CamBot®.remote

KST MOSCHKAU GMBH

About KST Moschkau

KST Moschkau GmbH is a system integrator and manufacturer in the fields of media technology, system construction, broadcast & ProAV, automation and virtuality.

Founded in 1985 by Udo Moschkau, the medium-sized family business supports its customers at the Kreuzau location with the training and education center KSTacademy, the demo, research and development studio KST-Innovation-Center as well as with extensive manufacturing facilities for KST's own product lines.

Reliability and trust form the basis of KST's customer, supplier and partner relationships.

CamBot®.system

CamBot®.system is the central hub that encompasses an extensive ecosystem of automations solutions, this provides high level automation to increase and optimize TV production workflows.

Included in the CamBot® ecosystem are of two types of modules, fixed basic modules necessary for core operation, and optional individual modules that enable additional functions and features for the operators.

As with all leading-edge technology, these modules are constantly being developed and updated in accordance with the latest industry trends and new production standards, this makes sure our customers are working on the cutting edge technology of tomorrow.

The aim of the CamBot®.system team is to automate as much of the production process as possible, and to achieve the simplest possible configuration for technicians, while providing a intuitive handling for the operators.

At KST we see automation as the future, which is why KST Moschkau GmbH and their research and development CamBot®.team in Munich, are actively committed to provide solutions catered to all companies sizes and budgets, from small and medium-sized projects, all the way to full studio builds.

Basic modules

CamBot®.control is the backbone of the entire CamBot® ecosystem. The server-based central CamBot®.control unit consists of one or more 19-type(")-4U servers, which control the individual modules through redundant power supplies and optional RAID drives.

CamBot®.remote is the software that controls the integrated systems in CamBot®. The full version CamBot®.remotePRO offers a wealth of features in a clear user interface and can control any module belonging to the CamBot®.system. The software enables the user to create advanced, creative, and smart automation, including building position presets and move patterns for cameras, light spots, and virtual objects all in the same way.

The intuitive GUI can be controlled via mouse and keyboard, touch screen or the CamBot®.remote panels RP1 and RP2, depending on the application needs. The true and tested hardware ensures optimal control of the production processes, enabling KST to offer the additional use of various third-party remote panel variants.

CamBot®.remote PTZ is an additional software created from a slimmed down version of CamBot®.remotePRO. This software is specially made for use with PTZ cameras.

Individual modules

CamBot®.robotics enables the control of robotic systems that are part of the CamBot® ecosystem, such as PTZ cameras, PT-Heads, robotic arms, rail systems, robotic cranes and many more.

Image selections can be made using **CamBot®.routing**: Control of matrices, mixers, switching of displays, etc.

CamBot®.matching controls the image technical parameters of used cameras.

DMX lighting systems and lighting consoles connected to the network can be operated via **CamBot®.light**.

CamBot®.graphics is used to control VR-scenarios, AR-objects, VR-lighting, on-air-graphics and many more.

Ingest and play-out systems are controlled via **CamBot®.clip**.

CamBot®.audio allows remote control of audio mixers, DSPs or clip players.

CamBot®.mediacontrol ensures the connection of media controls (Crestron) to the backbone.

CamBot®.remote

CamBot® is a concept for the general automation of studio productions. Currently, CamBot®.system consists of six different components, but it is constantly being developed and expanded.

The aim is to use automation to prepare studio productions to such an extent that processes that have already been tried and tested can be repeated through programming, thus significantly streamlining the studio workflow.

CamBot®.remote Production (Pro for short) is the software for controlling the automatable CamBot® systems.

The software offers a wealth of features in a clearly laid out user interface that allow deep, individual and smart intervention in the automation.

Among other things, the operator is able to assign position presets to cameras, light spots and virtual objects in the same way and to create moves for these systems.

CamBot®.remote PTZ is a slimmed-down version of the software, specialised in the use of PTZ cameras.

Intuitive user interface

The operation of CamBot®.remote is designed intuitively so that users can start production as quickly as possible. The software is optimised for touch surfaces and can therefore not only be controlled via a PC or the CamBot®.remote panels RP1 and RP2, but also via touch monitor, depending on the application requirements. This makes the control of the systems particularly flexible and adjustable according to individual ideas.

The software controls all axes of the different camera systems and simultaneously calculates and optimises the kinematics.

