YUV 8
QuickTime uncompressed YUV 10 bits
TGA sequence [1]

Other:
Notch Block
Clock [1]
Counter / Countdown [1]
Interactive Shader Format (ISF)
Solid
Test patterns
Text [1]
Web pages

[1] *Alpha channel supported*

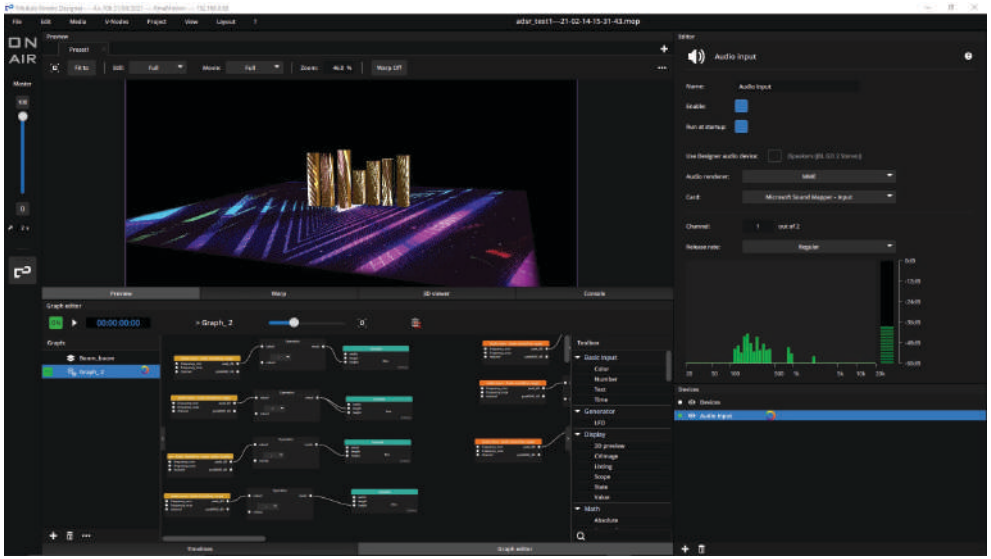
Advanced audio playback
for a complete experience

A powerful audio engine

Modulo Kinetic's audio engine and audio matrix editor deliver high performance and the ability to **flawlessly play a large number of audio channels**.

Audio reactive effects

Easily create audio reactive effects using FFT and level from external audio input or virtual channel.



Multi-channel, independent, and virtual audio channels

Multi-channel audio is available through professional sound cards and ASIO.

In addition, **Modulo Kinetic supports independent audio channels** for simplified routing to one or several outputs.
Create any number of virtual audio channels and easily assign them audio files.
Virtual audio channels can be grouped.

Through Modulo Kinetic Designer, you can easily work with the virtual channels or groups of virtual channels:

- Monitor audio level
- Control through timelines, keyframes, tasks, Graph Editor, or UI Designer

Full compatibility with L-ISA Immersive Hyperreal Sound technology

Modulo Kinetic allows the control of L-ISA, the spatial audio technology by L-Acoustics. **Bidirectional interactions between both platforms are possible so that audio and video perfectly blend.**

Operators can easily control the L-ISA solution directly from Modulo Kinetic, enabling spatial audio control from the media server's timeline sequencer, 3D engine, nodal editor, or embedded show controller.

The L-ISA system can also send data to Modulo Kinetic – such as audio source pan, width, distance, elevation... – in order to interact with media encoded in the server, or generative content created with Modulo Kinetic's 3D engine.

Soft edge blending capabilities

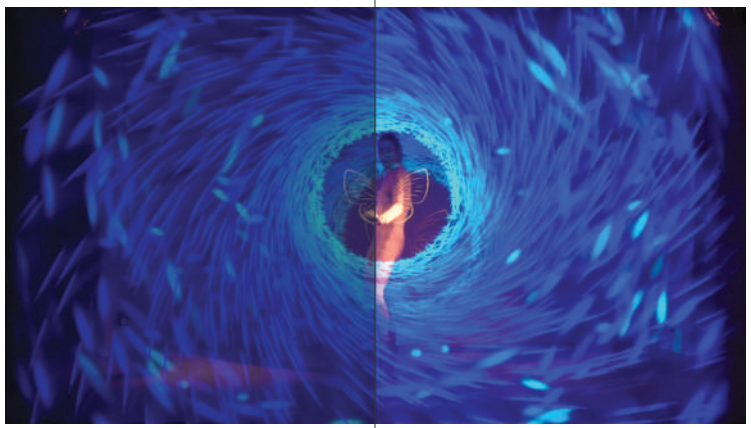
Achieve seamless projection using multiple video-projectors.
Display a test pattern on your outputs (grid, fine grid, greyscale, checkboard, SMPTE or colors). Easily adjust any parameter including the soft edge length, gamma, gain, black level...

Color level adjustment

Adjust the RGB gamma and level globally and/or by color channel.
Color level adjustment can apply to an output or an X-Map (see next section).
It provides the ability to easily create custom masks: Simply use a PNG still image as a mask on your output. The alpha channel of your PNG will be used as a mask.

Real-time color grading

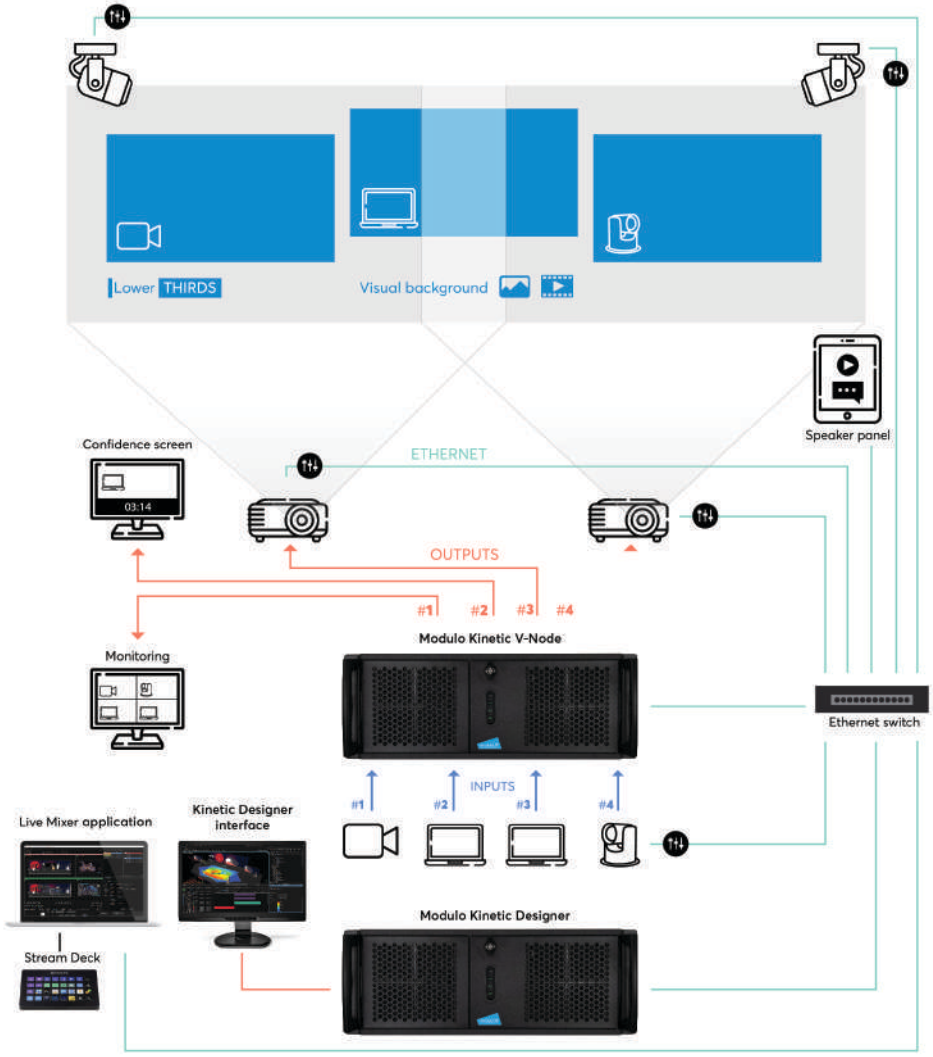
Easily apply color correction directly in Modulo Kinetic.
In case your output needs color correction, **save yourself from a new time-consuming media processing, export, and encoding.**
With the support of LUT format .cube, it is possible to transform color parameters such as gamma, contrast, saturation, luminance... directly in Kinetic Designer.
Simply **drag and drop your LUT files in the interface**, and color transformations will apply real-time. This can apply on outputs or X-Maps (see next section).



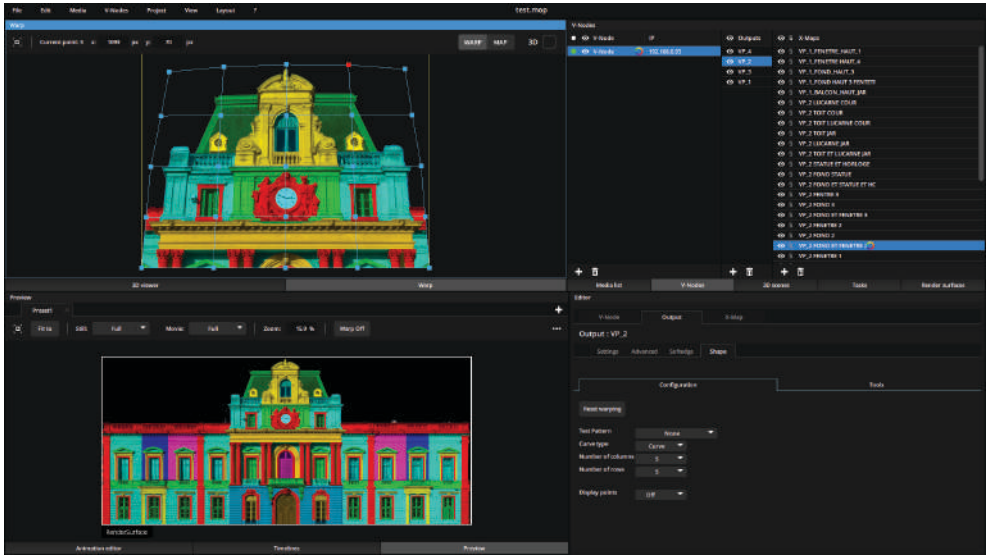
Original Output | LUT applied

Soft edge blending configuration featuring Live Mixer, Show Control and Speaker panel

See full application note



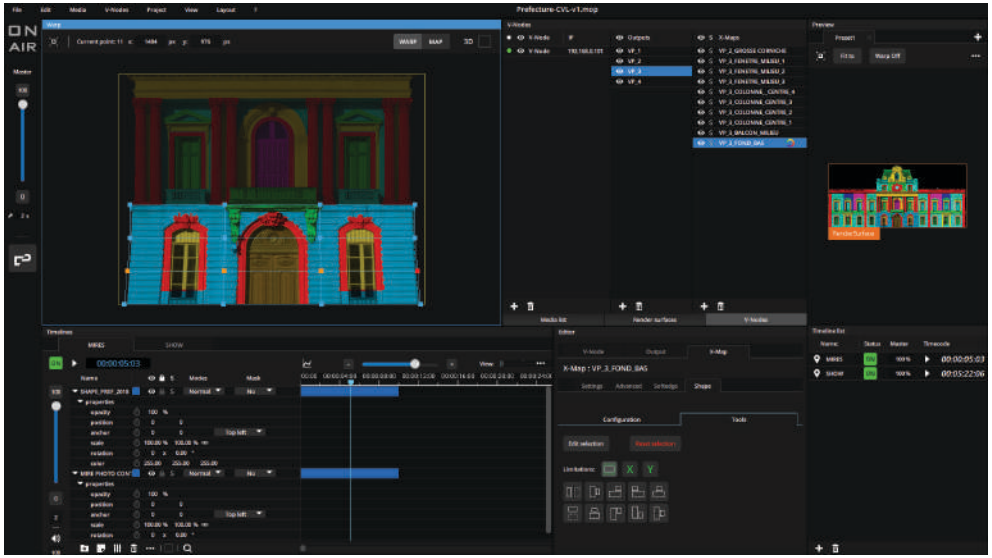
Advanced warping tools
for stunning and user-friendly projection mapping



Keystone and Curve modes

Modulo Kinetic offers a complete set of tools for projection mapping, including Keystone 2x2 and Curve modes.
In Curve mode, easily increment the number of control points with existing warping work perfectly maintained.

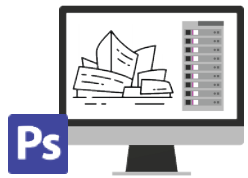
For projection mappings involving different levels of depth or complex shapes, basic warping tools are not adapted.
To address this type of projects while maintaining a simple and cost-effective workflow, Modulo Pi has developed an exclusive approach relying on user-friendly 2D tools: The X-Map function.



Exclusive X-Map function for advanced 2D mapping

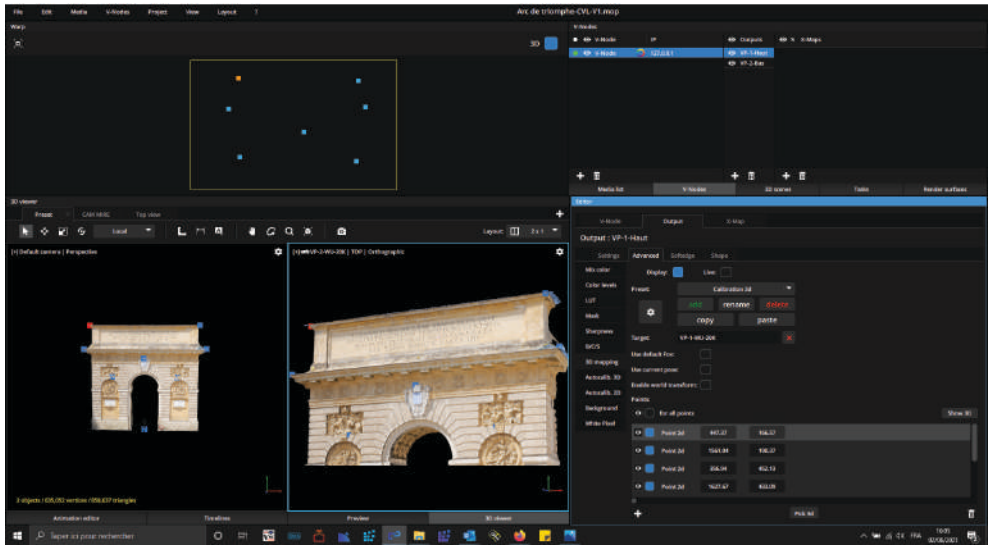
Stunning projection mapping is within your reach thanks to the X-Map feature, an exclusive function developped by Modulo Pi.

X-Map provides a **user-friendly and cost-effective approach to video mapping with a simple 2D workflow**: Photograph your projection area, organize layers in Photoshop, import the Photoshop file in Kinetic Designer, and **warp layers independently.**



3D video mapping tools

For projects with adapted budget and workflow, 3D mapping is another alternative relying on a 3D scan of your projection area.
The **3D model can be imported in Kinetic Designer, and video-projectors calibration can be made with 2D-3D connection points in the 3D scene.**

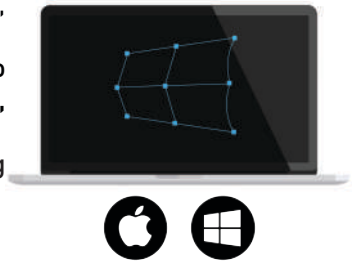


Multi-user warp remote application

Warp Remote is a companion app designed to optimize the warping process.

