EXTENDED

XR

REALITY

reckeen

3D STUDIO & lite

INSTRUCTION MANUAL

ver. 2.0 0915 and V3.1 0103

Table of contents

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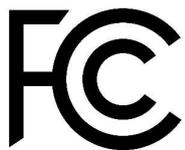
FCC NOTICE TO USERS

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warnings and Precautions

1. Read carefully all of these warnings and save them for later reference.

2. Follow all warnings and instructions marked on this unit.

3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.

4. Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.

5. Do not use this unit in or near water.

6. Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.

7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your dealer or your local power company.

8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.

9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord's rating.

10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.

11. Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.

12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.

13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:

    • When the power cord is damaged or frayed;
    • When a liquid has spilled into the unit;
    • When the product has been exposed to rain or water;
    • When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
    • When the product has been dropped or the cabinet has been damaged;
    • When the product exhibits a distinct change in performance, indicating a need for service.

Warranty

For a period of one year from the original date of purchase of the product, Reckeen equipment is guaranteed against any manufacturing defects. The original purchase receipt or invoice or other documentary evidence is required. To obtain warranty service, you must deliver the product, in either its original packaging or packaging affording an equal degree of protection . You cover all mail , delivery , transportation and insurance costs. It is your responsibility to backup any data, software or other materials you may have stored or preserved on your unit. It is likely that such data, software, or other materials will be lost or reformatted during service and Reckeen will not be responsible for any such damage or loss. Our warranty doesn't cover damage caused by accidents or unauthorized modifications, installing any other software and repairs, misuse, sand, grit or water. All other claims of any nature are not covered by this warranty. This Warranty is valid only in the country of purchase. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. RECKEEN SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY . Accessories ,such as the battery or the cable, are excluded from the warranty. These terms do not affect your statutory rights.

DISPOSAL ELECTRICAL AND ELECTRONIC EQUIPMENT

SYMBOL FOR THE MARKING OF ELECTRICAL AND ELECTRONIC EQUIPMENT INDICATING SEPARATE COLLECTION: For Customers the countries within the EEA . EEA: European Economic Area, which comprises the EU member States plus Norway, Iceland and Liechtenstein.

WEEE Directive

The symbol – consists of the crossed-out wheeled bin, as shown above. The symbol is indicating that electrical and electronic equipment should not be disposed of as unsorted municipal waste, but segregated for separate collection. For more information about recycling of the product, please contact Reckeen office, the waste authority, the approved WEEE scheme or the dealer/distributor where you purchased the product.

Introduction

Until recently, the use of virtual studio technique has been available only for the major TV networks, due to its high costs. With development of computers and digital image processing techniques, now such solutions are becoming more and more common. Nowadays, they can be used not only by the major TV stations, but also by local stations, educational institutions (e.g. to create educational programs), as well as by various companies and organizations, e.g. for products' presentation or preparation of staff trainings, promotional or educational materials, etc.

Thus, the Reckeen 3D Studio product was created in order to meet the needs of this market segment It is characterized by a very good price performance ratio paired with a simplified interface, which allows the operators to learn its usage very easily.

The Reckeen 3D Studio system is a ready to use solution - the user receives a complete workstation along with the preinstalled software and additional input/output cards mounted. The Reckeen 3D Studio enables connecting four cameras (4xHDMI or 2xHDMI and 2xSDI depending on version) and keying the signal. Instead camera we can connect every video signal source e.g. laptops , tablets , video players and other computing device.

Overview

The Reckeen 3D Studio is a PC-based system of a complete virtual 3D studio with the ability to import files in OBJ, 3MF and FBX formats and also available to prepare or download internal file formats *.recSets. In this case content is protected from modification and copying.

It is a system that enables a real time production of video programs with a high quality chroma key.

The Reckeen 3D Studio system uses four cameras in Full HD mode up to 60 frames per second and their images are keyed independently. The application allows you to work in 4K resolution. This means operating the system's up to 2 inputs and 1 output in 2160p format, i.e. with a resolution of 3840x2160 p30 or p 60. The chroma and luma key also work in 4K format. The system has 4 virtual cameras with the capability to save up to 15 shots for each of them. This allows the operator to use the following virtual camera movements in the scenography: pan, tilt, zoom, dolly, truck, arc, pedestal, cant and others.

Virtual cameras are controlled via the control panel Reckeen VKey100- specially dedicated to the system and equipped with a joystick.

Thanks to the built-in camera editor, you can program very impressive virtual camera movements and transitions in the 3D scenography, and with an innovative 3D set design editor Wizard installed on your system, you can modify and create your own unique studio designs.

This unique 3D scenography editor allows us to build "from scratch" our own 3D studio with available objects. The user as if he built blocks, builds his own scenography and then can modify the color, structure of the studio elements and many other properties. At the end, you can also set your own stage lighting by choosing the type of light , intensity and color.

Thanks to access to Microsoft Paint 3D we get the possibility to put into our scenography objects created with this program e.g. 3D subtitles.

The Reckeen 3D Studio system has a built-in STILL Editor for creating captions, text panels or news tickers - even during the Production.

In addition, the Reckeen 3D Studio system with four inputs for cameras and four chroma keys allows the user to place even four talents (a talent is an image of a presenter or an actor in front of a camera) on a single scenography.

It can also be used in a situation, where the images are transmitted by four cameras from different locations just to be placed in a single virtual scenography. The Reckeen 3D Studio system includes tools for recording, producing and online streaming the created live program. Reckeen can also be launched in LITE mode. In this situation , system deliver the tools for the creation scenography without 3d spatial knowledge. User can build as much more easier views based on pictures and images.

RECKEEN 3D STUDIO IS ACTUALLY 13 IN 1!

RECKEEN 3D Studio is a complete set of tools and functionalities you need to create, record and broadcast the high-quality 3D video content.

- Virtual Studio
- Mixer
- Still Editor – captions and graphic boards generator
- Studio Editor Wizard – stage design wizard
- 3D Studio Editor
- MS 3D PAINT editor
- Recorder
- Streamer
- PTZ support
- Tracking with PTZ
- Augmented Reality with PTZ
- Reckeen LITE system – the platform's simpler version for quick tasks and for the beginners.
- Material Editor

Functions and features of the system

The main purpose of the system is to provide the operator with all the tools necessary to produce a live program. Projects of this type require simultaneous actions on multiple image sources. To make this possible, the Reckeen 3D Studio system enables receiving external signal sources connected to the input card. Virtual cameras are controlled via the control panel Reckeen VKey100- specially dedicated to the system and equipped with a joystick. Additionally, it generates multiple signal sources from files on the hard drive replayed by the system players.

Available system inputs:

- cameras – up to two 4K camcorders or up to four Full HD (4x HDMI or 2xHDMI and 2x SDI – depending on the version). By purchasing additional License Key, You can upgrade LITE version to 3D Studio & LITE with 4K resolution,
- media (movies) - two clips at the same time,
- still images (bitmaps, panels) - two at a time,
- text - two text compositions at the same time,
- Sound – one clip from file and sound from Microphone,
- Two analog inputs and one microphone in front panel,
- By connecting an additional Reckeen Audio Box ADB-100, you can increase the number of inputs: two analog inputs ,one microphone and two digital inputs,
- Up to 6 NDI stream inputs.

The system takes a 'live' image from the camera. In the case of media, some additional functions are available:

- Media tray is an easy-to-use interface that brings all the media needed for broadcasting the program together in one place
- You can transfer media from the tray to the players or use them during the broadcast and as a source in virtual 3D studios
- The system has 7 trays for different types of media: video, still images, still text and audio files
- There is a possibility to insert a logo, text or animation to the scene thanks to 2 x DSK function and triggers option.

It not only supports the media, but also offers:

- Camera shots editor for programming virtual camera movements and transitions within each 3D studio
- Up to 15 shots in trackless mode for each virtual camera
- 30 free 3D set designs added to the system
- Virtual 3D studio editor

- Eye-catching news tickers and captions created in STILL Editor or loaded from external files.
- Wizard editor - Create your own 3D studio
- LITE Production - launch Reckeen Lite

Presenting previews of the media being played.There are the following previews available:

- preview from four cameras,
- media preview (two at the same time),
- still images preview (two at the same time),
- texts preview (two at the same time).

There are also broadcasting previews:

- PREVIEW - presenting the element prepared for broadcast,
- PROGRAM - presenting the signal currently being broadcast (system output),
- 4 virtual cameras V/C previews.

Additionally, the system enables:

- showing previews on multiple monitors. (If the monitors are connected to the workstation, it is possible to obtain a different previews' configuration on up to three monitors.)

Formats of system input:

- PAL 4x3 *
- PAL 16x9
- NTSC 4x3 *
- NTSC 16x9
- 720p50   – image resolution: 1280 x 720
- 720p59.94   – image resolution: 1280 x 720
- 720p60   – image resolution: 1280 x 720
- 1080i50   – image resolution: 1920 x 1080
- 1080i59.94   – image resolution: 1920 x 1080
- 1080i60   – image resolution: 1920 x 1080
- 1080p25   – image resolution: 1920 x 1080
- 1080p29,97   – image resolution: 1920 x 1080
- 1080p30   – image resolution: 1920 x 1080
- 1080p50   – image resolution: 1920 x 1080
- 1080p59.94   – image resolution: 1920 x 1080

- 1080p60 — image resolution: 1920 x 1080
- 2160p25 — image resolution: 3840 x 2160
- 2160p29,97 — image resolution: 3840 x 2160
- 2160p30 — image resolution: 3840 x 2160
- 2160p59,95* — image resolution: 3840 x 2160
- 2160p60* — image resolution: 3840 x 2160

   * note, these formats depend on the system hardware version

Formats of system output:

- PAL 4x3 *
- PAL 16x9
- NTSC 4x3 *
- NTSC 16x9
- 720p50 — image resolution: 1280 x 720
- 720p59.94 — image resolution: 1280 x 720
- 720p60 — image resolution: 1280 x 720
- 1080i50 — image resolution: 1920 x 1080
- 1080i59.94 — image resolution: 1920 x 1080
- 1080i60 — image resolution: 1920 x 1080
- 1080p25 — image resolution: 1920 x 1080
- 1080p29,97 — image resolution: 1920 x 1080
- 1080p30 — image resolution: 1920 x 1080
- 1080p50 — image resolution: 1920 x 1080
- 1080p59.94 — image resolution: 1920 x 1080
- 1080p60 — image resolution: 1920 x 1080
- 2160p25 — image resolution: 3840 x 2160
- 2160p29,97 — image resolution: 3840 x 2160
- 2160p30 — image resolution: 3840 x 2160
- 2160p59,95* — image resolution: 3840 x 2160
- 2160p60* — image resolution: 3840 x 2160

   * note, these formats depend on the system hardware version

Formats of video processing:

- Video processing:
  - 4: 4: 4 16-bit floating-point internal processing;

- Inputs and outputs:
  - SDI - YUV 4: 2: 2;
  - HDMI − RGB , YUV 4: 2: 2 , YUV 4: 4: 4;
- Capture in output format:
  - 4: 2: 0;
- Streaming:
  - 4: 2: 2.

Other additional features

- Control panel Reckeen VKey-100 with additional joystick to control the virtual cameras;

- real-time streaming of the program including YouTube , Facebook and Ustream ;

- Choice of skins Style for the system: White or Black ;

- Ability to load 3D objects created with Microsoft Paint 3D ;

- Jack 6,3 mm Microphone connection, 2 XLR channels Line inputs, Jack 6,3 mm Headphones connection - channels monitoring .