The operator can control up to three joysticks and thus all available spatial axes of the respective system with two hands.

The programming is designed so that the control always behaves the same regardless of which system is connected or controlled. So the operator does not have to adapt regarding the controlled camera system.

Most functions can be carried out in two variants; once the standard setting for a quick start and the extended functions for more in-depth setting options.

Joystick-Panel

The KST-CBR-RP1 joystick panel offers operators the right hardware for controlling CamBot®.remote Pro and CamBot®.remote PTZ.

With three joysticks for controlling up to seven system axes and individually assignable buttons, the RP1 leaves nothing to be desired and is ideally suited to existing production workflows.

For even more flexibility and to handle an almost unlimited number of systems with the same control panel, KST has developed the RP2, which will be available soon.

Third-party panels such as those from Skaarhoj and Panasonic are also supported.

Overview CamBot®.remote | Software

Position Database

CamBot®.remote offers extensive database functionality in which positions and camera movements can be stored. The aim is not to have to programme a move or position more than once and to be able to access and link to them again and again.

User-Management

The user management system allows each operator to create their own database entries. In addition, user groups can be created depending on the application of the software, with correspondingly activated functions.

Routing

The software also offers the possibility to manage various routers. This way, different audio and video signals can be routed to the corresponding inputs of the different monitors.

Matrix- & Cut-Moves

The position matrix is the dashboard of CamBot®.remote. Here, individual matrices can be created via drag-and-drop, productions prepared and operated during the shoot.

Rundown

The rundown summarises more complex sequences of camera movements in a chronological sequence. Especially in a planned and repeated production with fixed camera movements, the function of chronologically stored positions proves to be a great advantage.

Target-Mode

With the help of the target mode, people and objects within the set can be tracked with the camera system so that they automatically remain in the picture. A talent tracking system is required for moving targets.

Timeline-based Move-Editor

Database positions can be dragged and dropped into the move timeline to create one seamless move. It is also possible to work completely manually with keyframes; the system automatically checks the security and validity.

Moderator-Offsets

In most studio situations, the action revolves around a presenter and his or her guests. However, in a through-programmed show, the operator faces a problem: the people are of different sizes. CamBot®.remote offers several remedies here.

Define moderation positions

For different moderation scenarios, individual positions are usually created, which can be called up via the matrix or stored in the rundown.

However, since the same positions can be occupied by different moderators, the size of the people and / or heel height must be taken into account.

CamBot® offers the possibility to save different versions of the same position, so that the person size can be adjusted centrally and the show can be played correctly with only a few clicks.

PTZF-Offset

With the help of the PTZF-offset, each position can be assigned a temporary offset with one click and also be returned to its original state. The system recalculates all moves to and from the temporary offset position and ensures that everything works correctly in the further course.

Matrix- & Cut-Moves

The position matrix is the dashboard of the CamBot®.remote software. Here the user can create individual matrices, prepare his production and monitor it during the shoot.

A matrix consists of an overview of the individual camera positions stored there via drag-and-drop. The so-called cut movement is an automated camera movement between the current and the desired camera position controlled via the matrix. This automatically calculates the fastest possible and collision-free movement from the current position of the respective system to all other positions of this system. The operator is therefore certain, no matter where the camera is at the moment, that he can reach all positions stored in the matrix as quickly and cleanly as possible. The duration of the journey is indicated by the white seconds, displayed in the preview images of the matrix.

Depending on the application, several matrices can be created and switched between via different tabs. A matrix can be used as a show preset, for example, as general functions such as looping between positions or moderator offsets can also be controlled here.

It is also possible to place an unlimited amount of positions into one preview window so that they start up synchronised. In this way, the image mixer can choose between several moving cameras at any time.
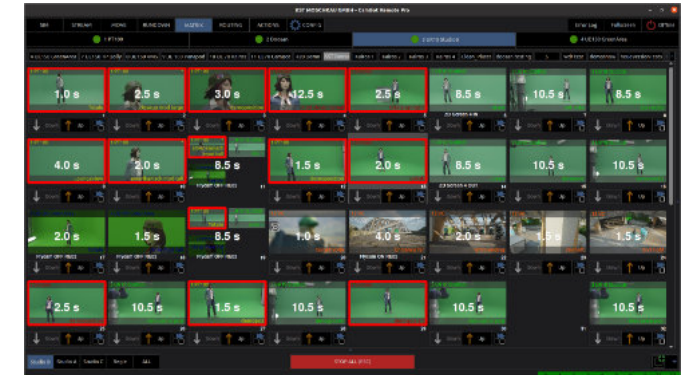
Matrix-Dashboard

Position Database

One of the central functions of CamBot®.remote is the position database. Camera positions and movements can be stored here. The aim of the database is to store all positions centrally and therefore not to have to carry out multiple programming.