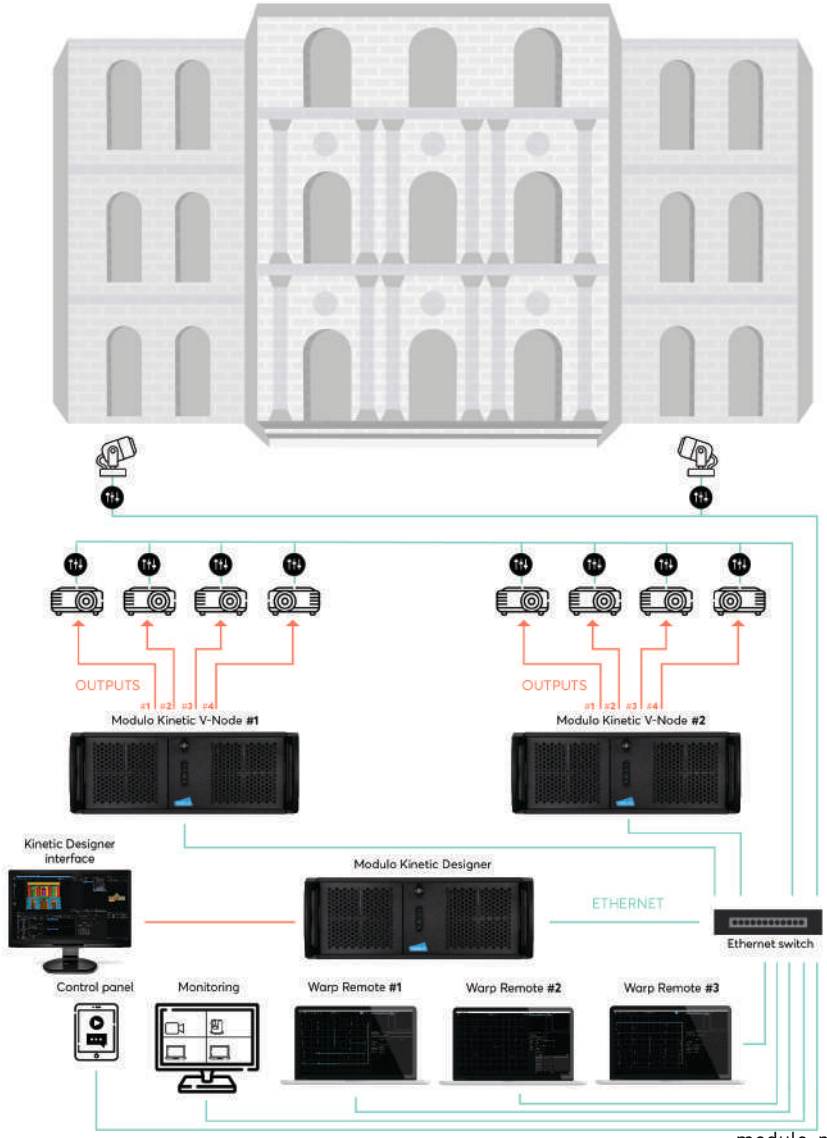
- Free application compatible with Mac and PC
- Gives access to the V-Node server(s), outputs, X-Map settings/warping
- Allows to work from a laptop and **get close to projection surface to fine-tune edge blending, warping or 3D calibration**
- **Multi-user application to speed up the warping process**

Warp Remote app

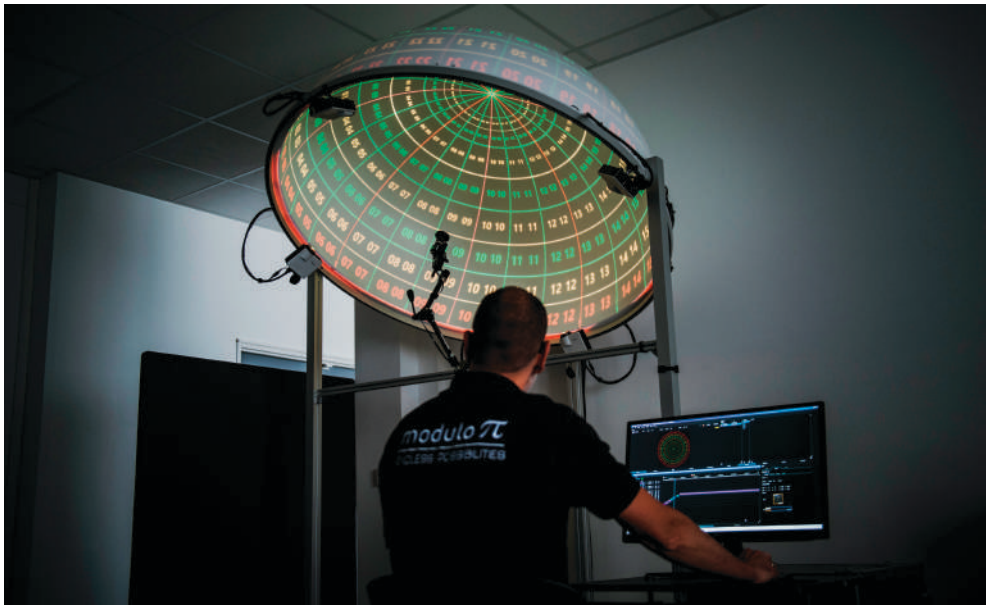


Architectural mapping configuration

See full application note



Multi-projector 2D autocalibration
allowing pixel-perfect projection



Automatic alignment of multiple video-projectors

PLANAR CURVED DOME

Modulo Pi developed its own autocalibration solution.
Available as an option, the autocalibration module allows to **automatically handle multi-projector soft edge blending and geometry on planar, curved, and dome surfaces.**

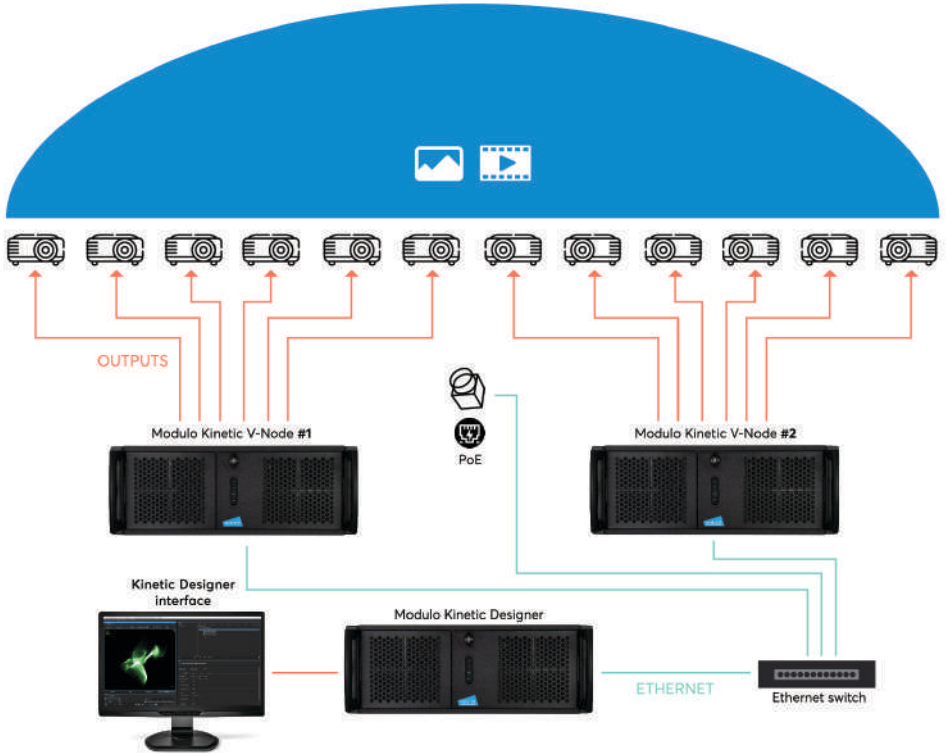
With Modulo Kinetic, autocalibration supports multi-server configurations, meaning unlimited number of outputs and resolution.
The dongle-based option relies on Power over Ethernet (PoE) cameras for fast and simplified cabling.

Using Modulo Kinetic with autocalibration, **high-precision edge blending, warping, and media playback is achieved within minutes and with zero latency.**

See 2D Autocalibration datasheet

Multi-projector 2D Autocalibration with semi-elliptical configuration

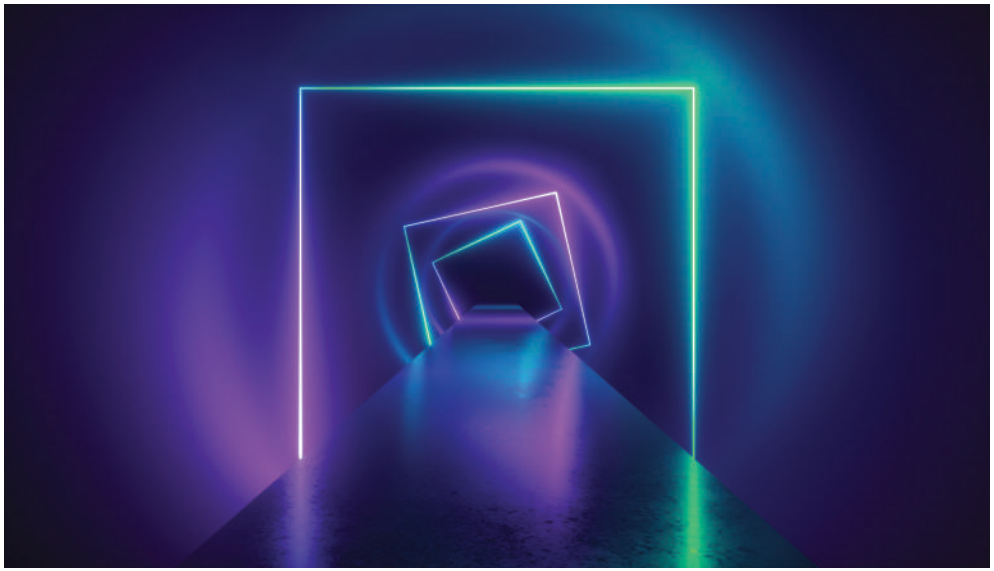
See full application note



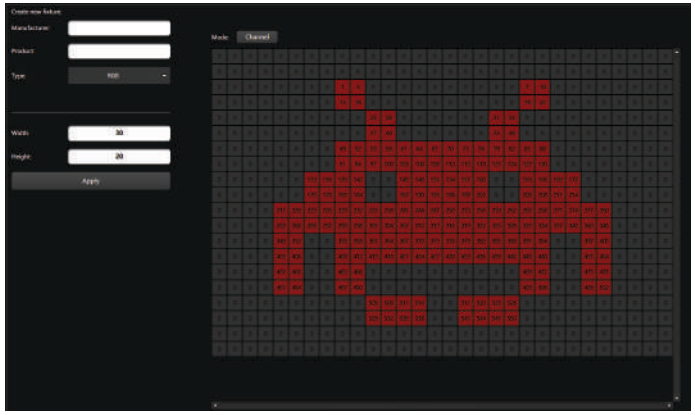
Additional output features
ready for any of your needs

DMX & Art-Net compatibility for lighting control

Easily playback video content as DMX to control LED strips and lighting fixtures.



Modulo Kinetic offers a video to Art-Net converter which uses the GPU to deliver **pixel accurate DMX over Ethernet in real time.**

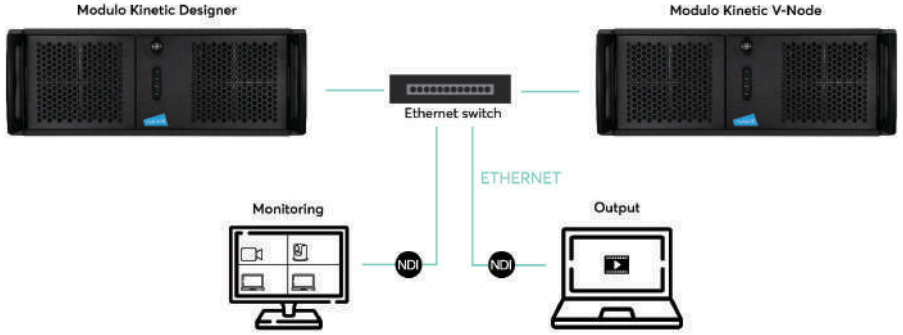


Newtek's NDI technology

Modulo Kinetic supports the NDI (Network Device Interface) technology by NewTek.

Visualize all your live sources on your custom designed monitoring output and/or stream them over NDI.
In addition, Modulo Kinetic offers the ability to **stream any output in NDI**.

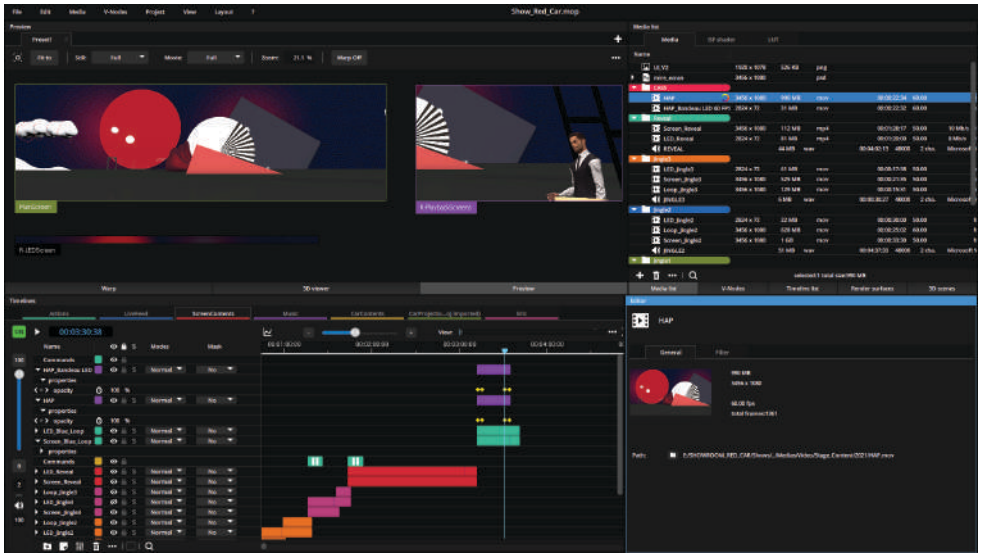
Also supported by Modulo Kinetic, NDI 5 opens new opportunities such as remote workflows.



Stream Monitoring and Outputs from V-Node servers in NDI

modulo KINETIC

User-friendly 2D real-time compositing
for unlimited editing



Non-linear real-time timelines

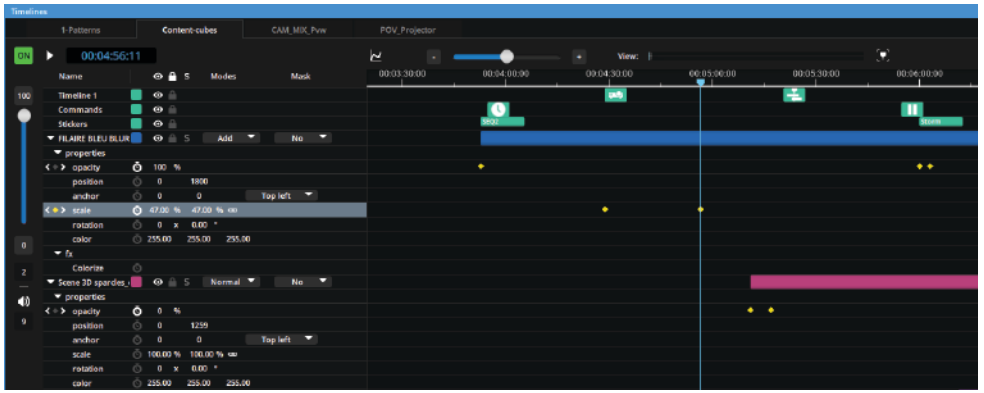
Modulo Kinetic's 2D compositing tool is inspired by renowned video editing solutions, making it easy and fast to learn.
Our **timeline sequencer** helps organize and animate your media, while the preview panel offers **real-time visualization of your render surfaces and composited media.**

- Unlimited, non-linear, real-time timelines
- Drag & drop media and 3D scenes in the timelines
- Create complex cues, loops, add effects and keyframe animations
- Add control cue, trigger tasks, control devices directly from the timelines
- Synchronization with MTC or LTC timecode [1] whenever needed

[1] Timecode card reader available as an option

Benefits of the timeline management:

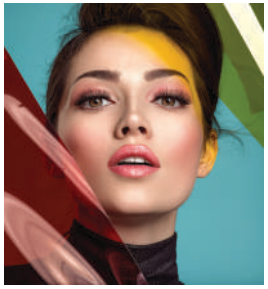
- **Advanced compositing:** Feel free to animate anything you want using fx and keyframes on any parameter
- **Versatile playback:** During show rehearsals, enjoy a very flexible playback and start, pause, stop your show whenever needed

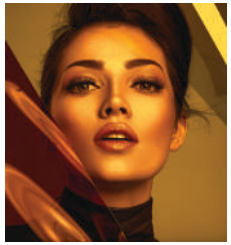


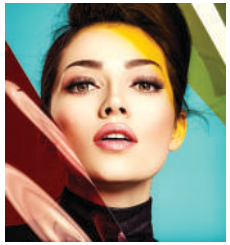
Creative filters

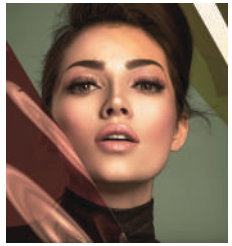
Modulo Kinetic supports **LUTs (Look Up Tables)**.
LUT files can be used for **color correction**, but also to apply **artistic effects** to your media by transforming their gamma, contrast, saturation or luminance.

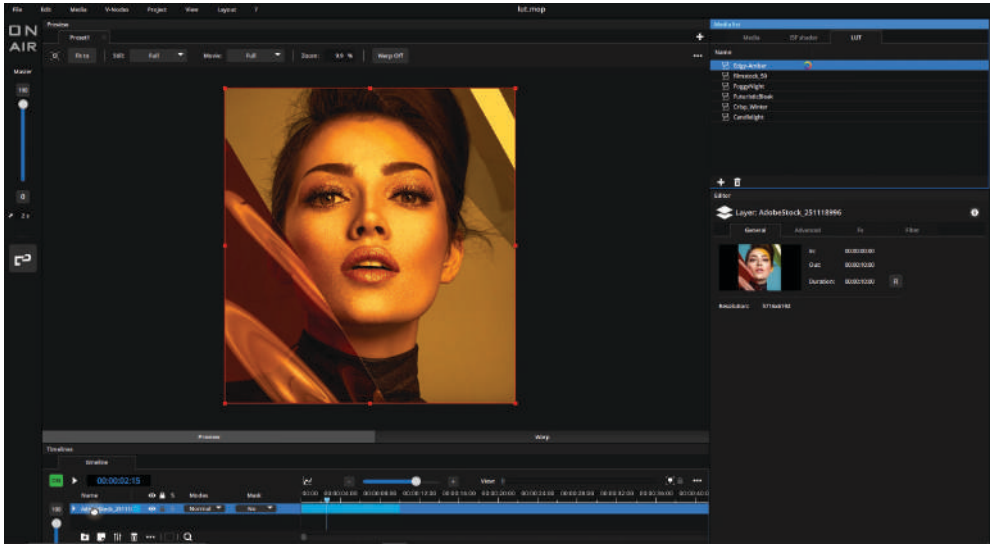
Simply drag and drop your desired LUT files in the Kinetic Designer interface, and their color parameters will apply to the layers of your choice real-time.