- Additionally connections by use Reckeen Audio Box ADB-100: Jack 6,3 mm Microphone connection, 2 XLR channels Line analog inputs, 2 XLR channel Digital inputs, Headphones connection - channels monitoring.

List of equipment

Your box should contain the following items. If you lack any of the following list - please contact your supplier.

- 1 x 3D studio unit

- 1 x Vkey 100 Control Panel

- 1 x USB Manual

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Reckeen 3D Studio system configuration
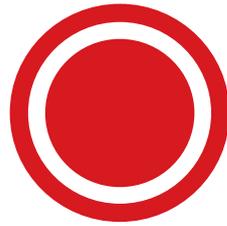
SYSTEM REQUIREMENTS

System Reckeen requires a minimum of one PC monitor in Full HD resolution (up to 3 Full HD monitors connected to the chosen graphic card ports), Camera with SDI or HDMI output - 4 pcs (4 pcs HDMI Cameras or 2 pcs HDMI and 2 pcs SDI Cameras depending on the chosen version of system inputs) , a PC keyboard – 1 pc. and a mouse - 1 pc. Cables for video signal connetions: 4xSDI or 2xSdi and 2xHDMI depending on version. In addition, it is possible to connect another 4th monitor for preview.

CONNECTIONS - FRONT PANEL

Reckeen 3D Studio System is housed in 19" 4U Rackmount chassis.

Dimensions in mm : 483 (W)x528(D)x177 (H) , Dimensions in inches : 19,02"(W)x20,79"(D)x6,97"(H) Weight approx. in kg : 15,5 , Weight approx. in lb: 34,2

After opening right or left panel doors different elements can be accessed. Access to the front panel doors is secured . This safeguard protects the system from accidental shut down or reset . Below the security lock there are two USB 3.0 ports.

After opening the right door, you will have access to the red Reset button, located next ,the system Start button, and the Audio Panel.

Audio Panel connections

- Digital
  - embedded stereo on each SDI and HDMI
- Analog
  - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 1 x MIC Jack 6,3mm – microphone differential input - two types of microphones – dynamic and condenser with + 48V phantom

System Reckeen supports 2 types of microphones. Every type requires different power supply as listed below:
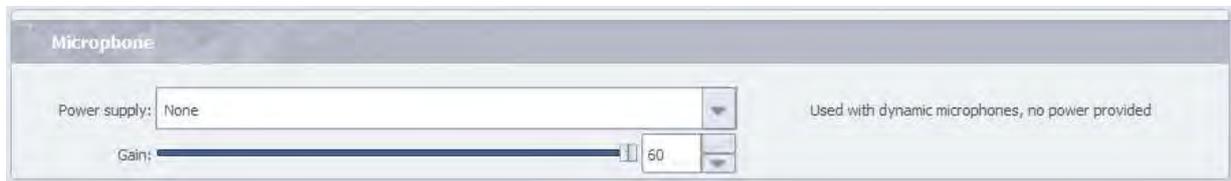
Dynamic
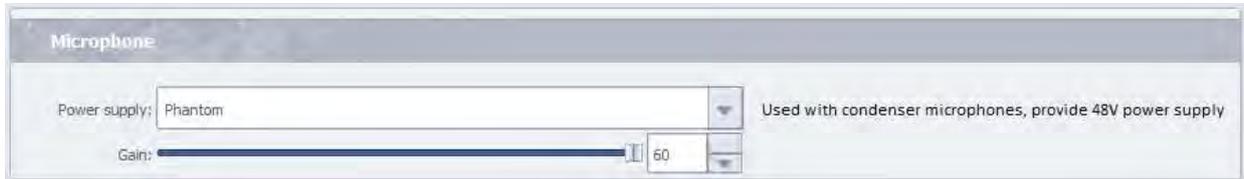
Condenser

Warning! Before connecting the microphone, read the chapter: Configuration Window: Audio Tab.

When you open Configuration Window in 3DProduction Module or LITE Production Module : Menu>Options>Configuration. You can find Microphone Settings below the Audio Level settings. There are two operating modes: a None mode with a dynamic microphone, for which you can set the Gain value with a slider, and a Phantom mode with a condenser microphone. When switch to the Phantom mode, you will be warned that a voltage of 48 V (volt) will be applied to the speech insert. A red LED lights up on the Audio Panel located at the front of the Reckeen workstation. It is recommended not to connect or disconnect a microphone to the Audio Panel during the time the red LED is lit up. You can safely connect a microphone only in None mode.

STEREO HEADPHONE SOCKET **-** THE JACK 6,3mm CONNECTOR

RIGHT CHANNEL MASTER OUT **-** THE JACK 6,3mm CONNECTOR

LEFT CHANNEL MASTER OUT **-** THE JACK 6,3mm CONNECTOR

RIGHT CHANNEL MASTER OUT **-** THE XLR CONNECTOR

LEFT CHANNEL MASTER OUT **-** THE XLR CONNECTOR
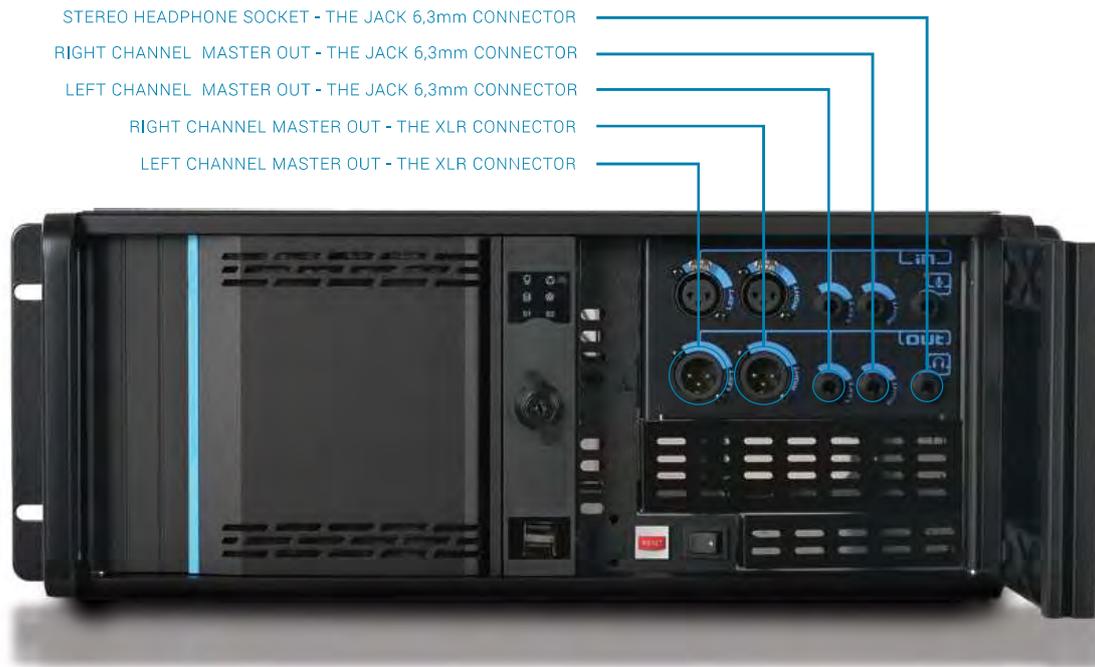
Audio output

- **Reckeen SDI Virtual Studio System**

  - Digital

    - embedded stereo on each SDI and HDMI

  - Analog

    - 2 x XLR two channels – professional balanced analogue audio stereo differential output (-10dBV, or 4dBu)

    - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential output (-10dBV, or 4dBu)

    - 1 x Jack 6,3mm – stereo Headphone outputReckeen HDMI Virtual Studio System

- **Reckeen HDMI Virtual Studio System**

  - Digital

    - embedded stereo on each HDMI

  - Analog

    - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)

    - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)

    - 1 x Jack 6,3mm – stereo Headphone output

MONO MICROPHONE SOCKET - THE JACK 6,3mm CONNECTOR
RIGHT CHANNEL MASTER OUT - THE JACK 6,3mm CONNECTOR
LEFT CHANNEL MASTER OUT - THE JACK 6,3mm CONNECTOR
RIGHT CHANNEL MASTER OUT - THE XLR CONNECTOR
LEFT CHANNEL MASTER OUT - THE XLR CONNECTOR
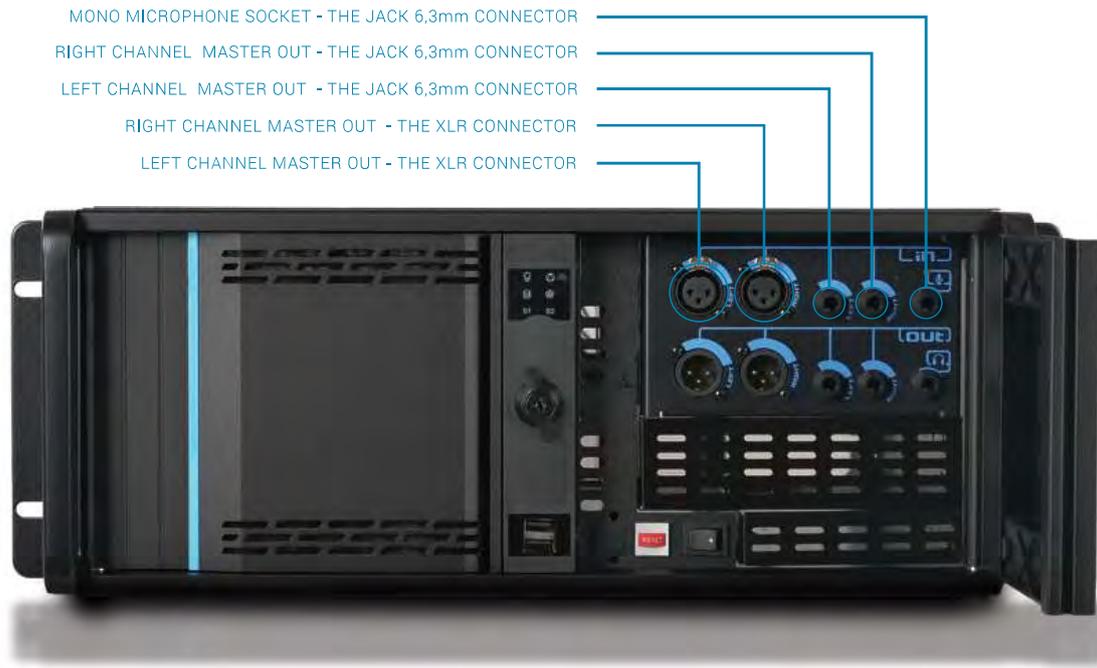
It is recommended that the workstation is placed in such a way that permits the airflow to the front and the rear panel. Fans for proper system cooling are mounted behind the left door's panel and in the rear of chassis . Slots and openings in the back of the workstation casing are provided for ventilation, to ensure reliable operation of the equipment and to protect it from overheating. The workstation casing is suitable for installation in server racks, taking up space of 4U.