The special advantage is that the positions are linked at all points in the software, so that changes have to be made centrally and only once in the database and are automatically adopted everywhere, for example in the matrices.

Metadata can also be added to the individual positions so that they can be easily found using the search function.

Target-Mode

With the help of the target tracking module, people or objects within the set can be tracked with the respective camera system. They will automatically remain in the picture despite of their movement in the room. The prerequisite for this is a talent tracking system with which the respective position in the room is recorded and transmitted to the camera control.

There are currently various tracking systems on the market. Most of them can be tested at KST-Innovati-

on-Center so interested parties can choose the most suitable solution for them.

Despite the set tracking, the operator still has manual access to the camera. He iss now able to concentrate on a dynamic ride and perspective without having to keep an eye on the framing or focus.

If no additional talent tracking solution is available, the target mode can also be used with fixed target positions. Especially with robot arms, the automatic framing creates a kind of "hover effect" around the target. Fixed targets can be programmed in within seconds using triangulation - even live and on-air.

Tracking-Systems

Tracking systems can be distinguished between different variants. A common system is "ezTrack-Hub" by Oaro, which supports different tracking technologies. The picture shows a system that works with position LEDs on the ceiling, this is called Antilatency. Another solution is the Vive solution known from VR glasses, where base stations are installed in the opposite corners of the room which track the target in the room via IR.
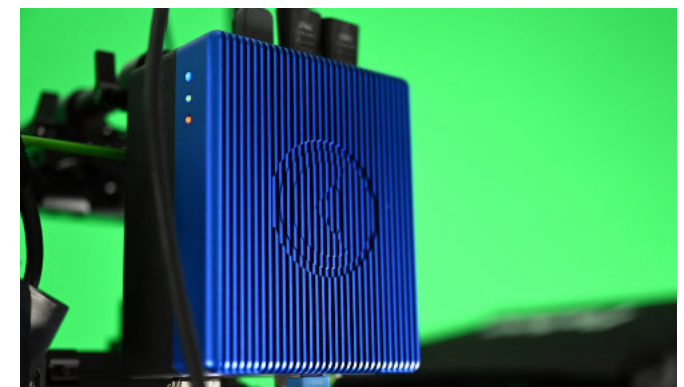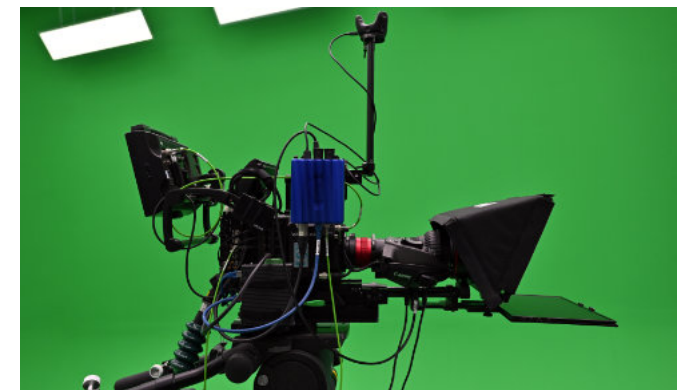
Moderator-Offset