Original Layer


Layer with LUT #1

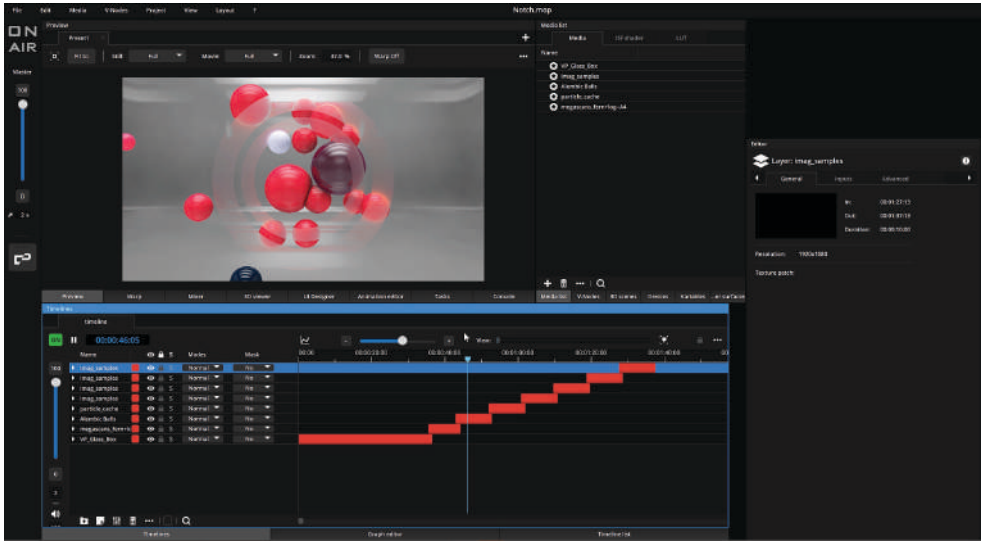

Layer with LUT #2


Layer with LUT #3



Support of Notch Block

Notch is a real-time generative content creation platform.
Modulo Kinetic supports Notch Blocks exported from Notch Builder.
These Notch Blocks can be imported in Modulo Kinetic for native playback.



Notch Blocks are imported in Modulo Kinetic with their parameters. To ensure a straightforward workflow, these parameters can be edited directly within Kinetic Designer using:

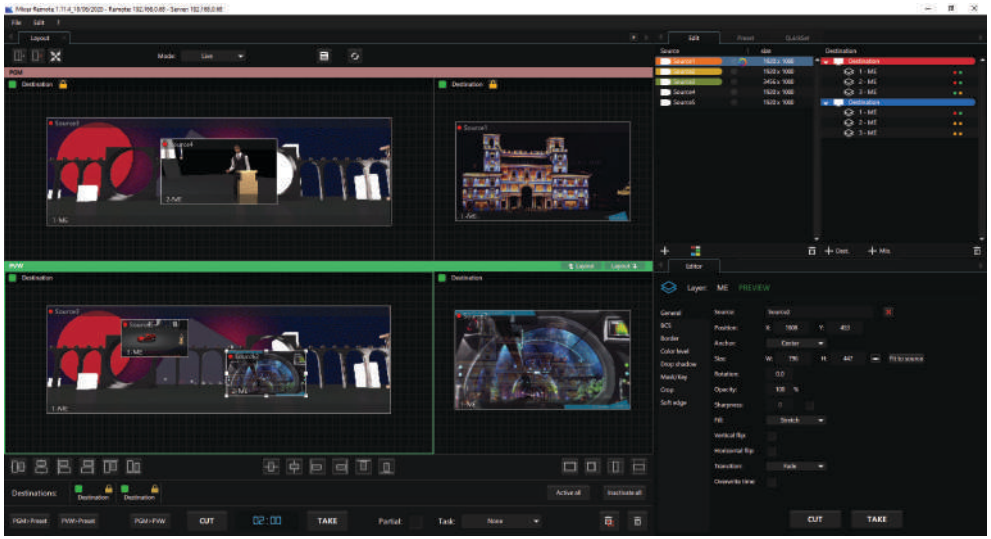
- Timelines
- Graph Editor
- Variables

As a world first, an embedded low-latency Live Mixer

All the capabilities of a true live mixer and a versatile media server available within one fully integrated system. **As an industry first, Modulo Kinetic embeds a low-latency live mixer:**

- Dedicated application (PC, Mac)
- Live Program, Preview, and Confidence screens
- Unlimited number of destinations and Mix Engines
- Workspace area selection turned into a source
- Presets management & Quickset function
- Mask & Keying
- Transition effects: Fade, flying,...
- Cut & Take buttons

See Live Mixer datasheet



Multi-user capabilities

For better ease of setup and operation, Modulo Kinetic is a **multi-user device:** Several operators can work simultaneously on the media server and mixer interfaces. **All contents and operations are perfectly synchronized.**

Full support of the Stream Deck control pads

Thanks to an editor integrated in Kinetic Designer and Mixer application, easily customize the LCD keys of the Stream Deck Mini, Stream Deck, or Stream Deck XL. **All parameters entered in the editor appear real-time on the Stream Deck pads.**
Modulo Kinetic and its embedded mixer can support any number of Stream Deck pads simultaneously, providing a user-friendly solution to control presets or recall tasks.

Live input boards
to match any of your requirements

Live capture cards and Flex modules

Our GPU-based solutions integrate live input cards, including FLEX video I/O technology by Deltacast.

- Up to 12 x SD/HD/3G-SDI, or 6 x 12G-SDI inputs
- Up to 2 x 4K HDMI 2.0 inputs

FLEX
DELTACAST FLEXIBLE VIDEO I/O PRODUCTS

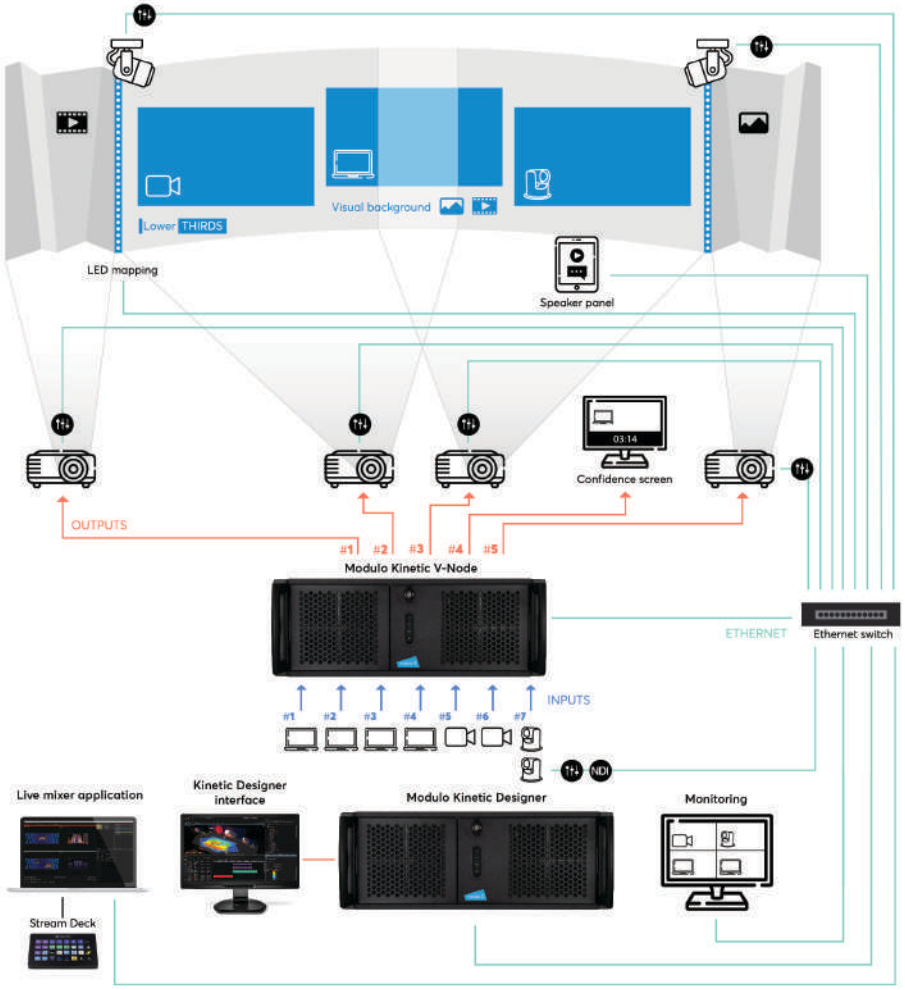
Newtek's NDI technology

NDI

Modulo Kinetic supports the NDI (Network Device Interface) technology by NewTek.
It allows you to stream multiple high-quality live video sources across an Ethernet network, and use them as inputs.

Soft edge blending & Projection mapping featuring Live Mixer, LED mapping, Show Control and Speaker panel

See full application note

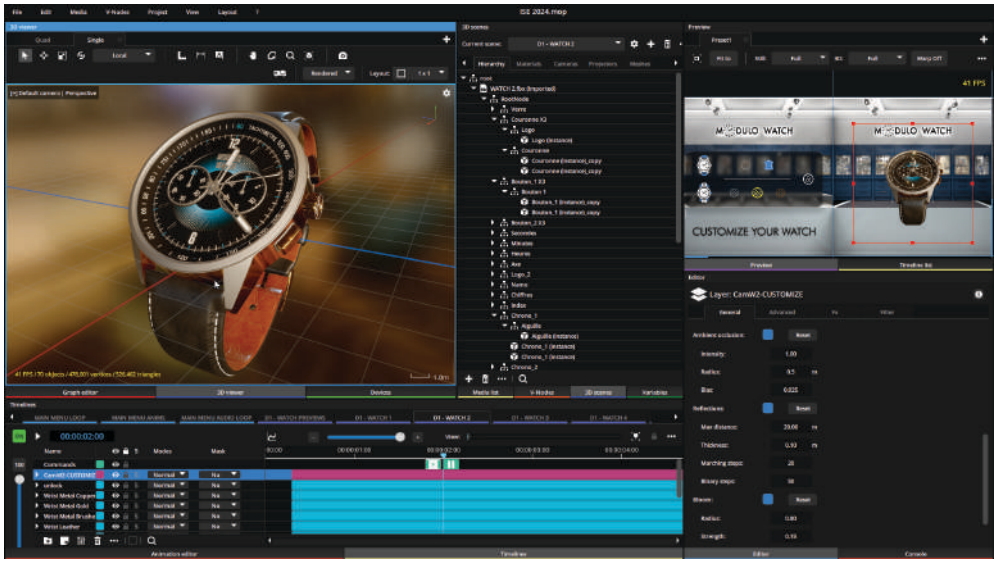


Modulo Kinetic embeds a powerful 3D engine designed to provide a comprehensive and optimal workflow.

Creating or importing 3D scenes and objects

Modulo Kinetic's 3D workflow is inspired from 3D modeling software.
Varied possibilities are offered to initiate your 3D project in Kinetic Designer:

- Create an unlimited number of scenes
- Add objects through our internal library and modify their position, size...
- Import 3D scenes with full tree incl. cameras, lights, animations such as GLTF, COLLADA DAE and FBX files
- Import point cloud files from professional 3D scanners



Once 3D scenes and objects have been imported, instances can be fully edited in Modulo Kinetic Designer: Add lights, cameras, assign advanced materials...

Lighting

Several types of lights are available in Modulo Kinetic to create realistic objects and scenes:

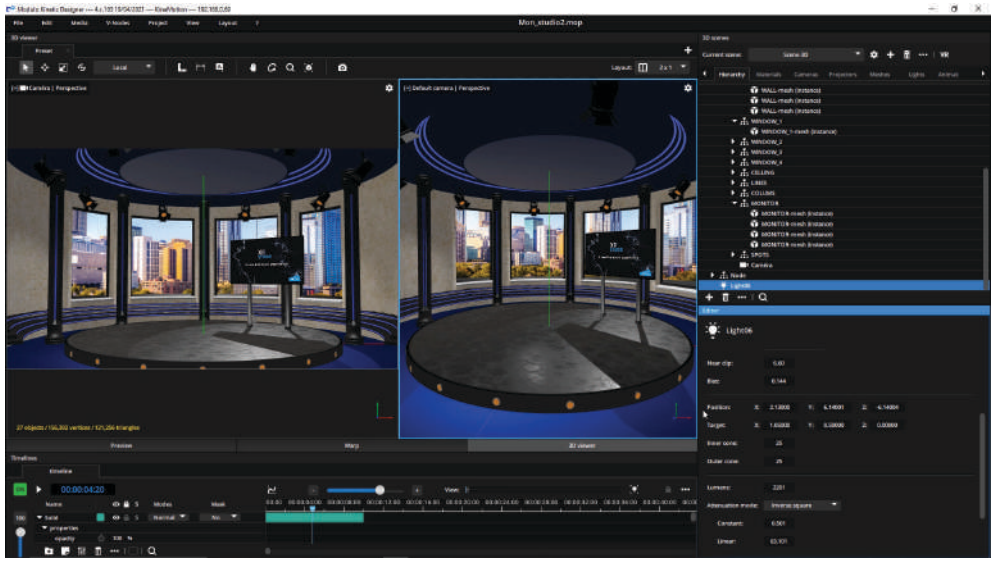
Directional light: A light that gets emitted from a source infinitely far away in a specific direction

Pointlight: A light that gets emitted from a unique point in all directions

Spotlight: A light that gets emitted from a unique point in one direction in a cone shape

These lights come with comprehensive settings: Power, color, temperature, attenuation, direction...
These settings are all accessible in the nodal and animation editors.

Shadows: Modulo Kinetic supports spotlight and pointlight shadows

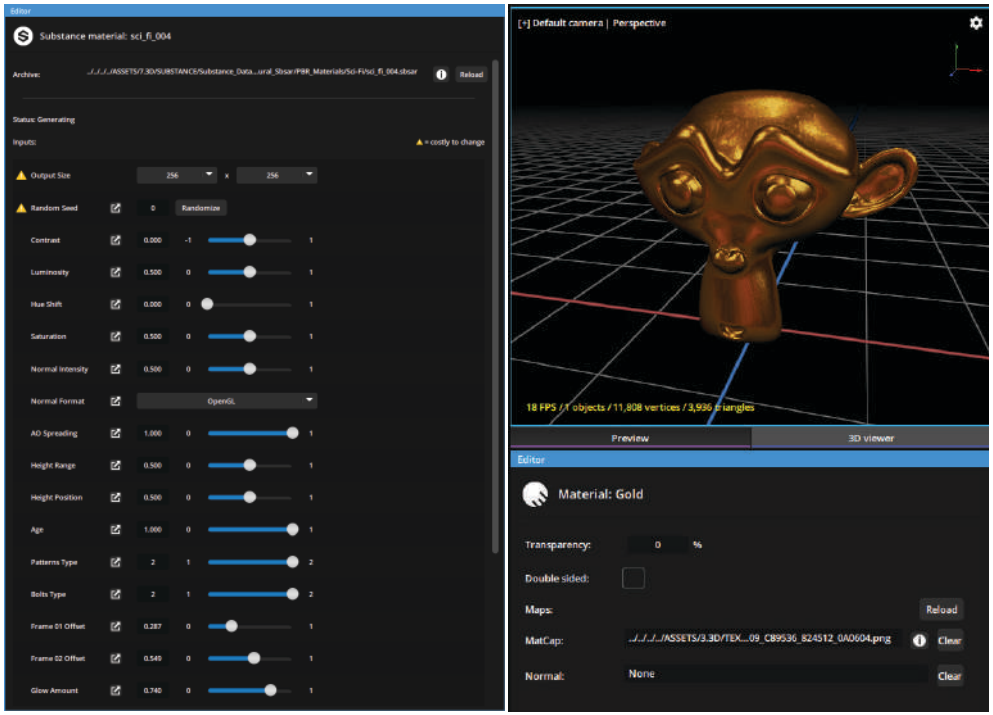


Advanced materials

To unleash creativity and optimal realism, Modulo Kinetic offers different options to texture 3D objects:

- **Unlit:** Material not affected by lighting
- **MatCap:** Complete materials including lighting and reflections
- **PBR:** For a realistic shading and rendering
- **Substance:** Industry standard PBR material format with easy understandable parameters for object texturing

Interact with the materials' parameters in real-time and make your 3D scenes, objects and simulations even more realistic or artistic.

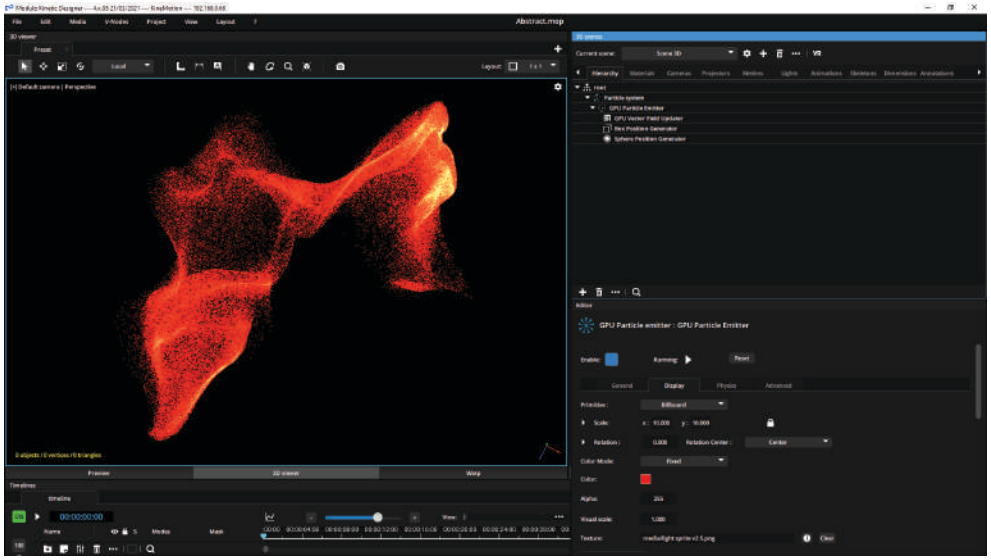


Particles engine

Modulo Kinetic embeds **a powerful 3D particles engine for real-time generative and interactive content.**
Particles can be created, modified, and animated directly in the Kinetic Designer interface to produce spectacular effects.