CONNECTIONS - REAR PANEL

I/O Port

- Tally Output
    - TL – DB9 – 4 channels
- Reckeen External Keyboard port
  - RS – DB9 – RS 232
- Reckeen External Audio port
  - LAN – Audio Link
- Ethernet
  - Gigabit Ethernet LAN
- PC/2
  - PC keyboard
- USB
  - 2 x USB 2.0 (front panel)
  - 4 x USB 3.0 (back panel)
  - 1 x USB 3.1 (back panel)

USB 3.1/3.0/2.0 PORTS (TYPE A)

LAN (RJ45) PORT - CONNECTION TO LAN NETWORK

AUDIO I/O PORTS WITH 1XOPTICAL S/PDIF OUT

USB 3.1/3.0/2.0 PORTS (TYPE C)

4 X USB 3.0/2.0 PORTS

AUDIO LINK - INPUT FOR CONNECTING AN EXTERNAL AUDIO PANEL

TL- TALLY LIGHT OUTPUT (TO CONNECT A DEVICE SIGNALING THE CURRENTLY OPERATING CAMCORDER)

RS232 - INPUT FOR CONNECTING AN EXTERNAL CONTROL PANEL
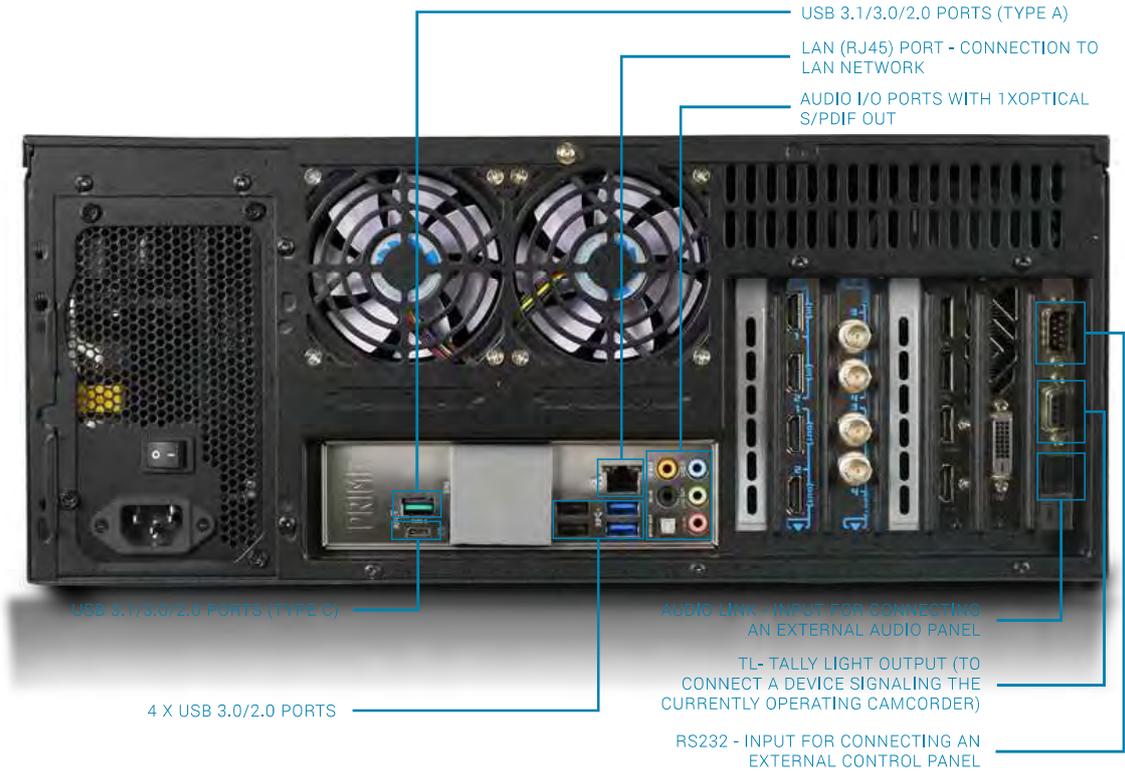
TALLY LIGHT output port

The Reckeen 3d Studio and LITE system in the basic version supports 4 video inputs from cameras and 4 Tally out ports. Similarly, in the 3DSPRO version, it has 8 tally channels. For each CAM 1 to 4, Tally out 1 to 4 are sequentially assigned. When CAM 1 is used in a virtual studio (VC1 to 4), the Telly 1 output will be signalled that camera 1 is on air. This will also be the case when CAM 1 is selected on PGM BUS.
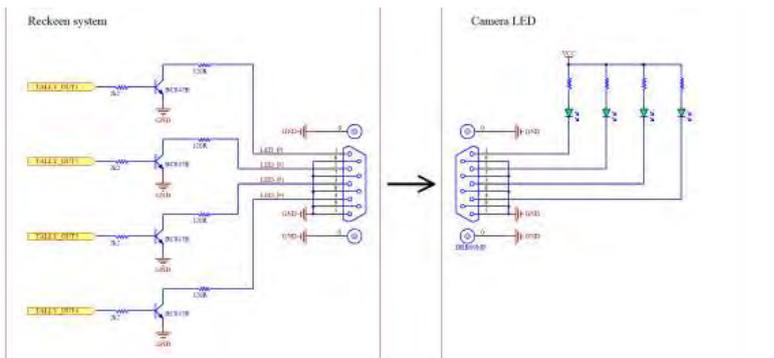
From the electrical side, the diagram of the Tally port is below, on each output there are transistors that connect the appropriate output to ground, externally it is enough to connect the LEDs and power it with an external voltage, e.g. 5-12V with appropriate current limitation by an external resistor.

Power

Switches power On/Off , 0 – OFF   1 – ON

Power supply cord with a suitable plug will be supplied depending on the user location

3

Reckeen 3DSPro, and 3DSProX8 Studio system configuration
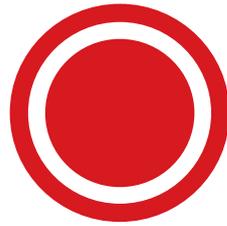
SYSTEM REQUIREMENTS

System Reckeen requires a minimum of one PC monitor in Full HD resolution (up to 3 Full HD monitors connected to the chosen graphic card ports), Camera with SDI or HDMI output - 4 pcs (4 pcs HDMI Cameras or 2 pcs HDMI and 2 pcs SDI Cameras depending on the chosen version of system inputs) , a PC keyboard – 1 pc. and a mouse - 1 pc. Cables for video signal connetions: 4xSDI or 2xSdi and 2xHDMI depending on version. In addition, it is possible to connect another 4th monitor for preview.

FRONT PANELS 3DSPRO AND X8

Reckeen 3DSPRO and 3DSPRO X8 Studio System is housed in 19" 4U Rackmount chassis.

Dimensions in mm : 483 (W)x528(D)x177 (H) , Dimensions in inches : 19,02"(W)x20,79"(D)x6,97"(H) Weight approx. in kg : 15,5 , Weight approx. in lb: 34,2 and 19" 1U - two units - ADB 100 and 3DSPRO.

After opening right or left panel doors different elements can be accessed. Access to the front panel doors is secured . This safeguard protects the system from accidental shut down or reset . Below the security lock there are two USB 3.0 ports.


After opening the right door, you will have access to the red Reset button, located next ,the system Start button.

Audio Panel ADB 100 connections

- a description of all connections can be found in a separate manual for the ADB 100 panel.

CONNECTIONS - REAR PANEL

I/O Port

- Reckeen External Keyboard port
  - RS – DB9 – RS 232 or depending on the type of motherboard, usb port.
- Reckeen External PCIE IPASS - connection between 3DSPRO, X8 and 4U System
  - IPASS EXTERNAL CABLES – VIDEO Link
- Reckeen External Audio port - connection between ADB 100 and 3DSPRO ,X8 panels
  - AR45 EXTERNAL CABLE – Audio Link
- Ethernet
  - Gigabit Ethernet LAN
- PC/2
  - PC keyboard
- USB
  - 2 x USB 3.0 (front panel)
  - 4 x USB 3.0 (back panel)
  - 2 x USB 3.1 (back panel)
  -

Connect the IPASS cables from the System 4U to the 3DSPRO, X8 Panel, the connectors are labeled PCIe.

Next, AudioLink should be connected - with an AR45 cable between 3DSPRO, X8 and ADB100. Picture below. The above cables are provided with the devices.
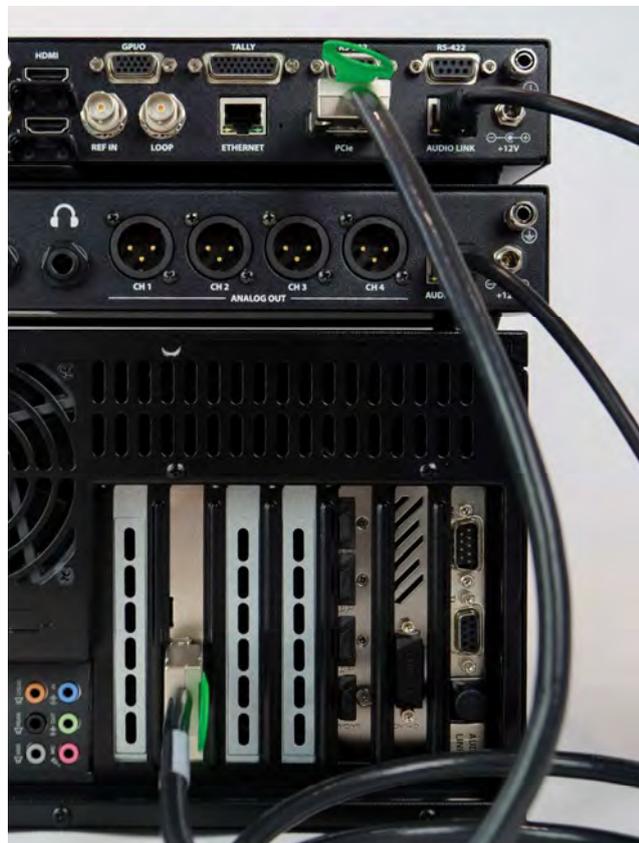
The next step is to connect the RS232 port to the VKey100 control panel

The above cables are supplied with the devices.

TALLY LIGHT output port

The Reckeen in the 3DSPRO version, it has 8 tally channels. For each CAM 1 to 4, Tally out 1 to 4 are sequentially assigned. When CAM 1 is used in a virtual studio (VC1 to 4), the Telly 1 output will be signalled that camera 1 is on air. This will also be the case when CAM 1 is selected on PGM BUS.

From the electrical side, the diagram of the Tally port is below, on each output there are transistors that connect the appropriate output to LED, externally it is enough to connect the LEDs
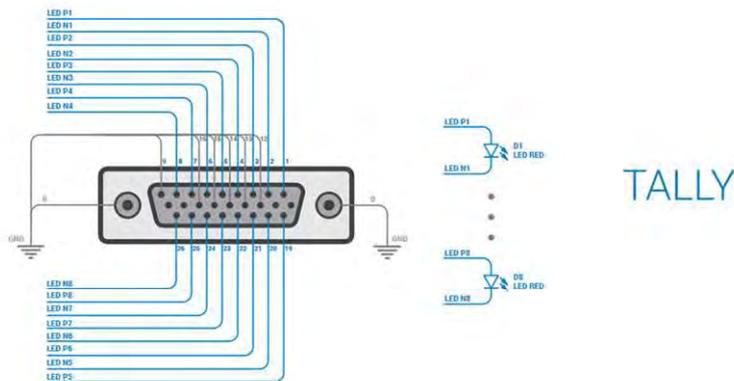
Power

Switches power On/Off , 0 – OFF   1 – ON

Power supply cord with a suitable plug will be supplied depending on the user location

Each panel 3DSPRO and ADB100 has its own separate power supply that must be connected first, a description of powers connections can be found in a separate manual for the ADB 100 panel. The 3DSPRO panel should be powered in the same way.

After connecting the power supply to all devices - these devices should signal the power supply via red Reckeen LEDs.