In most studio situations, the action revolves around a talkmaster and one or more guests to whom individual positions and presets of the camera systems relate. Especially with changing guests and / or presenters, a fully planned and programmed show is faced with the challenge that all people are of different sizes and all presets have to be adjusted accordingly. CamBot® offers several solutions here.
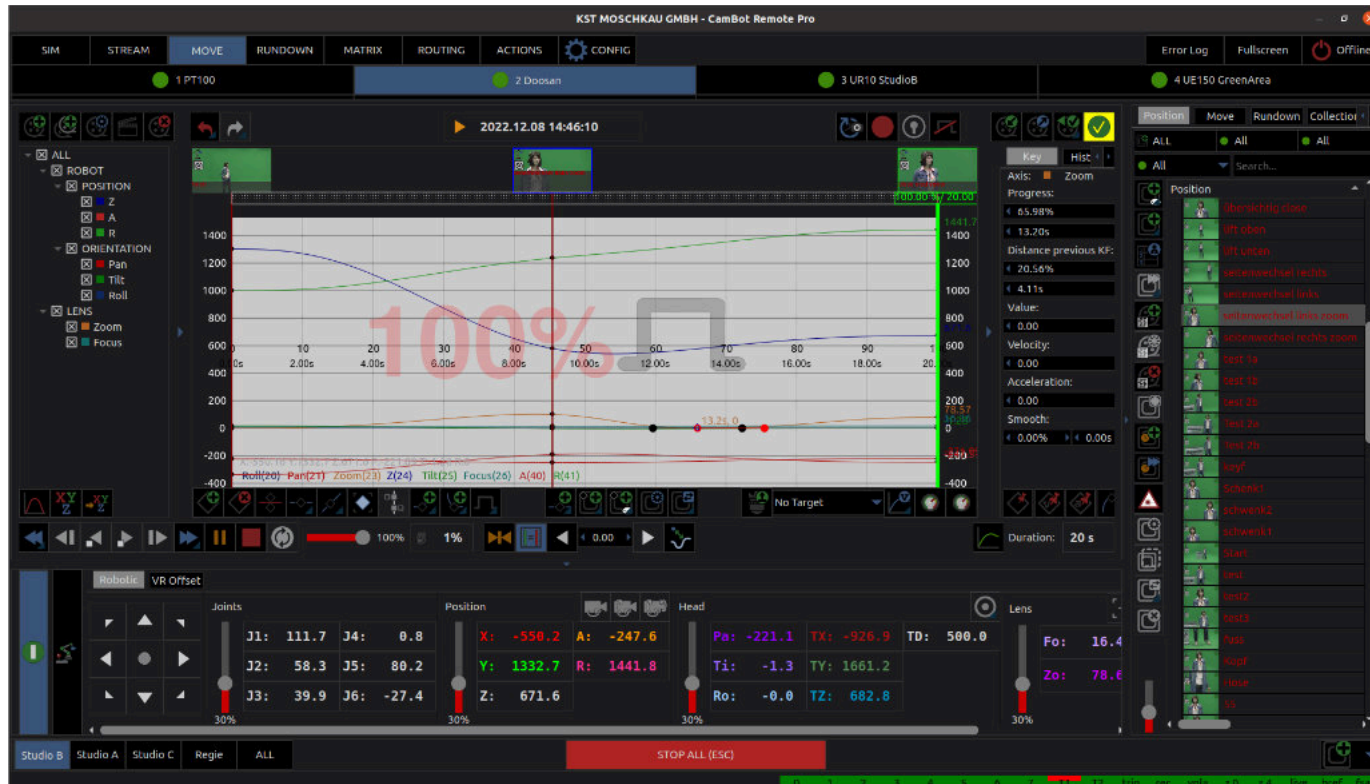

PTZF-Offset

With the help of the PTZF (Pan, Tilt, Zoom, Focus) offset, any position can be offset with just one click, for example if the presenter is not at the intended spot.

Again, the system recalculates all moves to and from this spot and makes sure that everything is still working properly. If it is determined that the moderator is back at the originally intended position, the PTZF-offset can also be removed again with one click.

Defining Moderation-Sites

For a show, special positions are usually defined for the different moderation situations. These positions are stored in the CamBot® database and can be named accordingly, e.g. matrix "Discussion Round" with the positions moderator, guest01, guest02 etc. CamBot® is able to store any number of variants for each of these camera positions. (Example: Mrs. Smith, with and without heel shoes or guest01 small / medium / large).

In the matrix, the operator can now globally define the variants of the individual positions for the show and adjust all assigned positions to the required person size with a few clicks. The system now recalculates all moves to and from these positions behind the scenes. This ensures that the entire setup of the show can be adjusted at short notice and still works as intended.

Timeline-based Move-Editor

The timeline-based move editor is CamBot®. remote's core element. Here, positions can be dragged and dropped from the database into the timeline to create a move that seamlessly connects the individual positions. The special feature: The software independently checks the safety and validity of the programmed move.