The particles are available in two forms:

- CPU for advanced control and complex animations
- GPU for a large number of particles displayed simultaneously



Varied generators are available to make your particles appear: Boxes, spheres, textures, 3D meshes, and more. These can be combined, creating infinite possibilities.

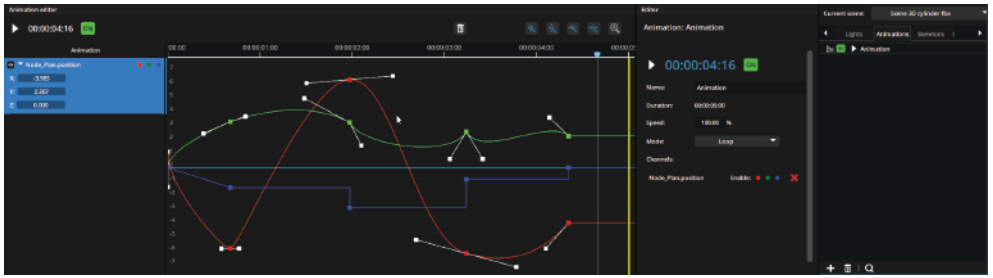
Particles can interact with a wide range of modifiers, from noises, spirals, attractors, colliders, to the most powerful vector fields as used in the latest video games.

Working with 3D animations

Create your own animations directly in Kinetic Designer's 3D viewer.
You can also import existing animations and modify them in the animation editor.

A large number of transition curves allows to quickly perform motion effects.

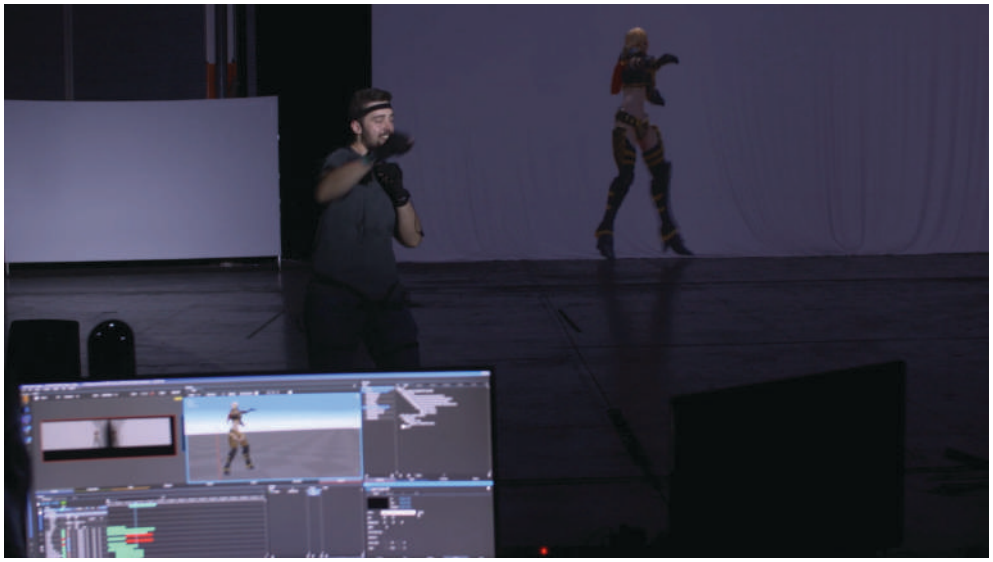
These animations can be triggered manually, from a task, or controlled from a timeline.



Skinning

Modulo Kinetic's exclusive real-time skinning feature allows including and controlling animated 3D characters in your simulations.

In addition, your can include real-time avatars in your show using a motion capture suit combined with a fully customizable bone retargeting.



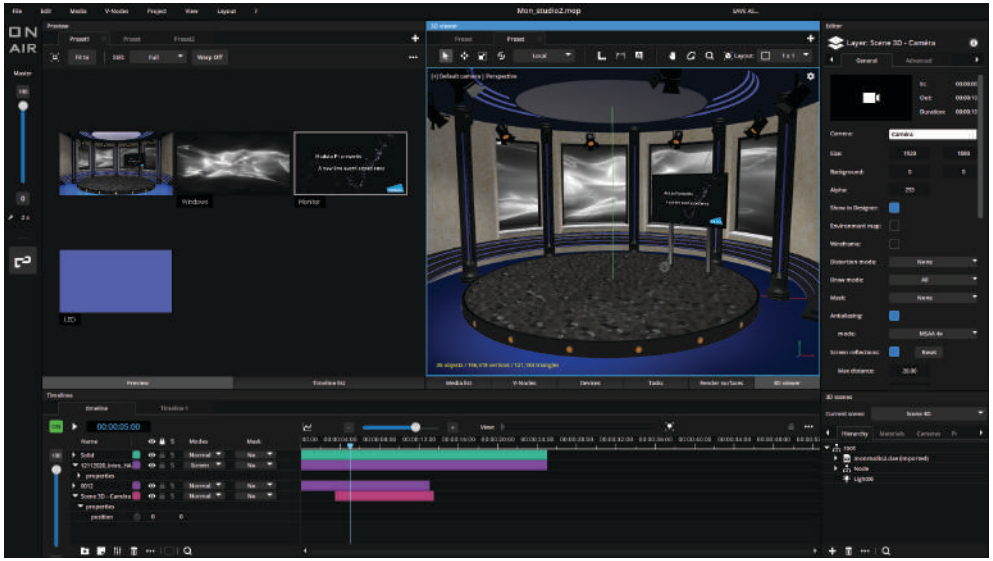
A 3D environment
perfectly integrated & interacting with the platform

To make the best out of Modulo Kinetic, the platform's 2D and 3D environments are perfectly integrated and interacting.

Use compositing content into the 3D engine

You can use the timelines to composite movies, live feeds, images, 3D scenes, and render them in any render surface in real time.
The render surface content can be easily linked to the 3D engine:

- Use a render surface to replace a material map (Unlit, PBR, Matcap)
- Use a virtual projector to project a render surface's content in a 3D scene



Render any 3D scene in a timeline

There are several methods to render a 3D scene's point of view in a timeline:

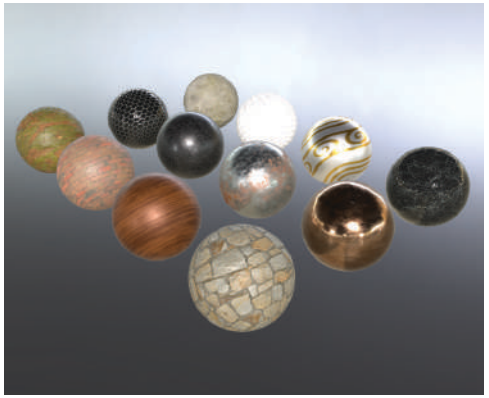
- Drag & drop a camera or video-projector from a 3D scene in a timeline, and create a 3D real-time layer. Enjoy varied parameters and modes: Rendering resolution, fill mode, mask mode...
- Drag & drop a mesh instance from a 3D scene in a timeline, and create a 3D real-time layer. This approach to dynamic content is relevant for creative LED screen applications, or XR projects based on LED screens

Post-processing

Advanced post process effects are available to ensure a realistic look.

You can render a camera, projector, or mesh instance in a timeline layer with:

- Post-process Reflection
- Ambient Occlusion (SSAO)
- Depth of Field (DOF)
- Glow
- Advanced Antialiasing



Before Post-processing

After Post-processing

Control the 3D engine from anywhere

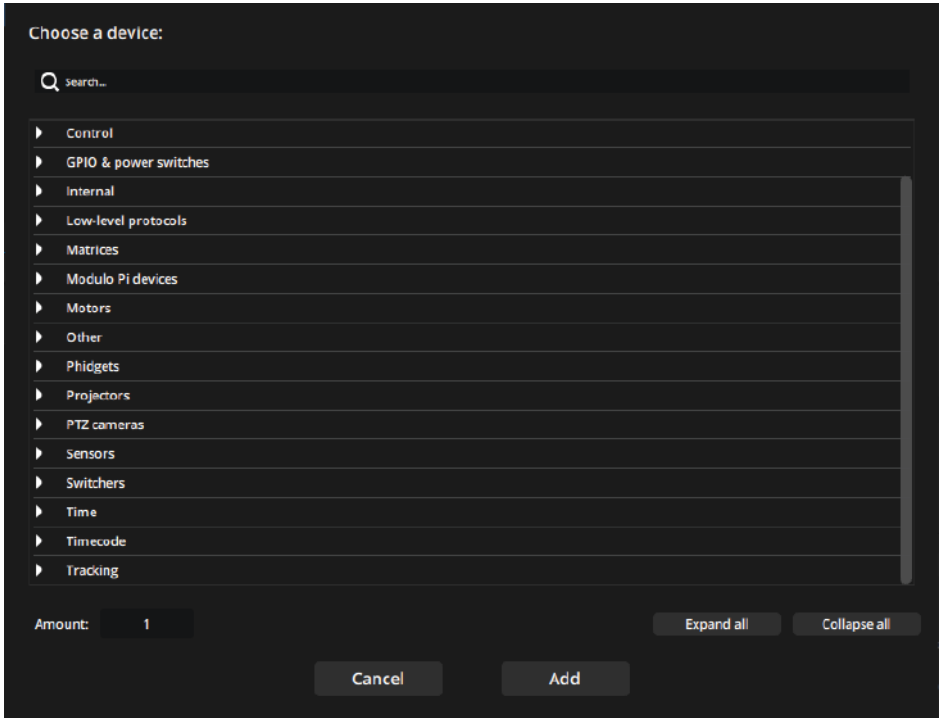
The 3D engine is perfectly integrated within Modulo Kinetic so that you can **easily take full control of your elements using the nodal editor, keyframe animations, or timelines**. This way, you can easily:

- Interact with the parameters of the 3D scene
- Animate elements of the 3D scene using keyframes
- Link the 2D and 3D contents in the timelines

Extensive show control capabilities
for easy show automation

An extensive library of devices

Modulo Kinetic embeds a large library of external devices including video-projectors, matrix switchers, video processors...

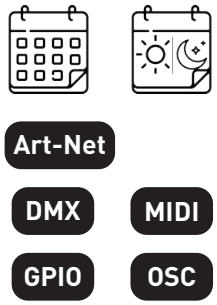


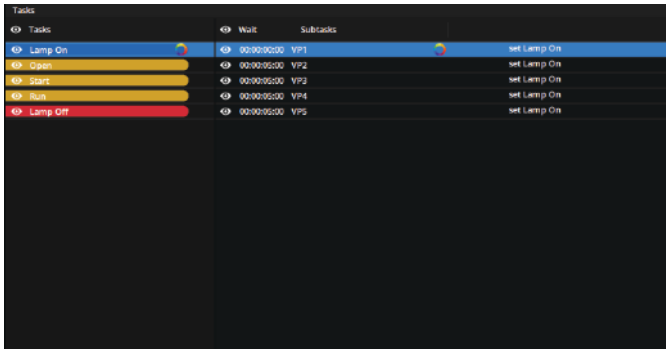
The preloaded devices are available with their main parameters to allow fast and easy control through Kinetic Designer.

Automated tasks and subtasks

Save an external Show Control solution. **Create, control, and play automated tasks for external devices directly in Kinetic Designer.**
Trigger tasks from specific devices such as Calendar, MIDI, OSC, GPIO, and DMX.

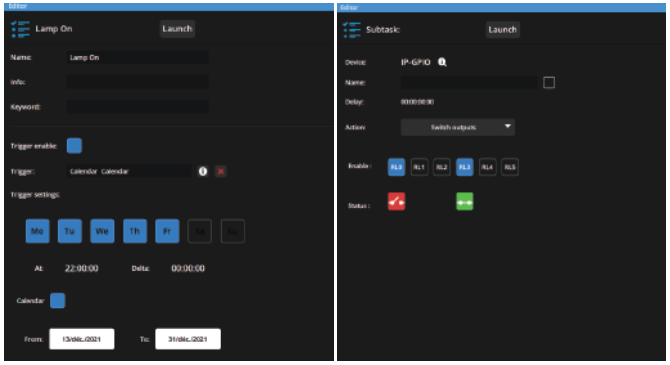
Tasks:





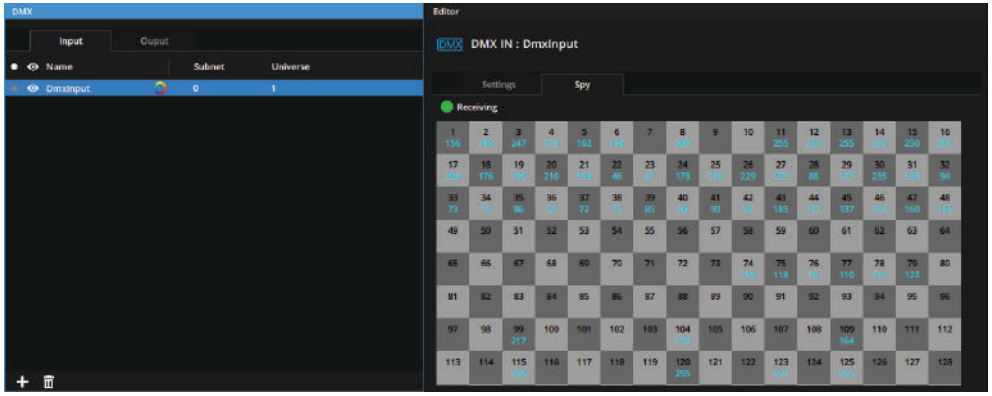
Triggers:

- Manual
- Timeline
- Live Mixer
- Stream Deck
- Custom panels
- External devices
- External Show Control



DMX Receiving DMX

Thanks to the advanced DMX light controller embedded in Modulo Kinetic, one can receive incoming DMX to perform different operations such as triggering a task. It also allows using a DMX channel as a controller in a Digimap or Graph, and control layers' parameters in a timeline, a 3D scene, or variables.

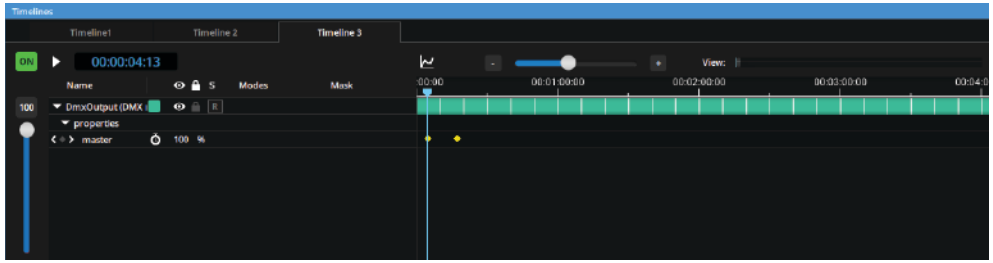


DMX Sending DMX

Many possibilities are offered:

- Control individual channels from a task, with keyframes in the timeline, or from the Graph Editor
- Create Submasters and adjust them from a task, with keyframes in the timeline, or from the Graph Editor
- Record snapshots from external DMX and recall them with a fade time from a task
- Use an advanced DMX recorder to record a show from a lighting console, then playback this show using a task or a timeline. The playback supports fade time and loop mode with fade time

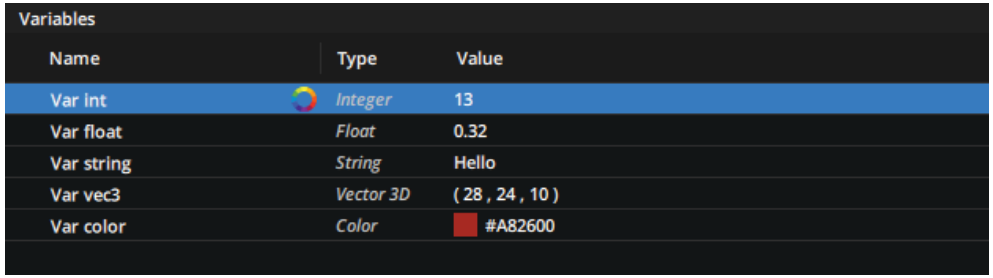
The snapshot and recorder support advanced filtering that can apply to a range of channels.