POWER SWITCHING SEQUENCES

3DSPRO and 3DSPRO X8 SYSTEM SWITCHING SEQUENCE.
The system requires the correct sequence of switching on the devices. The order is very important.

In the first step, power on the 3DSPRO / 3DSPRO X8 and ADB100 panels.
To turn the device on, hold the power button for 1 second
(turn it off about 3 seconds).Picture below.

In the next step, power on the 4U System.

4

Connections - Reckeen 3D Studio cards' inputs/ outputs
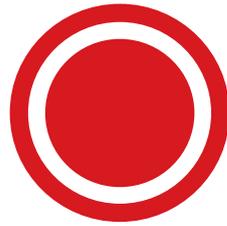
Video Input

- Reckeen SDI Virtual Studio System
  - SDI Video Input
    - 2 x SDI – 3G/HD/SD auto switching
  - HDMI
    - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k30p format*
- Reckeen HDMI Virtual Studio System
  - HDMI
    - 4 x HDMI 1.4 type A connector with support for 1080p60 two up to 4k30p format*
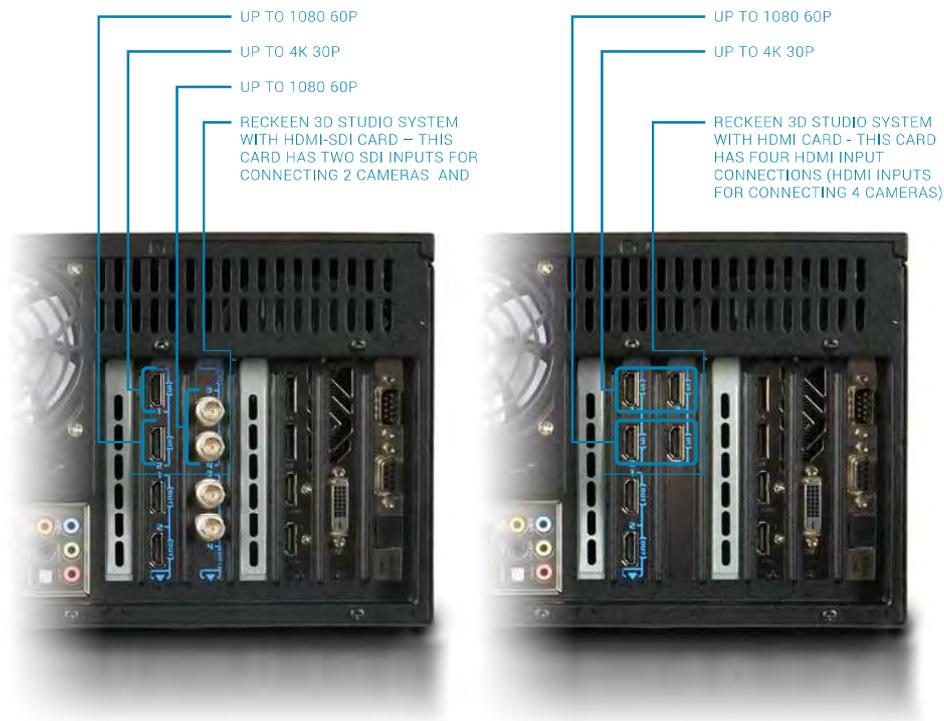
Video Output

- Reckeen SDI Virtual Studio System
  - SDI Video Output
    - 2 x SDI – 3G/HD
  - HDMI
    - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k30p*
- Reckeen HDMI Virtual Studio System
  - HDMI
    - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k30p*

*Reckeen LITE studio offers a 4K/p30 resolution. note, formats are also available depending on the hardware version with 4K60p resolution.

UP TO 4K 30P

RECKEEN 3D STUDIO SYSTEM WITH
HDMI-SDI CARD – THIS CARD HAS TWO
SDI OUTPUTS WITH PROGRAM AND
PREVIEW SIGNAL AND TWO HDMI
OUTPUTS WITH PROGRAM AND PREVIEW
SIGNAL

UP TO 4K 30P

RECKEEN 3D STUDIO SYSTEM
WITH HDMI CARD - THIS CARD
HAS TWO HDMI OUTPUTS WITH
PROGRAM AND PREVIEW
SIGNAL
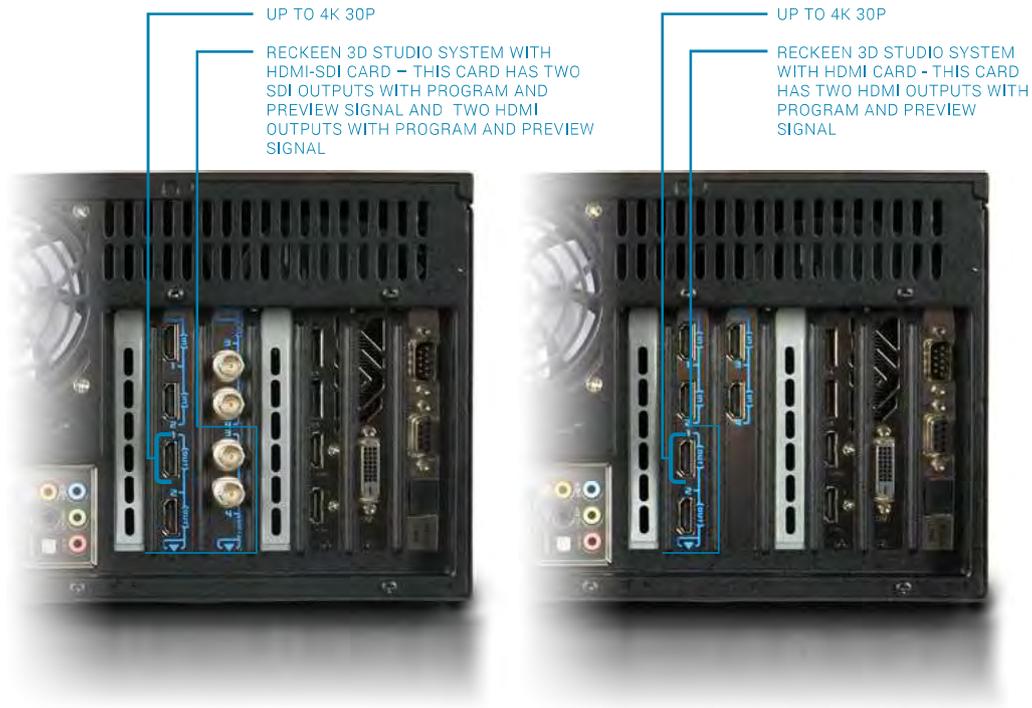
Monitor Output

(the number and type of outputs depends on the current version of the graphics card)

- 3x DP output for monitor
- 1x HDMI output for monitor
- 1x DVI-D output for monitor * note, only available in older GPU versions

DVI-D VIDEO OUTPUT FOR MONITOR

DP VIDEO OUTPUT FOR MONITOR

HDMI VIDEO OUTPUT FOR MONITOR

5

Connections - Reckeen 3DSPRO X8 inputs/outputs
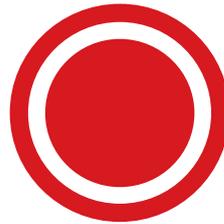
NOTE: For information regarding inputs and outputs of the older hardware version - 3DSPRO, please refer to older versions of the user manual. Such document is by default saved on your Reckeen system.

Video Input

- Reckeen 3DSPRO X8 Virtual Studio System
  - SDI Video Input
    - 2 x SDI – 12G/HD/SD auto switching to 2160p60 format
    - 2 x SDI – 3G/HD/SD auto switching to 1080p60 format
  - HDMI
    - 2 x HDMI 2.0 connector with support to 2160p60 format

RECKEEN 3DSPRO X8 STUDIO SUPPORT 4 INPUT FOR CAMERAS 1 TO 4

RECKEEN 3DSPRO X8 STUDIO SUPPORT 8 SDI AND 2 HDMI OUTPUT

NOT SUPPORTED IN CURRENT FIRMWARE VERSION

3DSPro X8										Max	Genlock
6 - input from 10											
1-SDI 12G	2- SDI 12G	3- SDI 3G	4- SDI 3G	5- SDI 3G	6- SDI 3G	7- SDI 3G	8- SDI 3G	1-HDMI	2- HDMI	no. of inputs	
full HD p60	full HD p60	full HD p60	full HD p60	no supported at presnt software				full HD p60	full HD p60	4	Yes
4k p30	4k p30	full HD p60	full HD p60							4	
		full HD p60	full HD p60					4k p30	4k p30	4	
4k p30		full HD p60	full HD p60					4k p30		4	
	4k p30	full HD p60	full HD p60						4k p30	4	
4k p30	4k p30							4k p30	4k p30	4	
4k p60	4k p30							4k p30		3	
4k p30	4k p60								4k p30	3	
4k p30	4k p30							4k p60		3	
4k p30	4k p30								4k p60	3	
4k p60								4k p60		2	
4k p60									4k p60	2	
	4k p60							4k p60		2	
	4k p60								4k p60	2	
								4k p60	4k p60	2	
4k p60	4k p60									2	
At present we support maximum 4 input from 10 of available											

Sync Input

- 1 x Reference input. Tri-Sync or Black Burst.
- 1 x Reference Loop Output. Tri-Sync or Black Burst.

In the CONFIGURATION tab, in GENERAL options, there are settings that configure the operation of the video input and output panel.

One of these options marked as GENLOCK is for synch reference inputs

One of these options labeled as GENLOCK is for sync reference inputs. In this option you have the option of turning on ternination if we use an additional connection to another device (Loop output). It is also possible to set the offset, i.e. the V and H shift of the synchronization.

Video Output

- Reckeen 3DSPRO X8 Virtual Studio System
  - SDI Video Output
    - 2 x SDI − 12G/HD - PRG
    - 2 x SDI − 3G/HD - PRV
    - 4 x SDI − 3G/HD - SMARTKEY 1-4
  - HDMI
    - 2 x HDMI 2.0 connector with support to 2160p60

10 - outputs									
1-SDI 12G	2- SDI 12G	3- SDI 3G	4- SDI 3G	5-SDI 3G	6- SDI 3G	7- SDI 3G	8- SDI 3G	1-HDMI	2-HDMI
full HD p60	full HD p60	full HD p60	full HD p60	full HD p60	full HD p60	full HD p60	full HD p60	full HD p60	full HD p60
full HD p30	full HD p30	full HD p30	full HD p30	full HD p30	full HD p30	full HD p30	full HD p30	full HD p30	full HD p30
4k p30	4k p30							4k p30	4k p30
4k p60	4k p60							4k p60	4k p60
PGM	PRV/PGM	PGM	PRV/PGM	Smartkey1	Smartkey2	Smartkey3	Smartkey4	PGM	PRV/PGM
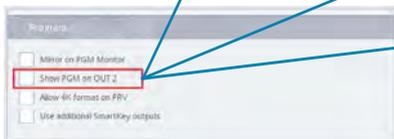
This option allows a second set of outputs to send a PGM signal.
By default value, this option is disabled and the PRV signal is given on these outputs

This option allows you to disable SmartKey 1-4 outputs.
This is recommended if you are not using these outputs.
Thanks to this, the sytem gains additional efficiency because no transfers are made to these outputs.
By default, these outputs are turned off.
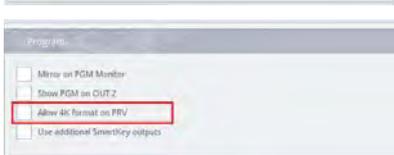
This option limits the PRV output format to FullHD resolution.
By default, this option is enabled, which means that the PRV outputs are signals in FullHD resolution.
Limiting the format to FullHD has an impact on system performance and FullHD is recommended if these outputs are not used or 4K format is not necessary.