The key question in the check is: "Would this move work kinematically and collision-free?"

All axes available to the system are represented in the timeline by individual curves. You can apply any number of keyframes or a wide range of curve functions to each of these axes to create the perfect move.

The camera movement can become arbitrarily complex.

It is also possible to record a manually executed joystick movement. The software tracks each curve with keyframes in the timeline. Afterwards the manual move can be smoothed and edited.

The finished moves can also be exported as curves for graphic systems and thus used frame-accurately in post-production without moving the physical system. It is also possible to prepare a move as splines in external graphic systems such as Unreal Engine and then import it into the move editor.

In the simulation view, the journey can be visualised in three-dimensional space, including the robotical tracking shot in advance.
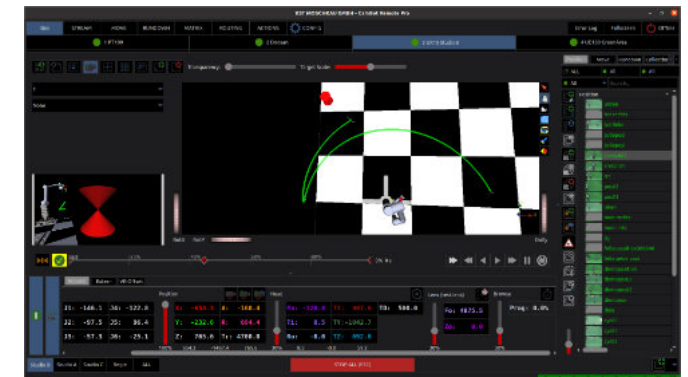
Overview Joystick-Panel KST-CBR-RP1

1) Speed-Slider

In the speed slider section, the user can set the input speed for each axis and switch off or invert the axis using the respective switch. Switching off individual axes is very helpful for clean panoramic pans, for example.

2) System-Selection

The operator can choose between the different systems to be controlled via the system selection.

Twelve buttons are built into the panel as standard, but two buttons can be assigned the command "page" via a programmable button assignment, so that more than twelve cameras can be operated from one panel. When switching to another camera, CamBot® remotely controls the image mixer or router for an automatically correctly routed image.

3) Joysticks

Three joysticks are installed on the panel: two three-axis joysticks and a thumb joystick. The right joystick takes over the orientation (pan, tilt, roll) and the left joystick the position in the room. The thumb joystick can control a seventh axis, for example a track. The joysticks are ergonomically arranged so the operator is able to use them simultaneously.

4) T-Bar

The T-bar of the panel has two possible assignments, either it is responsible for the global input speed of the control panel, or it is used to change the timing of the running move. In this way, a "slow-mo" can be dragged into the current, programmed move. This is especially helpful if the move follows the presenter but you do not know in advance how fast the presenter will move.

5) Zoom & Focus

On the panel is a conventional zoom rocker and a focus wheel. Both parts are also available as a small, separate panel for a focus puller that may be needed. With the innovative software features, such as the target mode, the focus can also be fully automated.

6) Matrix-Function-Keys

The matrix function keys communicate directly with CamBot®.remote Pro and correspond to the top two rows of the currently selected matrix. The buttons have built-in LCD panels that always adapt to the currently used preset. The four right-hand function keys can be assigned any matrix functions, so the matrix functionality can be controlled by the hardware panel. Operators are not forced to switch back and forth between the camera monitor and the software interface.

CamBot®.robotics

KST MOSCHKAU GMBH

CamBot®.robotics

The module enables the control of robotic systems that are part of the CamBot® ecosystem, such as PTZ cameras, PT heads, robotic arms, rail systems, robotic cranes and many more.

Entry-level robotic camera systems include PTZ cameras and pan-tilt heads for box or studio cameras.

More complex systems also include collaborative robot arms such as the KST-UR10 / 20 or the KST-H20, each with six movable axes. If desired, an additional floor / ceiling rail can be added for a seventh spatial axis. Other robotic systems that can be controlled with CamBot® are camera cranes and spider cams.

PTZ cameras can change the image in three directions: tilt, rotate and zoom. Thus, they represent the basic functions of robotic cameras. Expandable with the PTZmove.system, they can also be moved horizontally or vertically, so that they can be adjusted to the size of the presenter, for example.