Variables

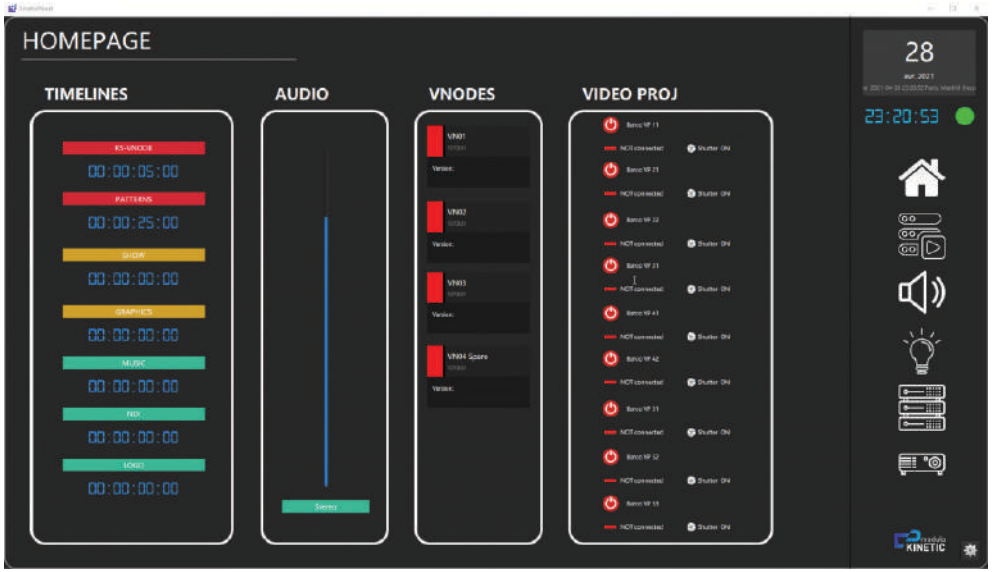
You can create variables (int, float, color, string...) and interact with these variables from anywhere:

- Control variables from a task
- Trigger a task from a variable
- Animate variables in the timeline
- Link a variable to a Digimap
- Read and control a variable in the Graph Editor
- Read and control a variable from a user panel



Embedded UI Designer

Easily **create custom panels** using Modulo Kinetic's UI Designer.
Available in Kinetic Designer, the UI Designer offers a very intuitive interface to create control or maintenance panels in just a few minutes: **Drag & drop tasks, add buttons, texts, images, web pages, etc.**
Each custom user interface can be protected with a user login and password.

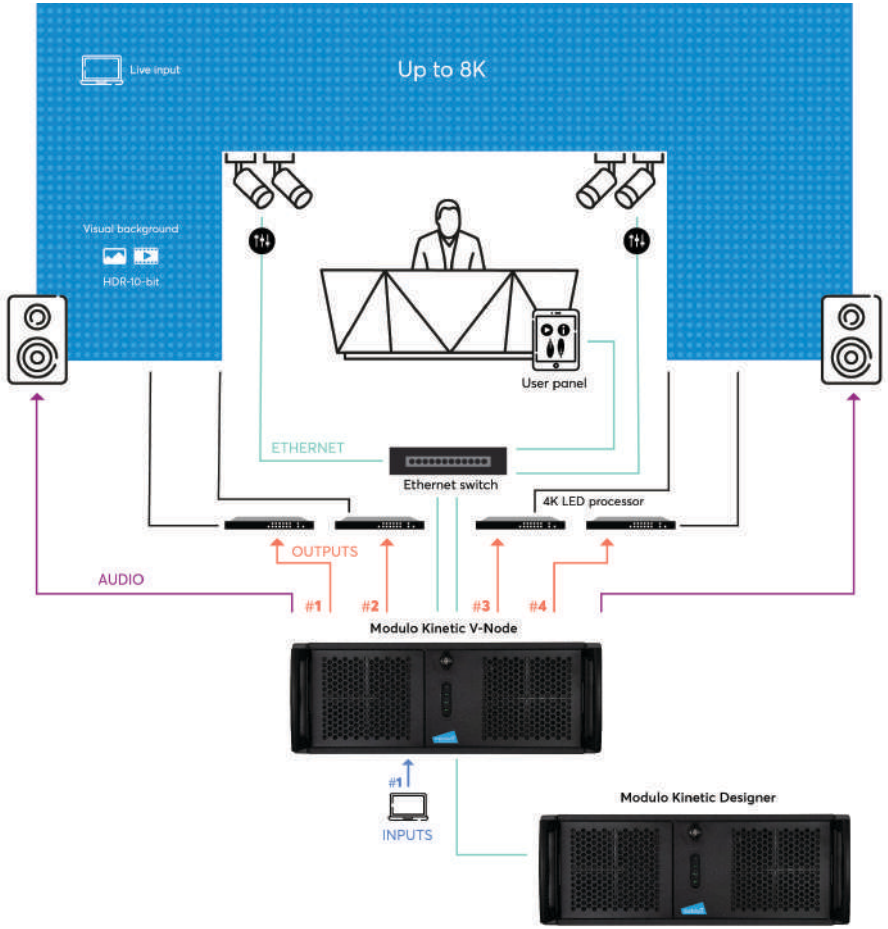


Versatile control opportunities

The user panels created with Modulo Kinetic's UI Designer are **compatible with PC, Mac, iOS, and Android devices.**

LED display configuration with Show Control & User panel

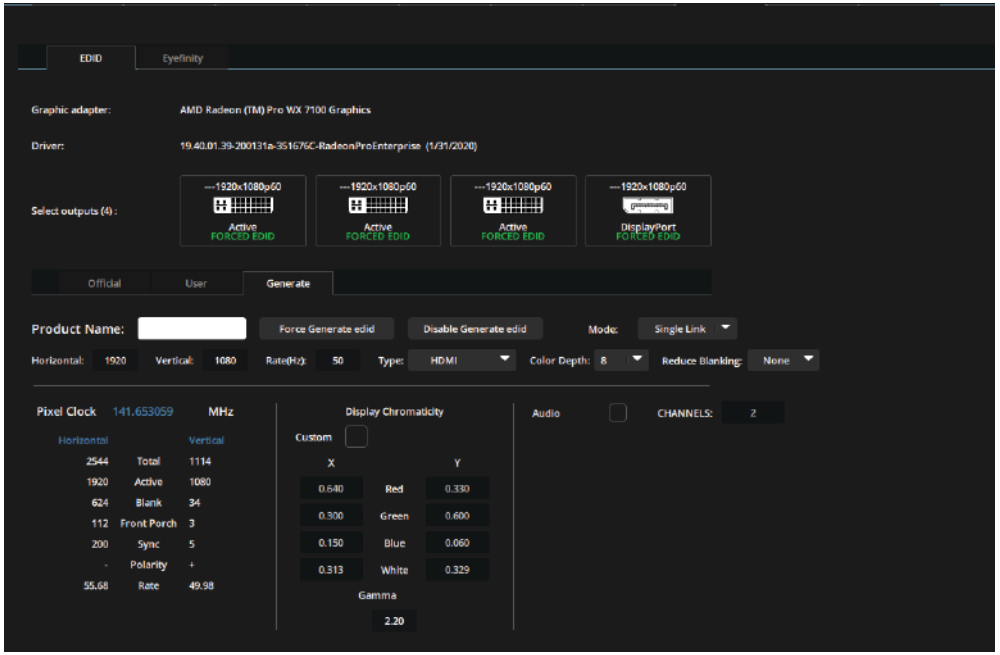
See full application note



Hardware settings and drivers update

All information about the hardware is available in Modulo Kinetic Designer. Here are some of the parameters settings that you can manage directly through the interface:

- Setup Deltacast cards and update drivers
- Setup sound cards
- Select networks and IP
- Force all EDIDs using embedded EDID generator
- VNC integrated
- Create multi-screen configuration...

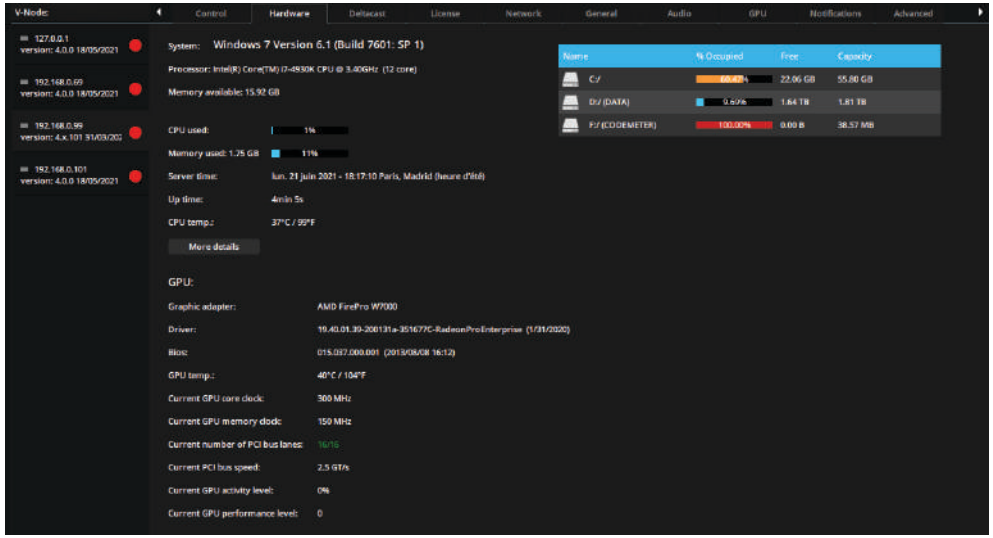


- In multi-server configuration, the setup of all servers can be performed through one Modulo Kinetic Designer
- The hardware panel and information remain available when the show is running

Hardware monitoring and notifications

Hardware information can be monitored anytime in Modulo Kinetic Designer. The interface shows data about the operating system, processor, CPU, GPU... Additional information about the hardware state will help you check the server is properly installed and functioning:

- RAM memory
- Hard drive
- Temperature
- Graphic card installed and running...



Email notifications can be created to automatically receive information or alerts about the hardware state. As an example, you can be notified when the server starts, when the GPU reaches a temperature limit, and so on.

Interactive experiences
made more accessible than ever

From the start, Modulo Kinetic was designed aiming at interactive experiences. After years of on-going developments and as technology evolves, Modulo Kinetic now offers a full array of features instrumental in building engaging interactive experiences with no coding needed.

Benefits of the fully-integrated approach

Modulo Kinetic stands out as the only media server that directly incorporates advanced interactivity features, reflecting Modulo Pi's commitment to a fully-integrated solution. This approach offers several key advantages:

- **Complexity reduced:** Enjoy a much simplified control room with no need for gateways to a suite of third-party tools. Setup and operation are made easy through one user-friendly interface
- **Performance & reliability improved:** Latency is limited, as room for bugs and interoperability issues
- **Budget under control:** It saves from having to invest into a complex suite of solutions. Also, no need for expensive custom developments

Endless possibilities to fit your project's needs and budget

Access several types of interactions using Modulo Kinetic, from basic to the most creative and elaborate experiences:

- **Web applications:** Interact with an AV setup using a web app on a smartphone, tablet, or touch screen
- **Control systems:** Interact by manipulating cost-effective sensors such as RFID tags or a great variety of USB sensors
- **Encoders:** Create an interaction based on motion control devices
- **Cameras & scanners:** Capture and dynamically update a photo or image scanned in a show real time
- **2D & 3D LiDARs:** Rely on this touchless technology for create gesture-based interactions
- **KineMotion:** Optical tracking module fully developped by Modulo Pi

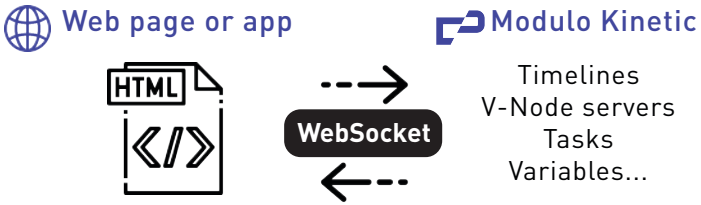
These solutions are introduced in the next pages.

Interactivity through web pages
for augmented experiences

Communication with web applications

Modulo Kinetic supports WebSocket, enabling seamless communication via this protocol. This allows the creation of **custom web applications that can interact with and control Modulo Kinetic.**

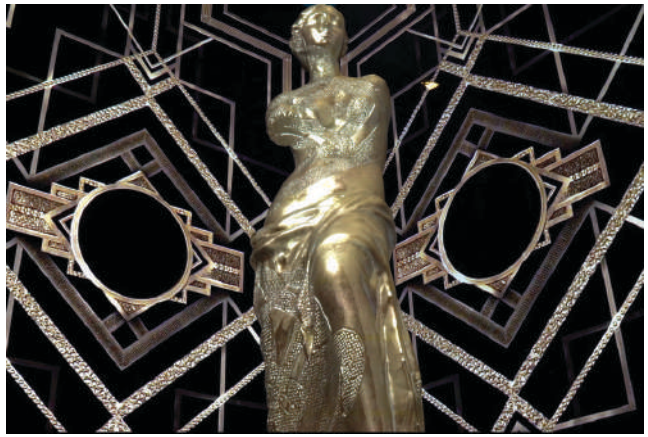
The **bidirectional communication** between your custom web application and elements in Modulo Kinetic include:



Personalized, interactive, augmented experiences

Once you have created your custom web pages or applications, **you can interact with a show powered by Modulo Kinetic from a smartphone, a tablet, a touch screen, or any other computing device.**

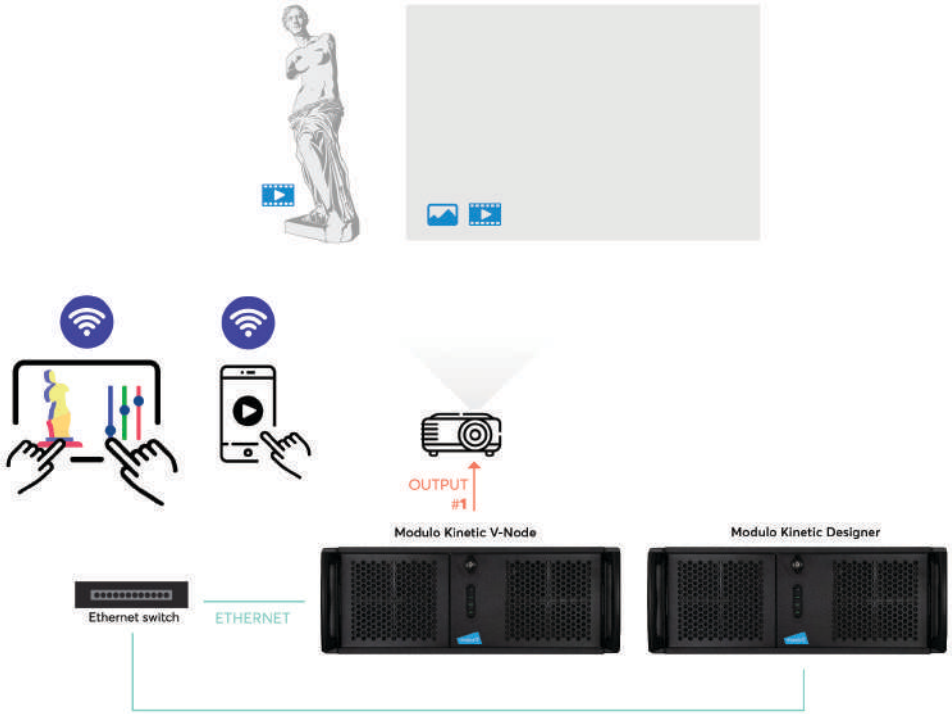
This flexible approach to easily trigger elements of a Modulo Kinetic project - media, lights, audio... - enables **personalized augmented experiences in the field of museography, theme parks, and live events.**



Demo

Interactive museum installation with touch screen and mobile phones

See full application note



Interactivity through physical devices
to engage the audience

Modulo Kinetic supports a wide array of sensors that can be used in the design of interactive experiences. These devices represent a cost-effective solution to add interactivity to a project.

RFID chipping

Use RFID wristbands or add RFID tags in objects to easily and automatically trigger tasks based on detection.

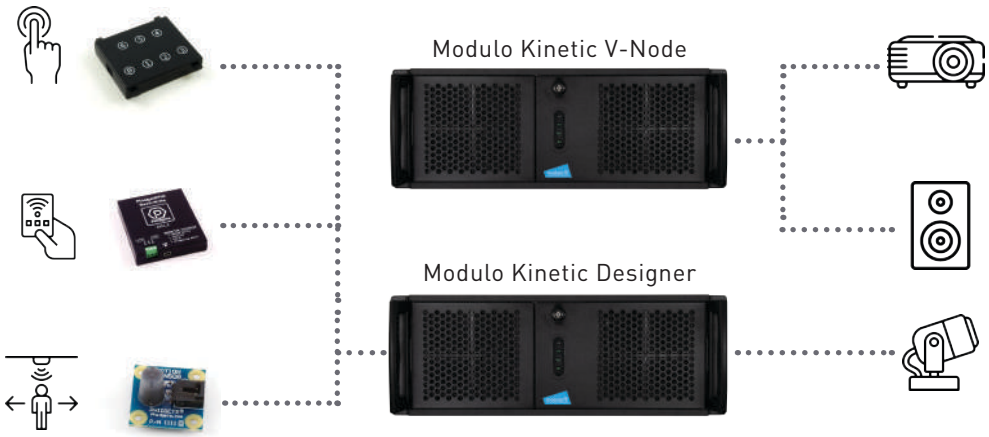
Library of Phidgets devices

Modulo Kinetic's library of external devices includes **+40 USB sensors by Phidgets**. These cost-effective sensing and control devices are easy to install and use.

A large variety of them are supported including:

- Rotating knobs
- Touch wheels
- Touch keypads
- Thumb sticks
- Position controllers
- Accelerometers
- Distance sensors
- Magnetic sensors
- Sound sensors
- Light sensors
- Humidity sensors
- Temperature sensors, and much more.

+40 USB Phidgets



One can easily create tasks in Kinetic Designer that will trigger automatically depending on the Phidgets' variables such as temperature, humidity, lux level, distance...