Monitor Output on GPU

(the number and type of outputs depends on the current version of the graphics card)

- 3x DP output for monitor
- 1x HDMI output for monitor
- The number and type of port depends on the version of the graphics card.

6
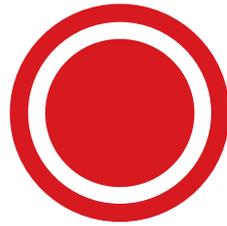
Reckeen 3D Studio system connections diagram

**HIGH QUALITY PTZ TRACKING
AND IMMERSIVE AR
IN RECKEEN 3D STUDIO**

Reckeen PTZ & FreeD controlling system for XR

Shooting location

Control room

BRC H800

BRC X1000

BRC X1000

BRC X400

SDI or HDMI

• • • Router

LAN

RM-IP10
optional PTZ controller

TRACKING VIRTUAL STUDIO & AR
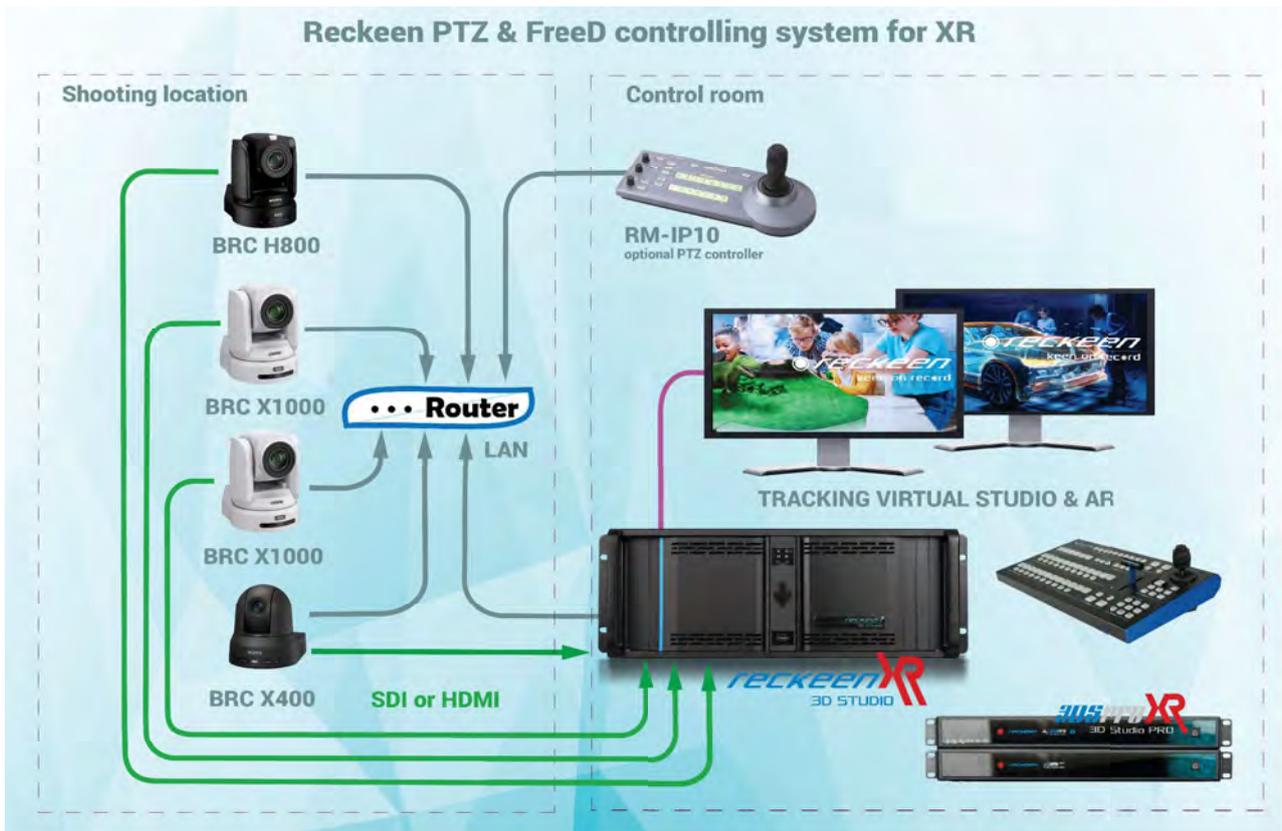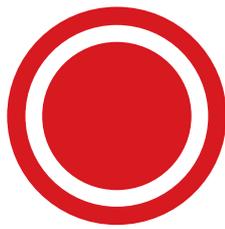
7

Reckeen 3D Studio System
Startup

1. Connect a power cord, a PC keyboard, a mouse and a control panel V-Key100 to the Reckeen workstation.

2. Connect one, two or three Full HD monitors to the workstation using HDMI, DVI or Display Port on the graphics card. Recommended resolution is 1920x1080 . It is not recommended to connect monitors with different resolutions.

3. Set the power switch located on the rear panel of the workstation to position 1 - enabled. Open the right door of the front panel and press the button starting the Reckeen system for a couple of seconds. This button is located on the right side of the red reset button.

4. Important: if you ignore all the messages during the startup process (which can approximately take up to one minute), you will be redirected automatically to the Reckeen Studio Start screen. For more information, see the System Recovery section.

5. During the first use of the system, the user is obligated to confirm the EULA End-user license agreement. For detailed description go to the About section in CONFIGURATION settings.

6. There are eight options to choose from on the Start screen (In Version3D + LITE):

   • 3D PRODUCTION – start the video production in 3D Mode

   • MICROSOFT PAINT 3D – run Paint 3D Program

   • LITE PRODUCTION – run Reckeen LITE and start the video production LITE Mode

   • VSM LITE Editor – start the Reckeen Virtual Space Maker LITE editor

   • STILL Editor – start the STILL Editor

   • CONFIGURATION settings – application configuration

   • RSS – five windows with manufacturer's information about news, events, promotions, etc.

   • SHUTDOWN – shuts down the system or close application

The detailed description of each option can be found in the following sections of this manual.

START SCREEN VIEW

The start screen appears automatically when you launch the Reckeen 3D Studio system.

3D PRODUCTION
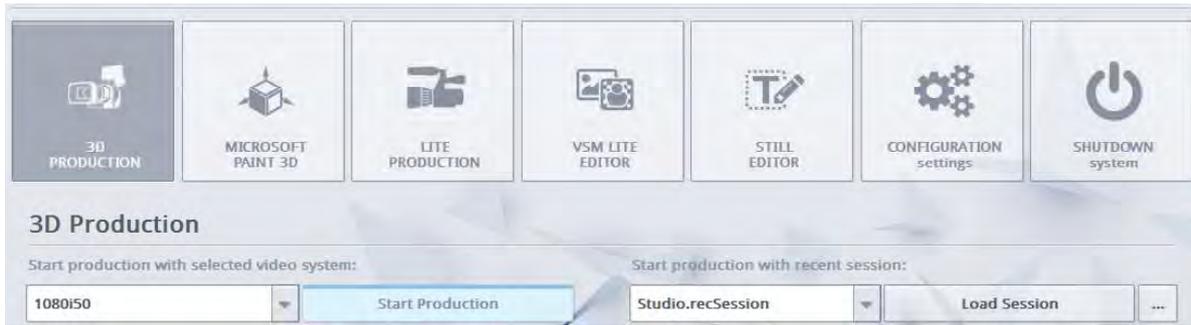
Before starting a new production, first you should choose an appropriate video format, that is a format of the Reckeen 3D Studio system signal output. Click on the 3D PRODUCTION button, and then select the format in which you will be working from the drop-down menu , next to the icon labeled Start Production. Keep in mind for the choice to be consistent with your camera's working format.

You can also load a file from a previously saved production session. The system has its own session files*.recSession. Session files contain production settings, video clips, graphics, logo, sound, program options, key settings, streaming settings and other. Select a saved session from the drop-down menu, next to the cursor arrow will appear a path to the file on the disk , as shown below, and click on the Load Session button.

You can also search the hard drive to load a previously saved session. It is done by clicking on the button with three dots located next to the Load Session icon.

MICROSOFT PAINT 3D
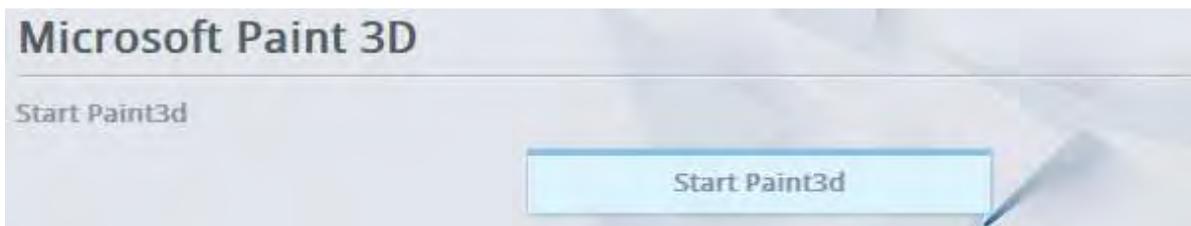
After you click Microsoft Paint 3D button and then Start Paint 3D button, you will be redirected to Microsoft Paint 3D. You can create there your own 3D objects and save them in * .3MF format on the disk. After

closing Microsoft Paint 3D program, you automatically return to Reckeen 3D Studio's start screen. You can load the created 3D object (e.g. a 3D text) to your stage design after clicking 3D PRODUCTION button and opening 3D Studio Editor.

Paint 3D program gives you enormous opportunities, like:

- You can sketch the drawing and then quickly change it into a three dimensional object.
- You can use the ready-made solids, build objects with their use, paint them, change their sizes and so on.
- Realistic textures, such as wood, grass or others, can be applied to your objects.
- You can create clippings from your favorite images or photos and use them as stickers to be put on your 3D models.
- You can show your 3D objects on www.Remix3D.com , where you can also find and use thousands of other users' creations.

You want a car to appear in your studio? It's very easy - you can create it from scratch or use one of the existing pieces of work!

You can put the crated objects into Reckeen 3D Studio system and enjoy the results of your work. Microsoft has released a series of video tutorials for Paint 3D:

- https://www.youtube.com/watch?v=K6I5lH2y_zI
- https://www.youtube.com/watch?v=FnYUN-_zGAU
- https://www.youtube.com/watch?v=aMNG4-sS3cY

Before you begin working with Microsoft Paint 3D, please read the terms of Microsoft Services Agreement. They are available at: www.microsoft.com

LITE PRODUCTION
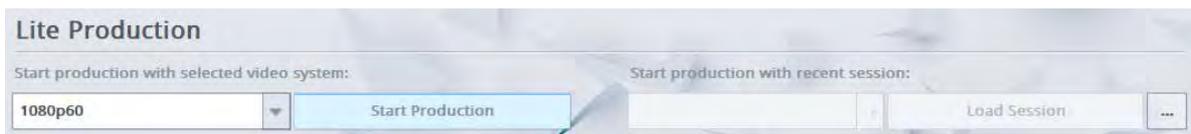
When you press LITE Production button, the same options appear on the screen as with the 3D Production mode. You have to choose the right format and load the session. Reckeen LITE mode will start after clicking Start Production button.