Remote (Pan/Tilt) Heads are used to equip professional box or studio cameras with the functions of a PTZ camera.

Collaborative robots, also called cobots, are designed to work together with humans, for example on assembly lines, so they meet special safety criteria, such as pausing movement when adjustable pressure is applied against the robot arm. As a result, they can work directly with humans without safety zones, making automated studio productions possible even in the smallest spaces.

Unlike cobots, **high-speed and large robots** cannot be used collaboratively, but they allow creators more design freedom for advertising, tabletop and cine productions, for example. A detailed timeline-based move editor makes special things possible here.

As an extension to the previously listed systems, additional horizontal or vertical travel planes, straight or curved, can be added using track and stroke systems, allowing a camera to be controlled on up to seven axes.

Where the reach of robots is no longer sufficient, robotic crane systems or spider cams are used.

Collaborative robot KST-UR10

Features	
Load capacity	10 kg
Range	1.300 mm
Dead weight	29 kg
IP classification	IP54
Ambient temperature	0 - 50 °C
Humidity	bis zu 90 %
Operating noise	~ 72 dB (A)
Mounting orientation	Floor, Ceiling & Wall

Axis Movement		Max. Speed
Foot	± 360 °	± 120 °/s
Shoulder	± 360 °	± 120 °/s
Elbow	± 360 °	± 180 °/s
Wrist 1	± 360 °	± 180 °/s
Wrist 2	± 360 °	± 180 °/s
Wrist 3	± 360 °	± 180 °/s

Associated Mounting Column	
Width (incl. feet)	1.200 mm
Height	1.300 mm
Column diameter	220 mm
Dead weight	125 kg
Features	rollable

Total weight	154 kg

KST-PT-100 pan-tilt head

- maximum payload of 15 kg
- dead weight of 6,1 kg
- max. speed up to 100°/sec.
- 350° swivel range
- dimensions 320 x 268 x 156 mm
- CamBot® optimized

Collaborative robot KST-UR20

Features	
Load capacity	20 kg
Range	1.750 mm
Dead weight	64 kg
IP classification	IP54
Ambient temperature	0 - 50 °C
Humidity	90% RH
Operating noise	< 65 dB(A)
Mounting orientation	floor

Axis Movement		Max. Speed
Foot	± 360 °	± 120 °/s
Shoulder	± 360 °	± 120 °/s
Elbow	± 360 °	± 150 °/s
Wrist 1	± 360 °	± 210 °/s
Wrist 2	± 360 °	± 210 °/s
Wrist 3	± 360 °	± 210 °/s

Associated Mounting Column	
Width (incl. feet)	1.200 mm
Height	1.300 mm
Column diameter	245 mm
Dead weight	125 kg
Features	fixed

Total weight	189 kg

KST-H20 collaborative robot

Features	
Load capacity	20 kg
Range	1.700 mm
Dead weight	79 kg
IP classification	IP54
Ambient temperature	0 - 45 °C
Operating noise	~ 40 dB (A)
Mounting orientation	Floor

Axis Movement		Max. Speed
Foot	± 360 °	± 100 °/s
Shoulder	± 125 °	± 80 °/s
Elbow	± 160 °	± 100 °/s
Wrist 1	± 360 °	± 180 °/s
Wrist 2	± 360 °	± 180 °/s
Wrist 3	± 360 °	± 180 °/s

Associated Mounting Column	
Width (incl. feet)	1.306 mm
Height	1.300 mm
Column diameter	300 mm
Dead weight	125 kg
Features	fixed

Total weight	204 kg

High-speed robot KST-SFA20

Features	
Load capacity	20 kg
Range	3.124 mm
Dead weight	560 kg
IP classification	IP54/IP67
Ambient temperature	0 - 45 °C
Mounting orientation	Floor

Axis movement		Max. Speed
Foot	± 180 °	± 180 °/s
Shoulder	±135/-90 °	± 180 °/s
Elbow	+206/-80 °	± 180 °/s
Wrist 1	± 200 °	± 400 °/s
Wrist 2	± 150 °	± 430 °/s
Wrist 3	± 455 °	± 630 °/s
Features		fixed

Contact

Do you have any questions or would you like more information about CamBot®.system? Contact us at +49 2421 55 890 or by e-mail at info@kst-moschkau.eu.

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