Demo

Easy interactivity through the Digimap function

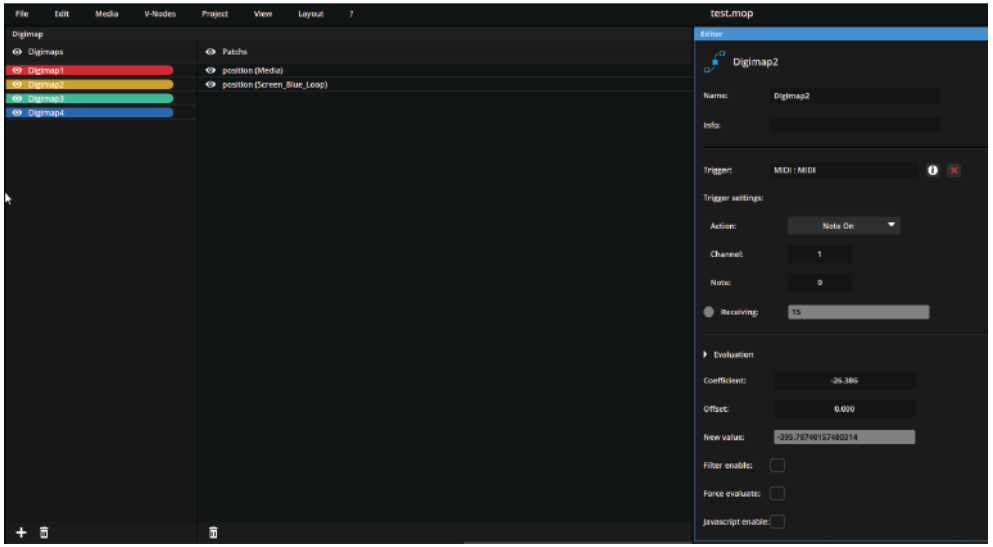
Simple tracking and interactivity can be achieved using Modulo Kinetic's Digimap function.

The Digimap function allows to **easily work with external devices (OSC, Art-Net, MIDI, TCP/IP rotary encoder, K2 motion control console by Kynesis...)** to:

- Control parameters of a media incl. position, rotation, opacity, color...
- Control parameters of a 3D node incl. position, scale, rotation...

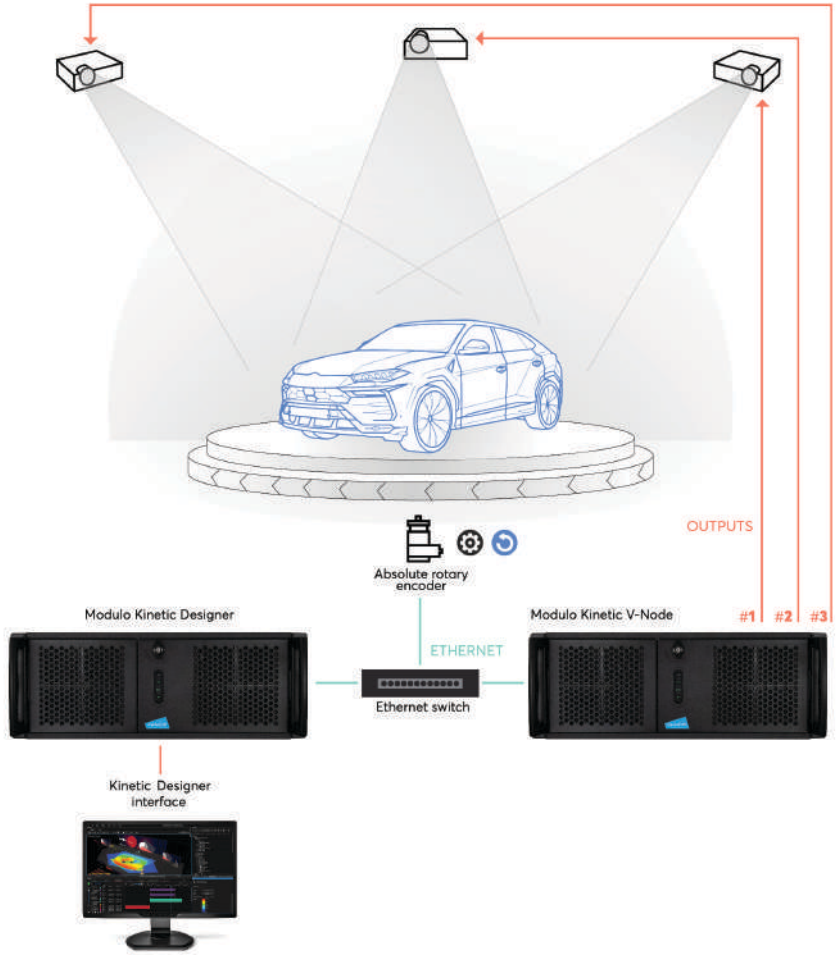
As an example, you can project on a moving screen on stage and have the projection perfectly mapping the position of your screen.
You can also change the layer opacity from a lighting console, control your show from a custom OSC control panel, etc.

Modulo Kinetic's wizard allows easy and quick calibration of the incoming data, so that you can link it to your media parameters.



Projection on a moving car with Digimap function

See full application note



Interactivity based on cameras and scanners
to enliven shows

Seamless communication with photo cameras and scanners

Modulo Kinetic supports new devices:

Canon EOS cameras

Image scanners
compatible with the 32-bit
and 64-bit TWAIN protocol

TWAIN

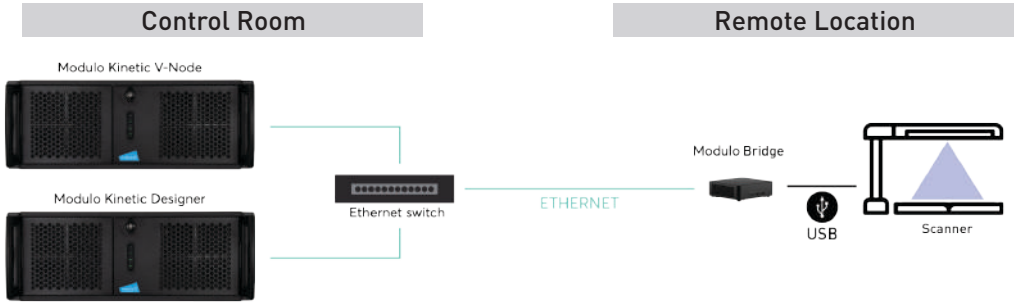
A turnkey solution to inject user-generated content

With support for these devices and its nodal programming tool (as detailed next), **Modulo Kinetic can capture and extract a photograph or scanned image, seamlessly integrating it into a live show in real time**.

Enabling remote connectivity with Modulo Bridge

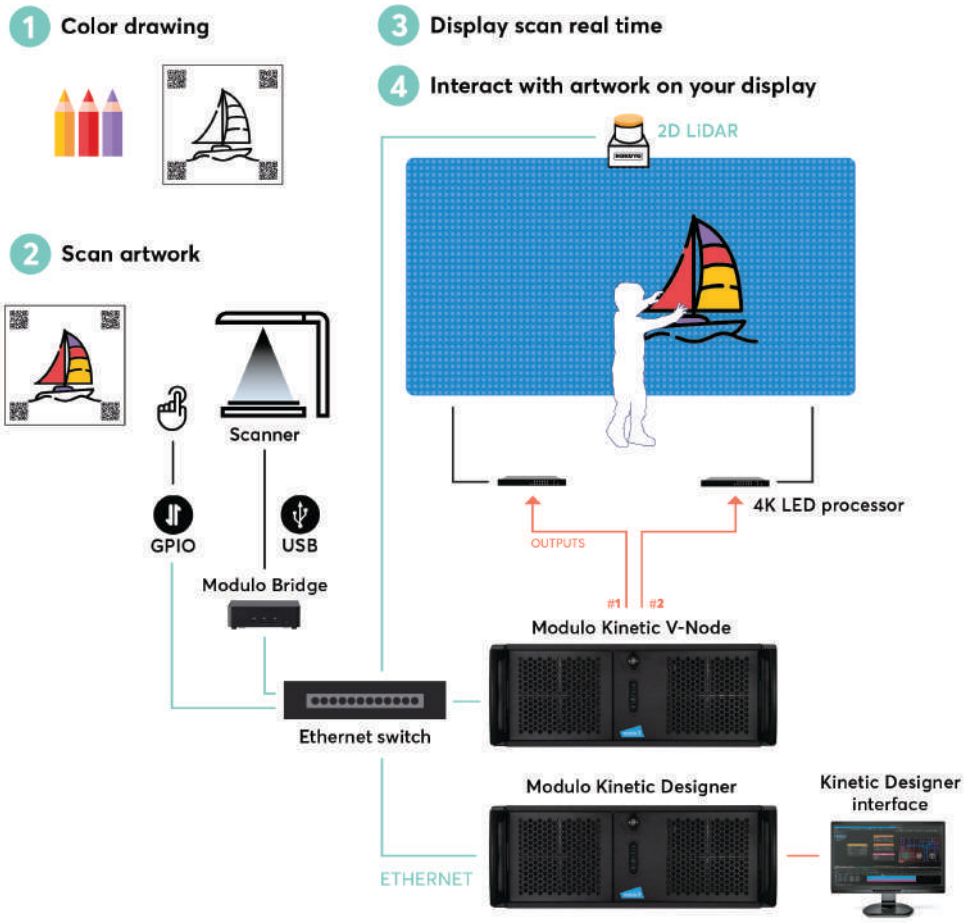
Since cameras and scanners used for interactive experiences are often positioned in the audience area - far from the control room - Modulo Pi provides **Modulo Bridge**.

Modulo Bridge is a compact device that creates an **Ethernet connection between USB devices and Modulo Kinetic Designer, enabling seamless communication over long distances.**



Interactive LED wall with live artwork scanning & display

See full application note

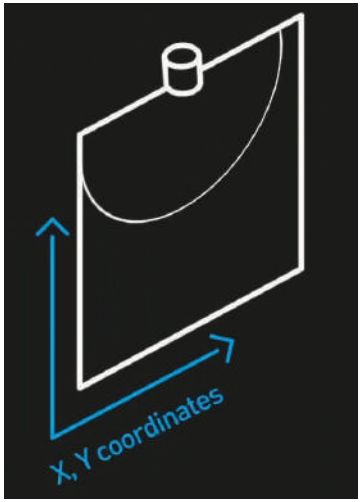


Interactivity through touchless devices
for a flawless experience

For gesture-based interactions with simultaneous users, **Modulo Kinetic supports 2D & 3D LiDARs (Light Detection and Ranging).**
Such technology opens scalable interaction possibilities on walls, floors, or table tops, with the advantage of not having to equip the audience with physical sensors.

2D LiDARs

This type of laser emits a single beam of light on one axis. 2D LiDARs can be used to **detect and track hands or objects on one plane (walls, table tops...)**.



Several brands and models are supported by Modulo Kinetic with varied scanning and measurement ranges.

Demo

Leuze electronic

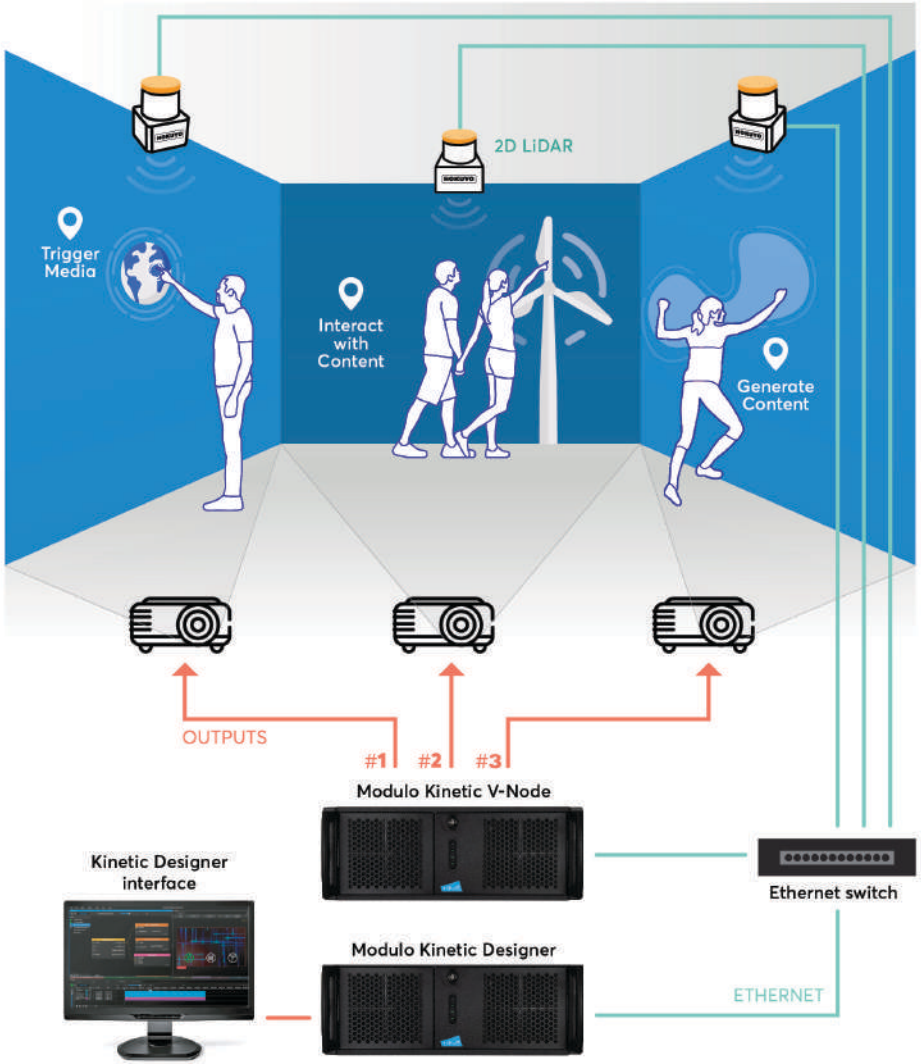
ROD4 series
Up to 65m (213ft)

HOKUYO

UST-05/10/15/20/30LX
5m to 30m (16ft up to 98ft)

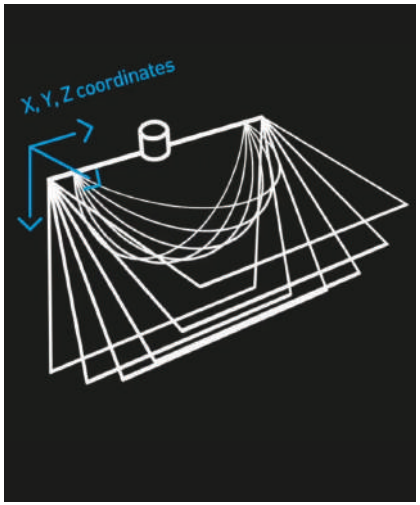
Interactive projection on walls with 2D LiDARs

See full application note



3D LiDARs

Those emit 128 invisible beams of light, allowing to collect a point cloud. They can be used to **track people or objects within a room**.



Modulo Kinetic supports different models so that you can select what is best for your project.

Demo

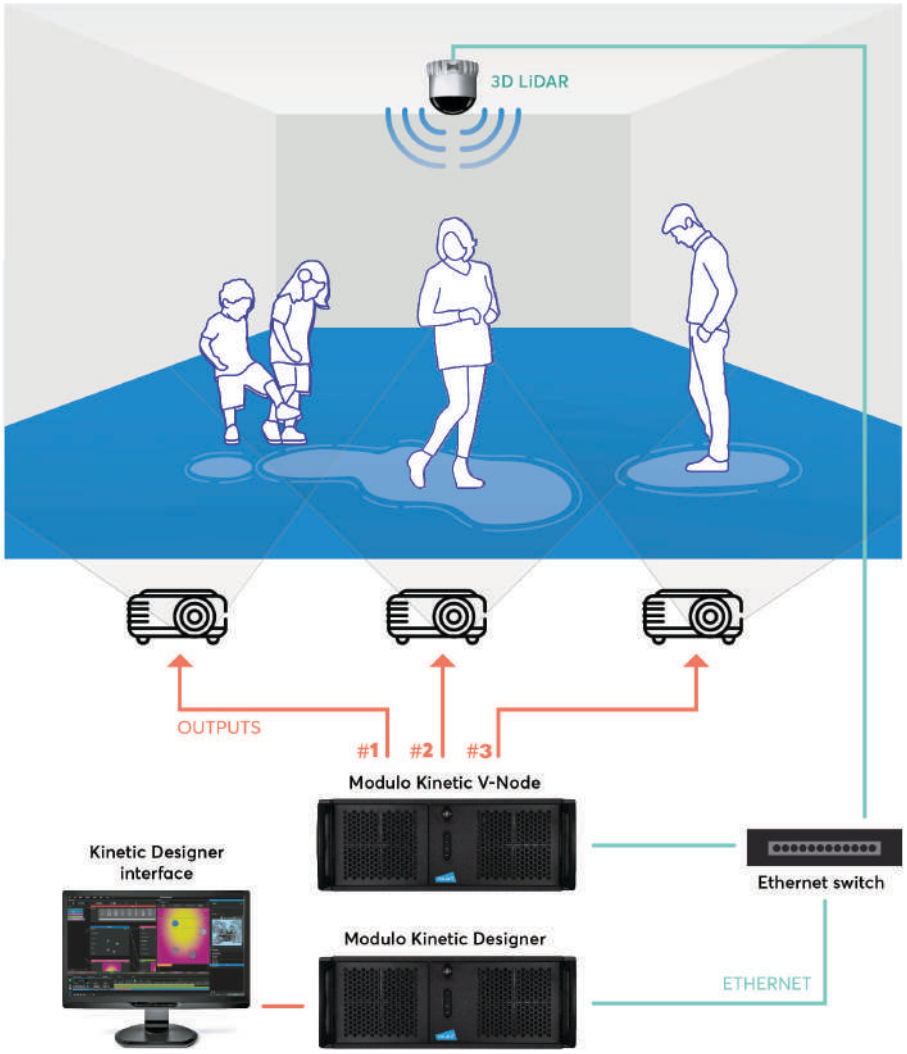
OUSTER

OS0
90m range at 10%
45° vertical field of view

OSDome
20m range at 10%
180° vertical field of view

Interactive projection on floor with 3D LiDARs

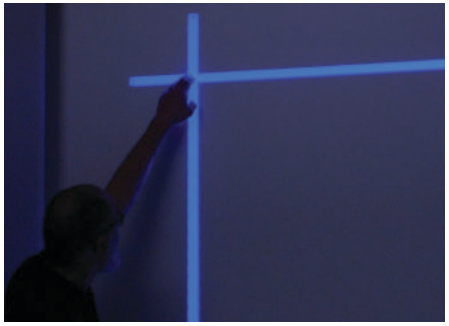
See full application note

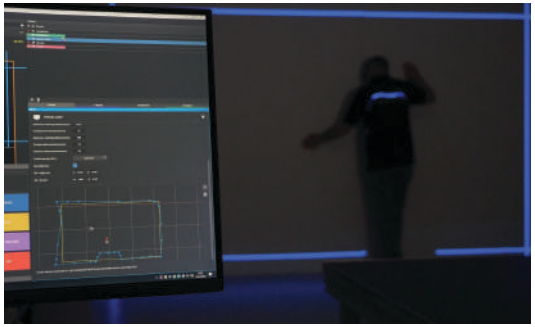


Interactivity through touchless devices
for a flawless experience

Easy calibration

All sensors supported can be **calibrated in seconds directly in Modulo Kinetic**. Simply add guides to your region of interest and point each corner. The sensor data is then converted into pixel coordinates.