4K RESOLUTION

The Reckeen system allows you to work in 4K resolution. This means operating the system's up two inputs and 1 output in 2160p format, i.e. with a resolution of 3840x2160. The chroma and luma key also work in 4K format. In addition, up to two of the inputs, depending on the system version, namely CAM 1 and CAM 4, allows us to connect 4K input signal. We choose CAM1 input for 4K signal.

Before we start working with 3D PRODUCTION or LITE PRODUCTION application, in the STARTUP module, we have to select an appropriate video output format. We do this using a drop-down list located

below the buttons. This time, we have added new output formats, labeled 2160p. Picture below.
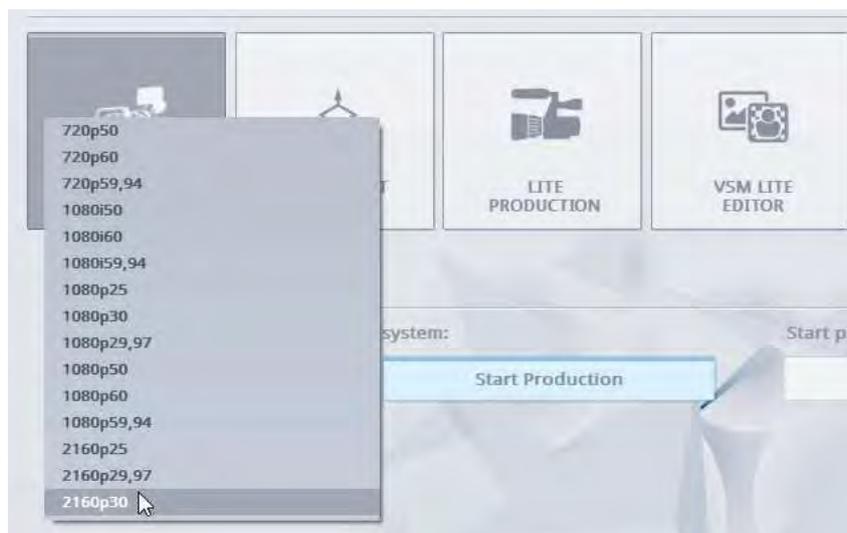
They are characterized by four times the number of pixels compared to Full HD resolution used previously. It is a resolution of 3840 x 2160.

We can choose from among 3 progressive scan operating modes, that is full frame frequency: p25, p29,97, p30 and p60.

We will choose 2160p30 format and press START PRODUCTION button. We will obtain this resolution at the RECKEEN card's PROGRAM output after starting the system and loading the Production module. On the second output - PREVIEW - we get a resolution of 1080p30.

We will get information about this resolution when we hover the cursor over input bar. Picture below.

We suggest to always match the refresh rate of the input image to the output, as in this case: progressive signal p30.

VSM LITE EDITOR
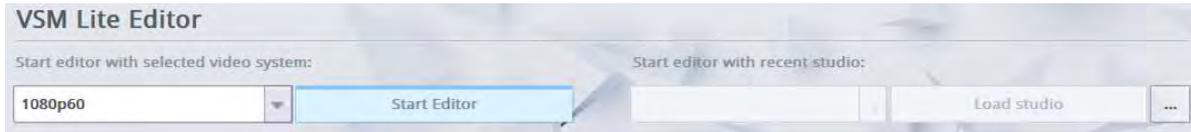
Virtual Space Maker LITE Editor has been designed to edit and introduce changes to the ready-made sets, but also to allow the users to create their own set designs. Such sets are intended for Reckeen LITE system. Just as with the previous options, in order to start the editor you have to choose the image system in which you are going to create your set design. You can launch the editor with the latest scenery (Start editor with recent studio) or load the scenery from the computer disk (Load studio). Loading a scenery is also possible later on while the editor is already running. VSM LITE Editor is also available as a standalone application to be installed on your PC or laptop.

STILL EDITOR

Also from the Start screen you can start the STILL Editor. It is a program for creating text and graphic panels. You can prepare, for example, subtitles, logos or news tickers - which will later appear on screen. First, select from the drop-down menu an appropriate resolution, consistent with resolution of production video, and then click on the Start Editor button. You can also load a previously saved file by selecting it from the drop-down menu or by searching your hard drive, as in the previous example.
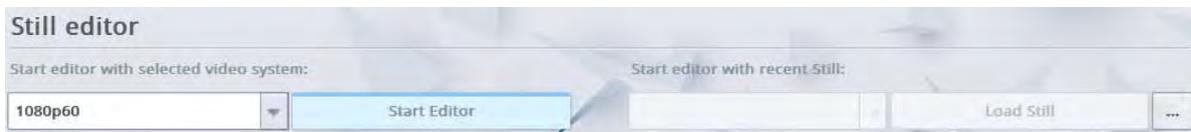
CONFIGURATION SETTINGS

Here are five functions available in this option Language, Style, Update, Free sets and About.
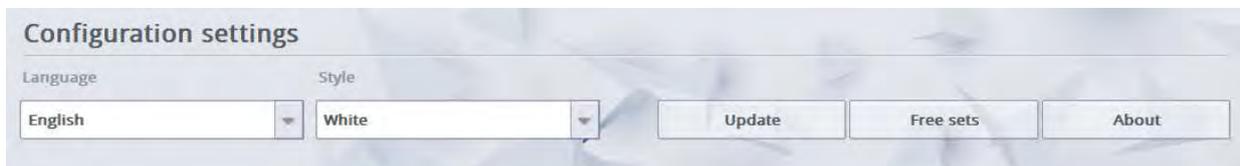
- Language
  - Clicking on this icon allows you to change the system language.
- Style
  - Choice of skins Style for the system: White or Black.
- Update
  - After clicking on the Update icon, the system searches for software updates.

- If no new available versions appear in the window, it means the system is fully up-to-date.
- Free sets
  - The system Reckeen comes with 30 free 3D sets and 30 free Lite sets.
  - After clicking on the button, follow the on-screen instructions. You have to create an account.
- About
  - When you click on this button the End-User License Agreement (EULA) appears in a separate window along with the current software version number and card's serial number at the bottom of the window.

RSS

RSS module is a place where information about news , events, promotions and products is sent by the manufacturer. There are five windows on the start screen. Remember that in order to receive it, it is necessary to have an Internet connection.

SHUTDOWN SYSTEM

You have two possibilities here: Shutdown system and Close application.

Clicking on the Shutdown system icon - shuts down and turns off the workstation, while clicking on the Close application icon allows for closing Reckeen 3D Studio application and going to Windows operating system.

Note: After clicking, a window with a warning appears.

8
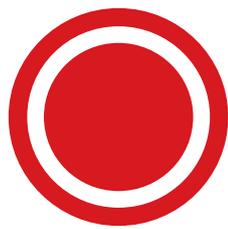
Still Editor

Still Editor - is an additional module for creating text panels, complementary to the Production module. It allows you to create aesthetic and impressive compositions in the form of graphic files with texts, e.g. news tickers. The text panels created in this manner can be used during the program broadcast, for example on the DSK layer. They may contain images created in any kind of graphics program (like a logo) and texts.

It is possible to set all the essential elements of texts: content, type, size, and font attributes. Additionally, you can set the caption's scale and position, choose a color or add a contour and a shadow. Text panels created with STILL EDITOR have a very significant advantage over the graphics prepared in other graphic programs. You can modify their content in real-time during the production stage (in the Production module). It allows you to use them as templates of, for example, news tickers, where you can quickly and easily enter a new content without changing the graphic elements.

After creating the text panel's project, you can save it as a virtustill file or export it as a PNG file.

STILL EDITOR MODULE START

Still Editor module is launched from the start screen. First, choose the appropriate resolution from the drop-down menu, then click on the Start editor button. The image system of your choice should match the system of Production module that will be launched later on. If, for example, the signal format from your camera is 1080p60 (which corresponds with a resolution of 1920x1080), it is recommended to open the editor in the same resolution.
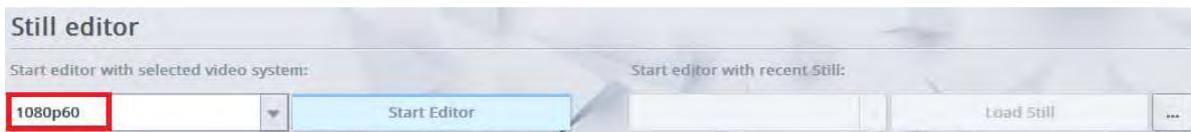
At the Still Editor module startup, you can also load a previously saved file by selecting it from the drop down menu after clicking on the Load Still icon (a list of recently opened files will be displayed) or by searching your hard drive by clicking on the icon with three dots.

APPLICATION SCREEN

On the application screen you can see a characteristic grid in the background. It indicates an alpha channel, that is transparency.

Everything that will be placed on the working area, for example a text, an picture, a frame, or a rectangle, will be visible on a transparent background. The working area is of the same size and proportions as the production screen. This means the text's position and size corresponds to the real view on the screen later.
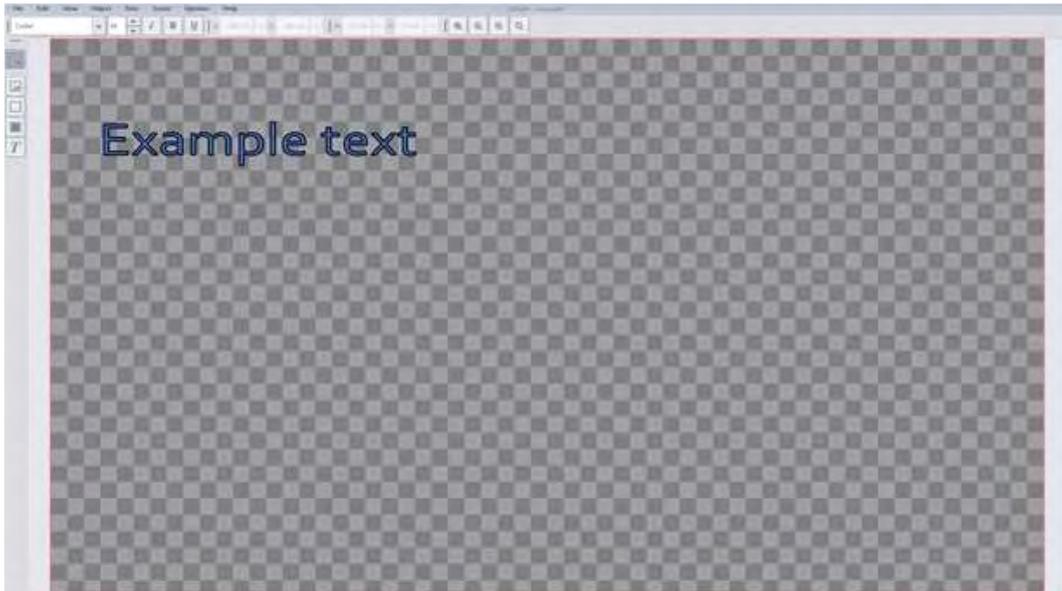
View: application screen

On the application screen, the following can be distinguished:

1. Menu bar,

2. Horizontal toolbar,

3. Vertical toolbar,

4. Working area (image below)
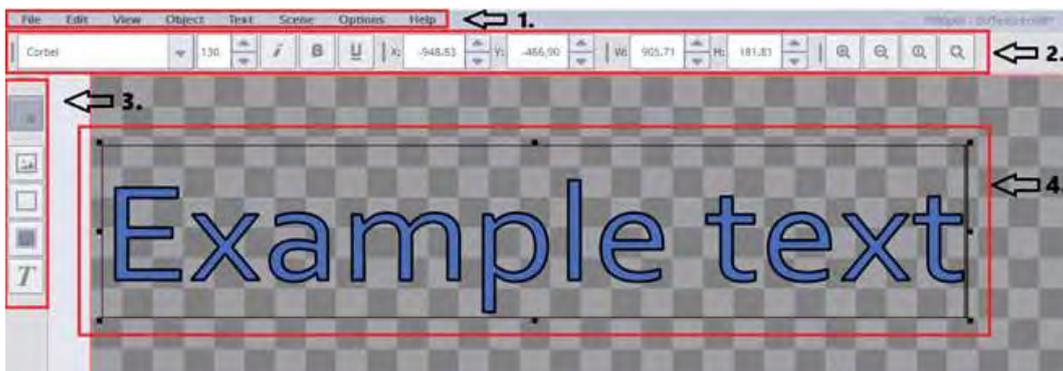
Menu bar

Menu bar is located in the top left part of the screen. You can find 8 main options there: File, Edit, View, Object, Text, Scene, Options and Help.