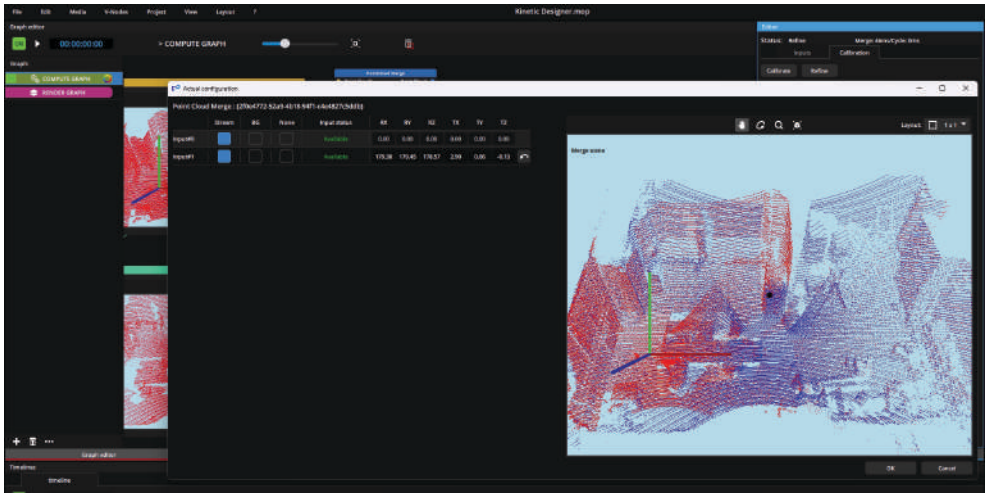


Once the calibration is complete, you get a table of persons or objects tracked.

Merge sensors for advanced setups

For setups combining interactive floors and walls, 2D and 3D LiDARs can be chained and merged.

For extra large venues, several 3D LiDARs can be used. Their respective point clouds will automatically merge.



Powerful intuitive tools, and a seamless workflow
to create your interactive projects

Modulo Kinetic embeds a **node-based programming environment.**

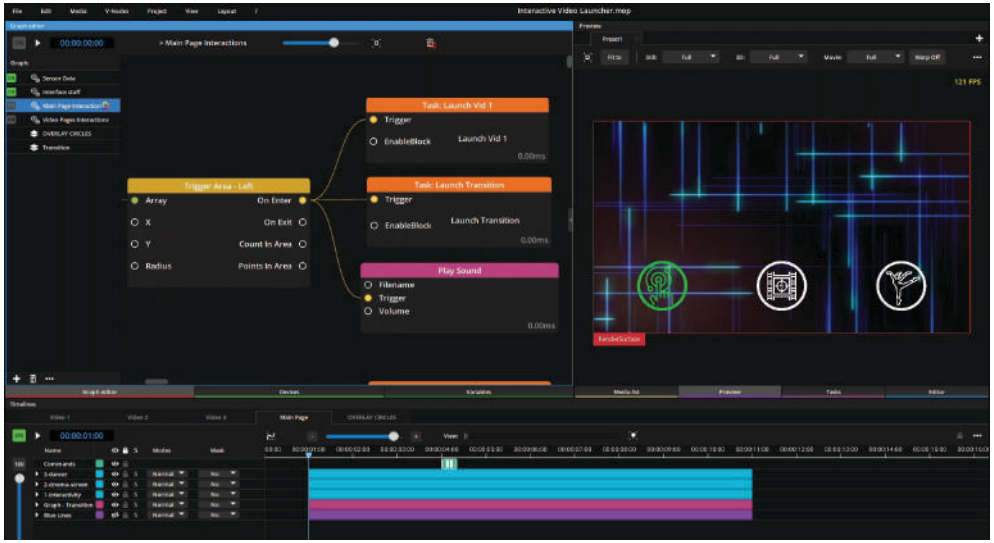
Using the Graph Editor, a variety of nodes can be linked together to create a wide range of interactions. Based on this intuitive and logical approach, highly sophisticated creations can be achieved without having to go through long and complex coding operations.

Compute Graph nodes

With this type of nodes, the **incoming data from sensors is used to modify parameters real-time**: Trigger a media, change position, color, rotation...
This type of node is CPU based and runs on the Kinetic Designer station.

Here is an overview of the blocks you can connect in the Graph Editor:

- A device incoming or outcoming data
- A media layer parameter such as opacity, position, or scale
- A media fx parameter
- A 3D object parameter such as a node, light, camera, material...
- A particle parameter
- A task
- A variable



Render Graph nodes

In this case, you will compose your own interactive effects using Modulo Kinetic. The media server embeds a 3**D engine for generative content, and an ever-growing internal library of effects** including blur, fluid, noise, twirl, spray paint, metaball, and many more.

Using the nodal editor, the effects can be linked and chained to create unique outcomes. Such visual FX are GPU based and run on V-Node servers.

Follow our tutorials and learn how to create Compute and Render Graph nodes step by step:

Compute Graph
for an interactive video launcher

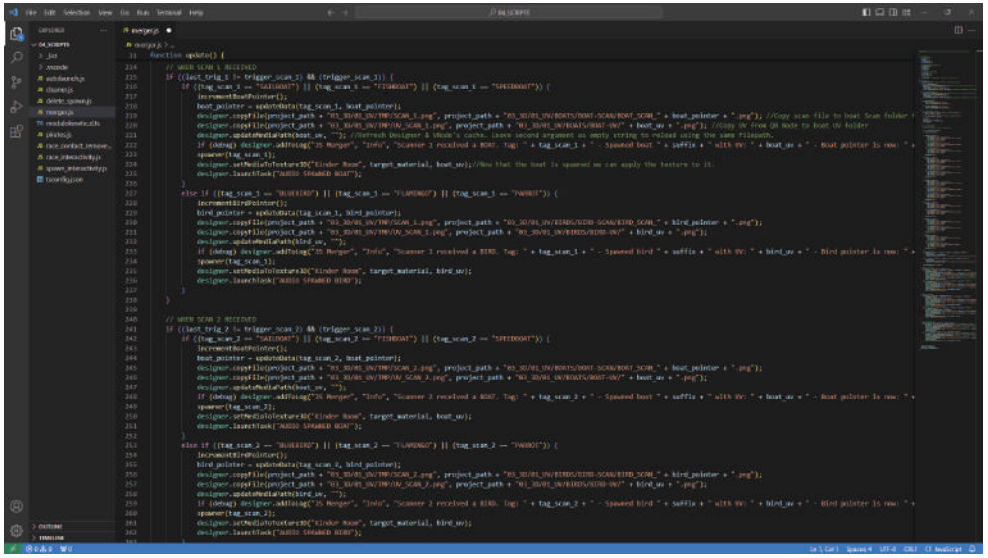
Render Graph
for interactive media reveal

Powerful intuitive tools, and a seamless workflow
to create your interactive experiences

JavaScript coding for specific requirements

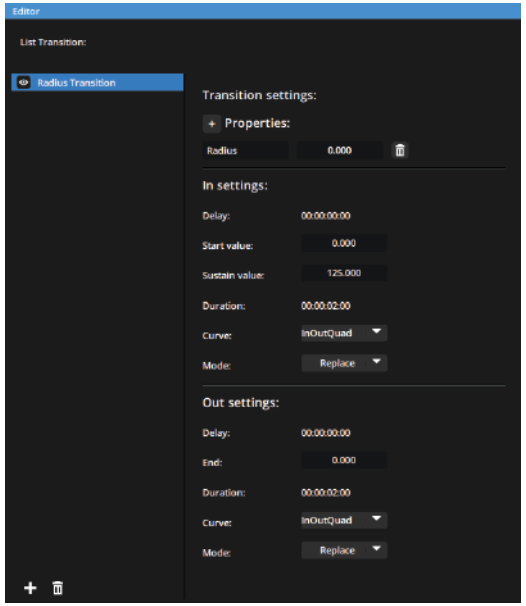
For specific custom blocks, users are empowered to go further using JavaScript with their preferred integrated development environment.

The code editor offers syntax highlighting making the coding process more intuitive and efficient.



Transition effects

In/Out transitions can be created and added to interactive effects in order to produce a smooth user experience.
All parameters can be adjusted and added to the nodes of your choice.



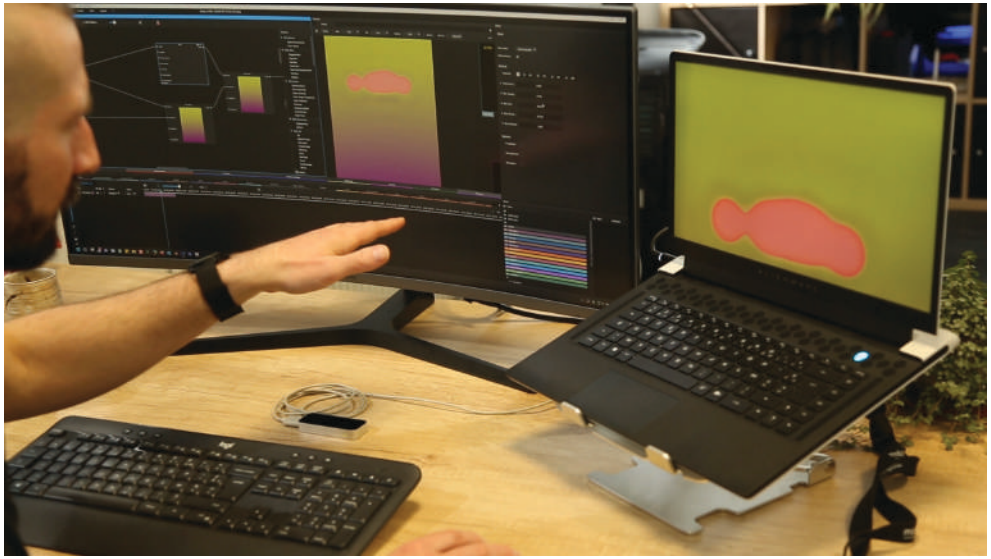
A smooth collaborative workflow

To save time and maximize efficiency, a project can be easily split between the creative and technical teams.

Both teams can work offline through a light setup with a simple laptop, a **Modulo Pi dongle** equipped with the **Kinetic Designer 2D+3D license**, plus a **Leap Motion Controller 2 by Ultraleap** for the creative team.

Supported by Modulo Kinetic, the Leap Motion controller provides hands & fingers tracking. **The device can be very useful for prototyping an interactive experience involving 2D and/or 3D LiDARs.**

Hands tracking will help simulating an audience and you will enjoy a **real-time previz of your interactive effects** in the Kinetic Designer interface.



Once the interactive project is complete, the show can be easily exported and sent to the team working with the Modulo Kinetic media servers for the merge.

The interactive graphs can be easily imported in the final project, and the Leap Motion controller simply replaced by the sensor used on-site. Effects will automatically scale to match the real-world scale.

Find out more about the workflow of Modulo Kinetic with 2D/3D LiDARs and access different interactive demos:

Watch Demos

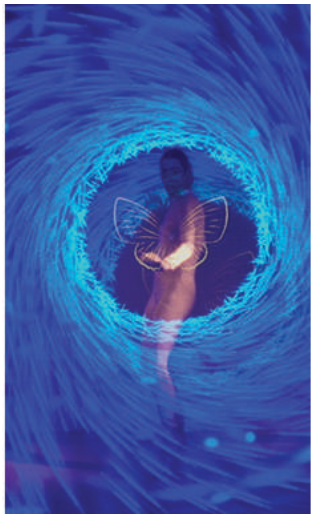
KineMotion tracking module
for creative and interactive visual experiences

KineMotion, the real-time tracking system by Modulo Pi

Available as an option, KineMotion is an **optical tracking solution** instrumental in creating state-of-the-art visual experiences:
Dynamic projection mapping, interactive video effects, automatic follow spot, spatial audio, and more.

Modulo Kinetic & KineMotion offer ultra-low latency to meet the needs of the most challenging configurations such as:

- Dynamic projection mapping on 3D moving objects in real time
- Advanced real-time 3D edge blending
- Real-time 2D fx interacting with beacon position
- 3D real-time particles interacting with beacon position
- Automatic follow spot: Beacon position sent to light desk through PSN
- Spatial audio: Beacon position sent to L-Acoustics' L-ISA system



PROJECTION · VIDEO EFFECTS · LIGHTING · SPATIAL AUDIO

All the calibration steps are integrated in Modulo Kinetic:

- Easily calibrate the infrared camera system
- Set a 3D world reference
- Fully auto-calibrate the video-projectors using the same cameras

See KineMotion datasheet

Demo

KineMotion kit:

> Add-on software for Modulo Kinetic Designer
> Calibration toolset: Wand, square & travel case
> Beacons + 8 LEDs 1.8m cable with reflector
> Active synchro RF box
< Not included: OptiTrack tracking cameras

Modulo Kinetic is also compatible with other tracking and motion control solutions such as BlackTrax or Kinesys.

As an all-in-one solution, Modulo Kinetic is perfeclty suited for virtual projects. In the context of restrictions related to the Coronavirus pandemic, new features have been developped and implemented in Modulo Kinetic to answer the rising need for virtual productions.

Adapted to the Pro AV industry

Extended Reality (XR) is a technology inherited from the film and the TV sectors. To address the specific needs and workflow of the Pro AV industry, we have upgraded Modulo Kinetic with XR features designed to make production of **virtual and hybrid events** significantly simplified and accessible.

The benefits of virtual productions

Modulo Kinetic can be used to make virtual events or installs featuring:

- **Background replacement:** Get immersed in a 3D virtual set
- **Augmented reality:** Add virtual elements to a real scene
- **Scenic extension:** Stretch the limits of your real stage or studio
- **Extended reality:** Enjoy a rendering in which real and virtual environments are perfeclty associated and mixed

These elements help enrich the content usually met in physical events with immersive 3D environments, 3D objects, animations, and the ability to switch scenes, contents, and cameras in an instant.

Demo

Compatible with green screen and LED screen configurations

Modulo Kinetic is compatible with **green screen configurations** thanks to an embedded advanced chroma keyer.

It can also be used in configurations based on **LED walls** and offers a dedicated workflow.

A virtual event in green screen configuration - © ADC Production

Tools adapted to the mission within one platform

All elementary bricks to build a full XR studio are available in Modulo Kinetic:

- Import complete 3D scenes (FBX, COLLADA)
- Create different 3D plates (several backgrounds and foregrounds)
- Add lighting with shadows
- Use PBR or Adobe Substance realistic materials in your 3D scenes
- Capture live camera feeds with our low-latency capture cards
- Display live presentations through our low-latency capture cards
- Receive the cameras' pose real time thanks to our show control and support of the FreeD and SteamVR protocols, or Stype tracking system
- Blend 3D scenes and reality through the timelines' advanced compositing
- Display movies in your 3D scenes through the timelines
- Use advanced post-process Reflection, Ambient Occlusion (SSAO), Depth of Field (DOF), Glow and advanced Antialiasing in the timeline to display 3D scenes
- Trigger tasks from phones/tablets using custom panels created with our show control & UI Designer
- Control PTZ cameras using our show control & UI Designer
- Switch from one camera to another through our embedded live mixer
- As an option, work with KineMotion to add interactivity such as virtual boxes to trigger actions, control 3D particles...

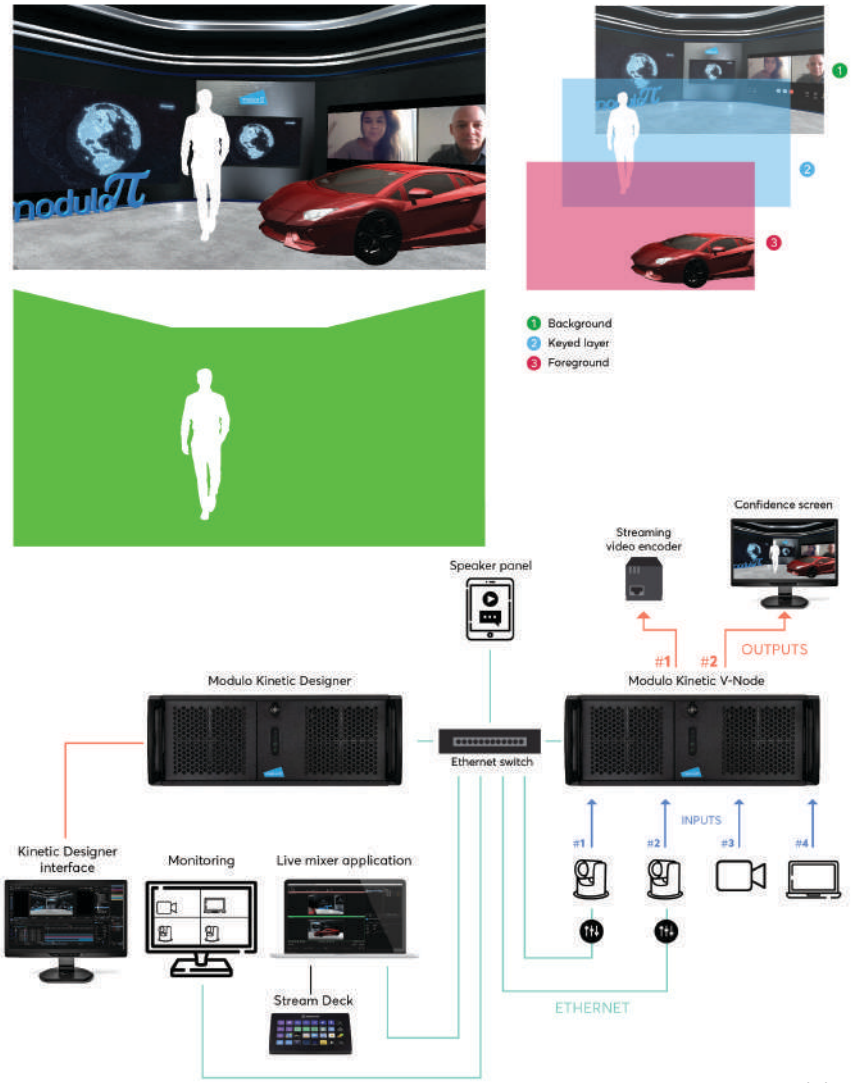
Panasonic BUSINESS · STEAM VR · STYPE

Quickly setup your XR studio through Modulo Kinetic:

- Integrated Panasonic AW-UE130 and AW-UE150 calibration files with FreeD protocol support
- Instantly find a camera's position thanks to our user-friendly wizard
- Fully integrated camera calibration tools: Multi zoom calibration file, nodal offset calibration tool

XR studio in green screen configuration

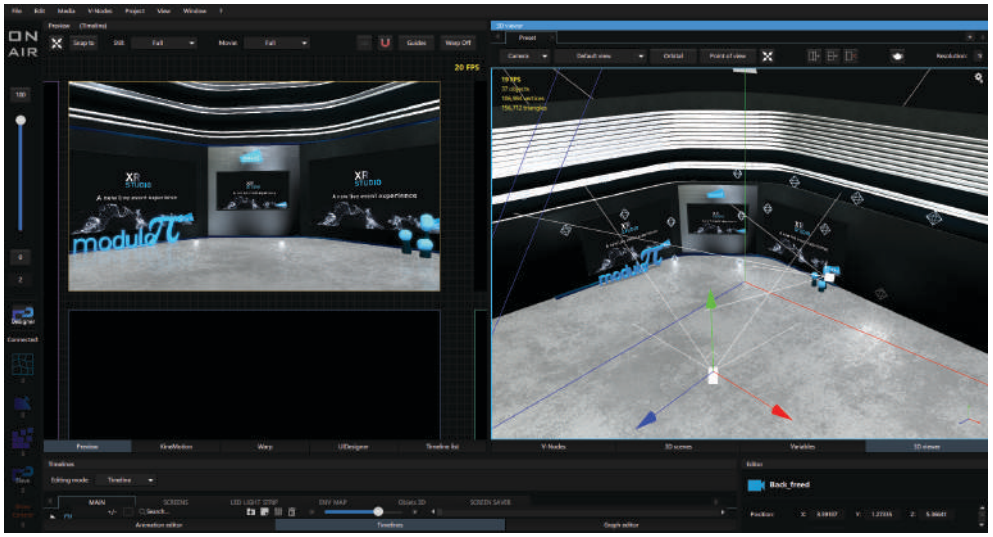
See full application note



A scalable solution

Several XR cameras can be supported from Modulo Kinetic Designer, offering one unified user interface for a simplified workflow.

If you need more power to display several points of view with complex and advanced 3D scenes, simply add some Kinetic V-Node servers to your setup.



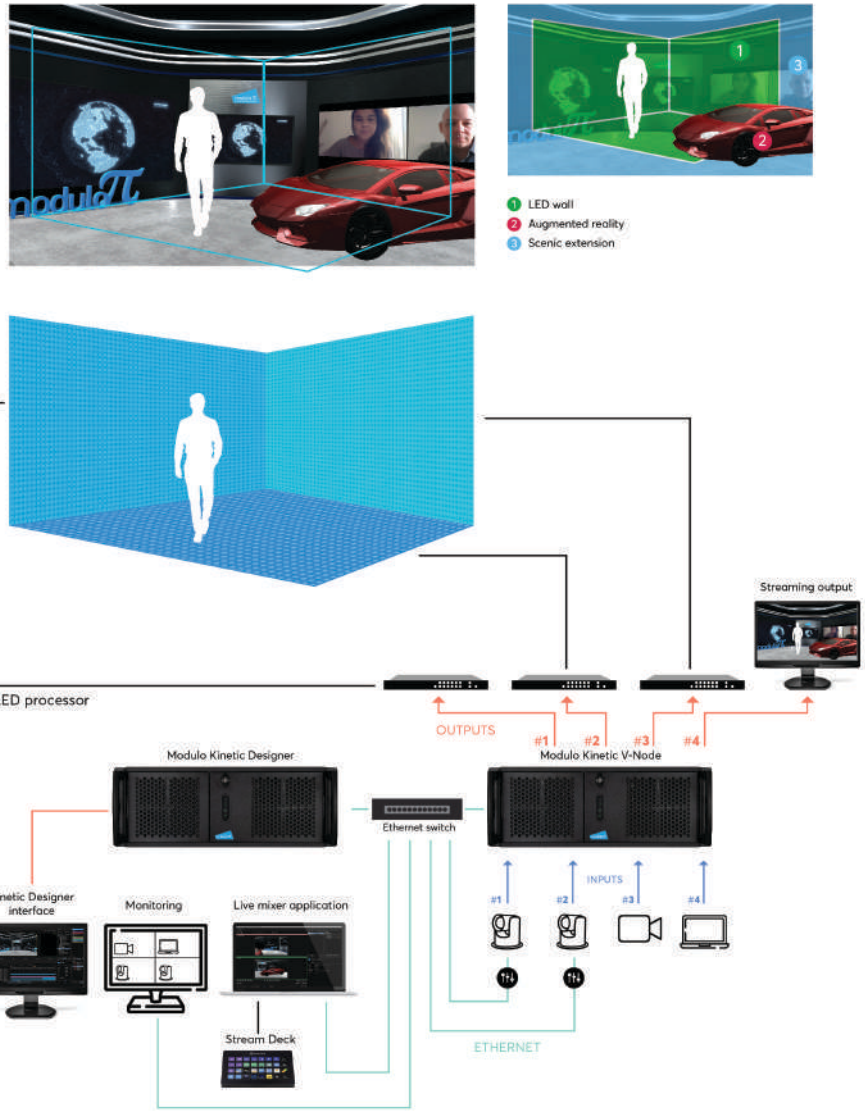
Versatile and future-proof XR tools

Unlike traditional XR solutions, Modulo Kinetic is not limited to XR workflows. The media server is suited for virtual productions, but it can also be used on a large array of projects including video mapping, corporate events, fashion shows, concerts...

Modulo Kinetic is the **perfect fit for hybrid events involving in-person and remote participants, with physical and virtual elements mixed.**

XR studio in LED screen configuration

See full application note



modulo KINETIC

Software + Hardware designed & manufactured
for the highest performance and reliability

Delivering as promised

To ensure utmost reliability, our media servers come as hardware + software solutions.
Our platforms are based on **strictly qualified GPUs and components**.
Modulo Pi is a technology partner of leading manufacturers of graphic cards and live input boards. All our systems are running on Windows 11 CBB 64 bits [1].

Modulo Kinetic is available in two different enclosures:

Regular chassis

Ruggedized chassis: Features a reinforced suspended framework and professional connectivity to endure rough conditions.

[1] *As of September 2024. Prior models running on Windows 10 SAC 64 bits*

Made in France

Our software is fully developed in-house. Based nearby Paris, our team of developers keeps on updating and improving our media servers.
In addition, **our hardware is fully assembled and tested in our offices before shipping.**

Customizable configurations

To meet your specific requirements, Modulo Kinetic is available in different hardware configurations which can all be customized: Add a timecode card, a live capture card, additional storage capacity...

Modulo Kinetic datasheet
Modulo Kinetic Ruggedized datasheet

Customizable hardware configurations
to adapt to your needs and budget

REFERENCES	OUTPUTS	SSD	OPTIONAL CAPTURE CARD
Kinetic DESIGNER			
KI-DES		250 GB + Fast NVMe PCIE 2 TB	
Kinetic DESIGNER - Ruggedized			
RKI-DES		250 GB + Fast NVMe PCIE 2 TB	
Kinetic V-NODE			
KI-VNO-1	1 output 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-2	2 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-4	1 output 4K or 4 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-6	1 output 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-2x4K	2 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
KI-VNO-3x4K	3 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
KI-VNO-4x4K	4 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
Kinetic V-NODE - Ruggedized			
RKI-VNO-1	1 output 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-2	2 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-4	1 output 4K or 4 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-6	1 output 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-2x4K	2 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
RKI-VNO-3x4K	3 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
RKI-VNO-4x4K	4 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓

New upgraded hardware

As of 2022, Modulo Kinetic comes with a new hardware. The upgrade significantly improves the servers' performance. It includes [1]:

- Bigger RAM (up to x8)
- Doubled bandwidth with PCIE 4.0
- New GPU generation
- New server motherboards
- Additional slots for live input boards

[1] Depending on model.
For more details, please consult the technical datasheets.

OPTIONS

REFERENCES	
KineMotion	
KM-SOFT	KineMotion add-on software for Modulo Kinetic Designer
KM-CALIBTOOL	KineMotion calibration toolset: A calibration wand, a calibration square, and a travel case
KM-BEACON	KineMotion Beacon + 8 LEDS 1.8 meter cable with reflector
KM-SYNC	Active synchro RF box
Auto-calibration	
AUTOCAL-1-OUT	Multi-projector auto-calibration module per output
AUTOCAL-LUCAM	PoE camera with 1 x 15m cable (LUCID)
AUTOCAL-FILENS	High resolution fish-eye lens (FUJINON)
AUTOCAL-8LENS	High resolution 8 mm lens (FUJINON)
AUTOCAL-CASE	Travel case with custom inserts for 1 x PoE camera, 15m cable, auto-calibration dongle, and up to 2 lenses (FUJINON)
Boards and TC	
DELTA-2x3G	Live Capture: 2 x 3G SDI
DELTA-1x12G	Live capture: 1 x 12G SDI + 2 x 3G SDI or 4 x 3G SDI
DELTA-2x12G	Live Capture: 2 x 12G SDI + 4 x 3G SDI or 8 x 3G SDI
DELTA-6x12G	Live Capture: 6 x 12G SDI or 12 x 3G SDI
DELTA-2xHDMI	Live Capture: 2 x HDMI 2.0
DELTA-MIXED	Live Capture: 4 x 3G SDI + 1 x HDMI 2.0 or 2 x 12G SDI + 1 x HDMI 2.0
DELTA-HOST [1]	Flex Host Card [1]
MOD-HDMI [1]	Flex Module single HDMI 2.0 [1]
MOD-DP [1]	Flex Module single DP 1.2 [1]
MOD-SDI4 [1]	Flex Module 4 x SDI 3G [1]
TC-PCIE-R	Timecode card reader
TC-PCIE-RW	Timecode card reader writer
TC-USB-R	Timecode card - USB
Miscellaneous	
MOD-BRDG	Modulo Bridge, network bridge hardware for USB devices

[1] Option limited to ruggedized models

Companion Apps

Modulo Kinetic comes with a series of companion apps designed to further enhance your experience working with our media server solution:

- **Kinetic Panel:** Access your custom user panels on Android, iOS, Mac, PC
- **ModuloDMXTool:** Send and receive Art-Net DMX from/to any device
- **VNC Viewer:** Remotely connect to Modulo Kinetic
- **Warp Remote:** Handle multi-projector edge blending, warping and 3D calibration from your laptop

Download Companion Apps on Customer Area

Practising, Offline Programming, Simulation & Creation

Modulo Pi's eshop shows different licenses and accessories to support you in your daily projects and workflow.

A **Modulo Pi dongle** and **Modulo Kinetic Designer 2D** license offer the opportunity for offline programming. Pre-program any project from your PC without having to be connected to a media server. The pre-programming work can be saved for later use, and easily transferred to the media server whenever needed.

The **Modulo Kinetic Designer 2D+3D** license gives access to the project study and simulation tools, as well as the 3D particles engine for generative content.

A **Learning kit** is also available to discover how to use Modulo Kinetic step by step. The kit includes in-depth tutorials and corresponding material: A media kit, shapes, and a self-assembly castle.

Visit Modulo Pi eshop

Online user manual

To find out more about Modulo Kinetic, an online user manual is available and often updated with technical information, tutorials, application notes...

User Manual
Starter Guide
Training & Video Tutorials available in French & English

modulo KINETIC

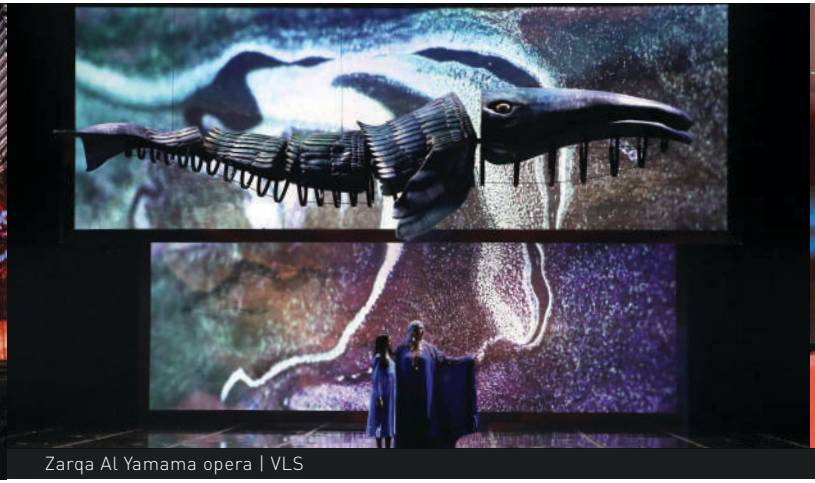
A field-proven media server solution
ready for any application

Hundreds of successful projects worldwide
Our all-in-one approach and advanced features perfectly answer the needs of a wide array of applications:
Live events or permanent installations, creative mappings, theme parks, museums, and touring.

Visit our Showcases gallery

Live events: Corporate events, fashion shows, mappings, opening/closing ceremonies, touring...


Monumental Tour | AV Extended


Zarqa Al Yamama opera | VLS


ARTEXPLORER museum boat | Arscénique, Akumendo

Permanent installs: Immersive venues, theme parks, museums, corporate venues, permanent/semi-permanent mappings...


The Extraordinary Journey attraction | Futuroscope Park

The Mime and the Star | Puy du Fou


Gustav Klimt, Gold in Motion | Fabrique des Lumières, Cadmos

modulo π

Two turnkey solutions
All your needs covered

modulo PLAYER

More than a Media Player

A cost-effective media server ideal for your everyday projects

- Flexible Playlist management
- Advanced 2D mapping through our exclusive X-Map function
- Embedded low-latency Live Mixer **| INDUSTRY FIRST |**
- User-friendly tools for Interactivity
- Multi-projector Autocalibration module **| BY MODULO PI |**
- Easy, yet powerful Show Control
- User Interface Designer to easily create your own UI
- True multi-user mode for optimized setup and operation
- Available in 4 customizable hardware configurations

modulo KINETIC

More than a Media Server

The ultimate video solution tailored for your most challenging projects

- Non-linear, real-time timelines editing with keyframes
- Embedded low-latency Live Mixer **| INDUSTRY FIRST |**
- Advanced 2D & 3D warping tools incl. exclusive X-Map function
- Multi-projector Autocalibration module **| BY MODULO PI |**
- Real-time 3D engine with generative content, incl. particles
- Real-time study and simulation in 3D & VR
- 3D video-projector calibration
- Flexible node-based programming
- Easy, yet powerful Show Control
- User Interface Designer to easily create your own UI
- Powerful tools for interactive experiences **| NEW |**
- KineMotion, powerful optical tracking module **| BY MODULO PI |**
- Dedicated tools for Virtual Productions with AR & XR
- True multi-user mode for optimized set-up and operation

Modulo Pi | 113-121 avenue du Président Wilson 93210 La Plaine Saint Denis - France | +33 (0)1 7024 9964 | contact@modulo-pi.com | modulo-pi.com

modulo π