Horizontal toolbar,

Below the menu bar, you can find a horizontal toolbar. It allows for quick access to tools related to the

text's font (font type, size, italic, bold, underline), positioning of the inserted objects (picture, text, frame, or rectangle), and changes in the view of the scene (zooming in - zooming out).

Vertical toolbar,

On the left side of the screen, starting from the top, a vertical toolbar is placed. Its icons allow for a quick access to editing options - Add: insert object (picture, frame, rectangle, text) and select object mode.

Working area,

In this area, the items (text, picture, frame, rectangle) are placed. What is visible in the working area will later appear on Preview or Production screen. It is therefore important to select an appropriate image system at the start of the Still Editor module, for example 1080i50. Image system in which you are working is displayed at the top of the screen, next to the name of the file.

MENU BAR

Menu bar is located in the top left side of the screen. Below, further sub-options, that show up when you click on the main option, are shown.

MENU BAR – FILE
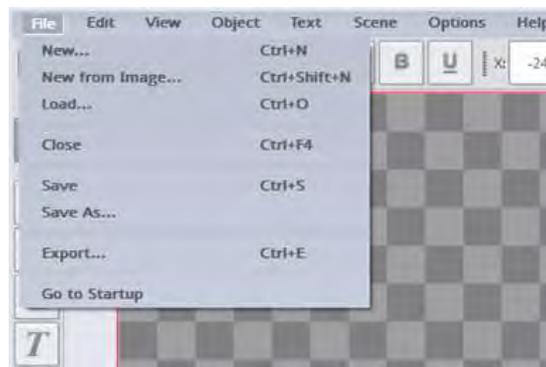
- New - create a new virtustill file of the text panel
- New from Image - to create a new text panel a background of which is loaded from an image file.
- Load - load an existing virtustill file
- Close - close the currently opened file with a possibility to save changes
- Save - save changes to the current project in the virtustill file
- Save As - save the project file under a different name
- Export - allows you to save the project as an image in PNG file with transparency (alpha channel) preserved.
- Go to Startup – quit the editor

MENU BAR – EDIT

All the sub-options are shown in the picture below.
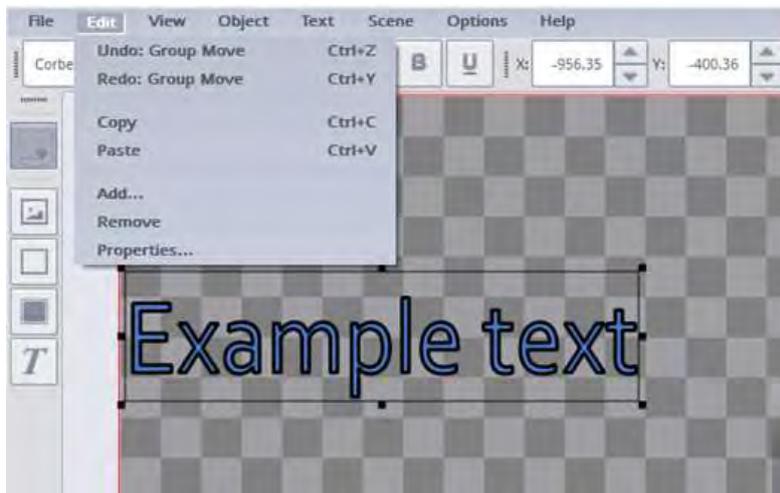
- Undo - Deletes the last change in the editor
- Redo - Reverses the Undo command
- Copy - Copies the last selected item (text, picture, frame, rectangle)
- Paste - Pastes the previously selected item
- Add - Enables inserting objects (picture, frame, rectangle, text) into the working area. For quick access this function is also available in the form of icons on the vertical toolbar. See the next image.
- Remove - deletes the selected item

EDIT - CHARACTERISTICS OF ITEMS: TEXT, FRAME, RECTANGLE AND PICTURE

Properties - after selecting an item (picture, frame, rectangle, text) on the working area, it allows you to modify its properties
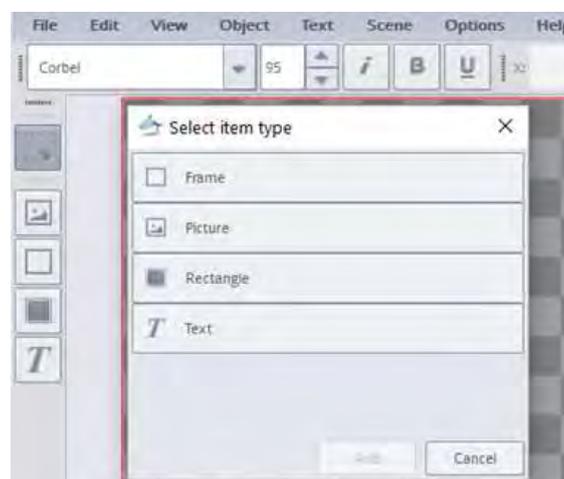
Here, we will discuss in detail the properties of individual items that can be placed into the working area - on the example of Text item. Other items (Frame, Rectangle, and Picture) have the same number or a smaller one of properties.

Text, Outline, Shadow and Positioning functions

After opening Text Properties window, in the upper left corner you can find five main functions to choose from allowing you to edit captions: Text, Outline, Color, Shadow and Positioning.

Text function

In the image below you can see an open window of text item properties with the Text function. In the highlighted box there is a place to enter caption's text that is to appear on screen.

The text can also be entered without opening this window, that is directly on screen with a keyboard, after clicking the left mouse button once on the caption's text .

You can also open the object's options window with a double-click of the left mouse button and enter the caption's text in the edit box. The text's size and font are set by default.
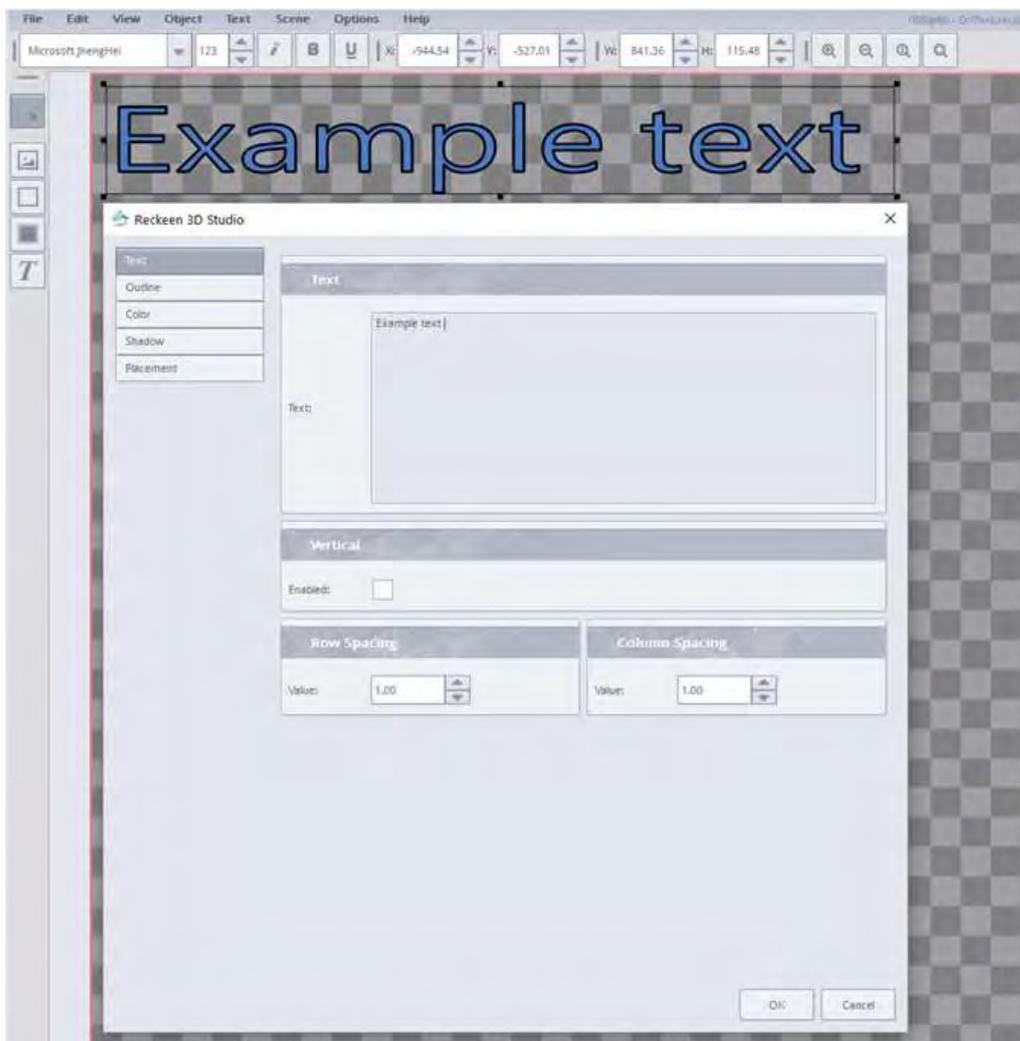
Another way to edit the text is to enable the Vertical option. Selecting this option will result in text's rotation by 90 degrees. See the image below.
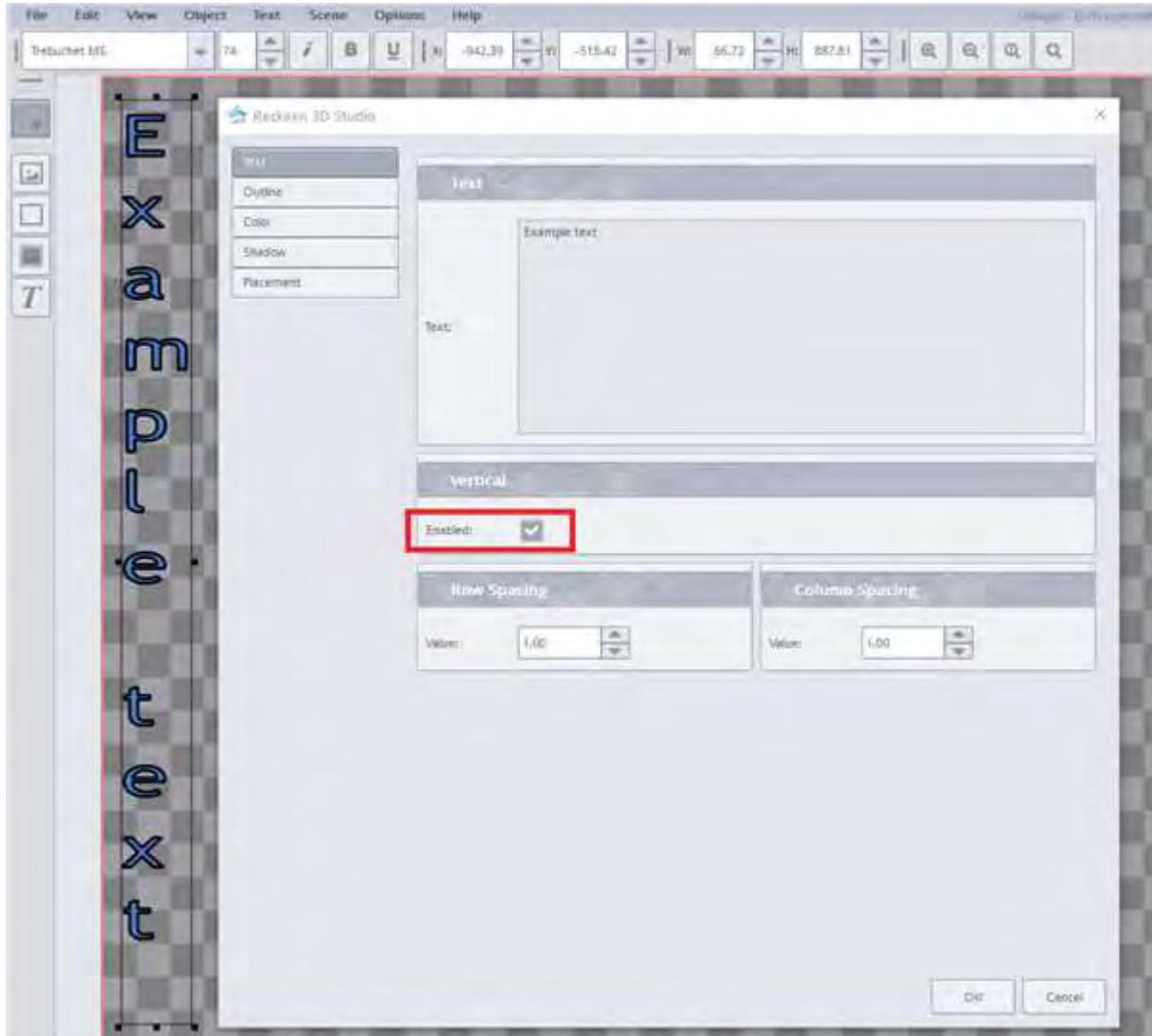
In this window, you can also set the text's Row Spacing and Column Spacing. The values of both functions are set by default to 1.00.

OUTLINE FUNCTION

Outline function allows you to edit captions' contours.

Due to the changing screen background during the broadcast, the entirely monochromatic captions may disappear at certain moments, when the background color is the same as the text's. For this reason, borders are added to the text with a color contrasting with the caption's filling. The most commonly used version are white letters with a black outline, and this option is set as a default when creating texts.

The Outline function enables using different kinds of Pen Styles, that is texts' borders.

We can choose: No Pen - captions will have no contour, or one of the following options: Solid Line, Dash Line, Dot Line, Dash-Dot Line and Dash-Dot-Dot Line.

Width is a next useful option. When you change its value, the width of text's contour changes. See the image below.

Possibility of setting yet another option - Join Style allows you to change the shape of texts' contour. See the image below.

The captions can be more rounded (Round, Bevel) or rather sharp (Miter, SVG Miter). Value of the miter limit can be a be adjusted, if your font and its contour requires so. You can also set the color of the text's contour (border).

The color wheel shown in the picture below is based on the RGB model (Red, Green, Blue) extended with transparency and also Hue, Saturation, Value, and Alfa channel (which is transparency).
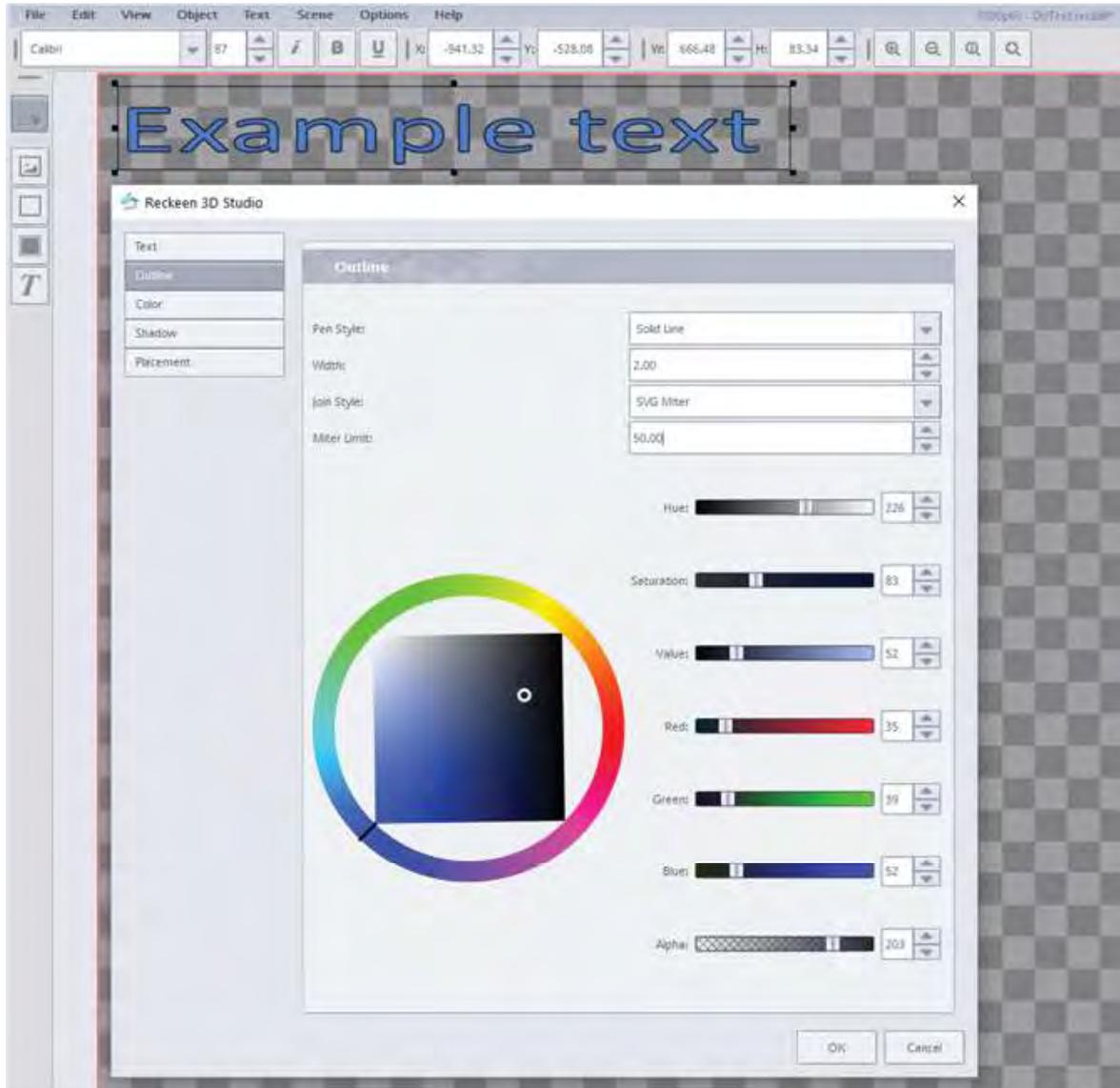
Texts' color can be set using the sliders located on the right side of the screen:

- Hue - the hue parameter corresponds to the colors on the edge of the color wheel, starting from 0 (red), through 120 (green) and 240 (blue) to 360 (red). By changing the slider's value, the position of an indicator line on the wheel is changed.

- Saturation - the value of saturation parameter ranges from 0 (white) to 255 (100% full saturation), by changing its value with a slider, a circle's position along one of the square's sides changes.

- Value - the brightness parameter encompasses the range from 0 (black) to 255 (100% bright color of a given hue and saturation), by changing its value with the slider, the circle's position along one of the square's sides changes.

- Transparency is set with an Alfa slider - the transparency parameter ranges from 0 (fully transparent, invisible border) to 255 (100% full visibility). You can also use the cursor to set all the above values (except the Alpha channel). The cursor has to catch on the line indicator pointed with a lower white arrow in the picture below.

Changing the position of the line indicator on the wheel allows you to set the color by changing the Hue parameter.

If the cursor is caught on the circle indicated by an upper white arrow, you can move it inside the square. This allows you to change all the other parameters apart from the Alfa.

The current color will be visible in the middle of the white circle.
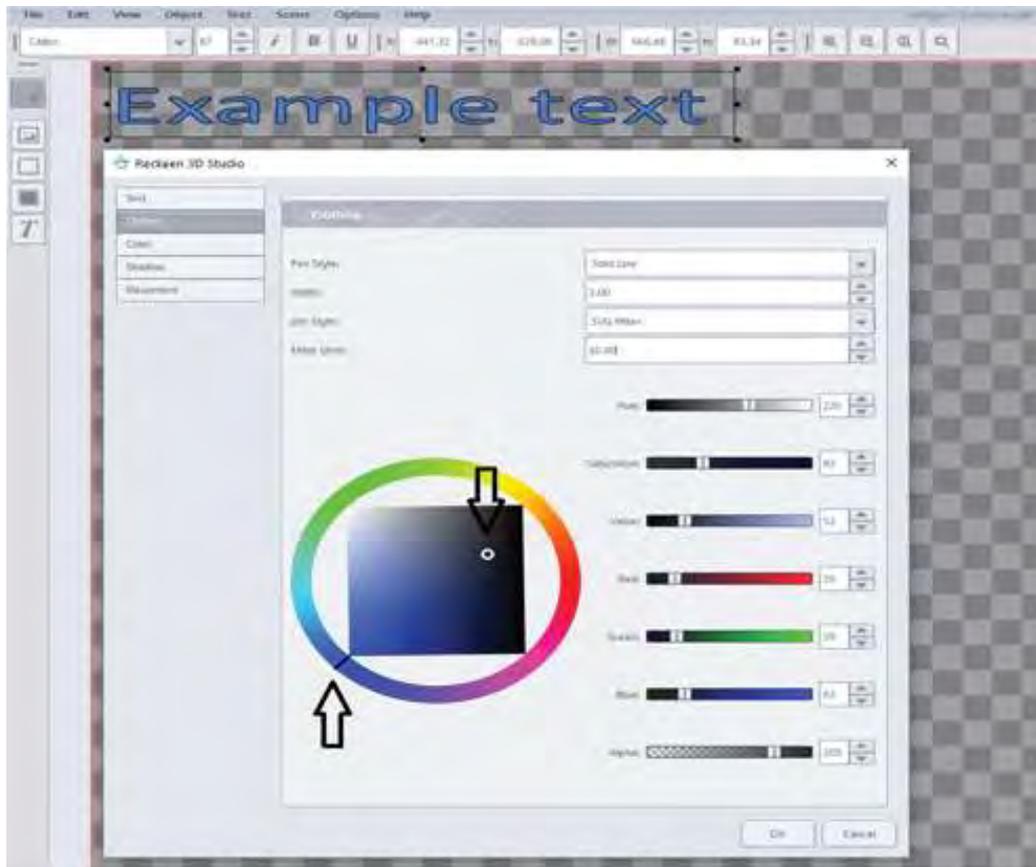
COLOR FUNCTION

Thanks to the Color function, you can design the text's filling, including the selection of a fill color or a fill pattern. See the image below.
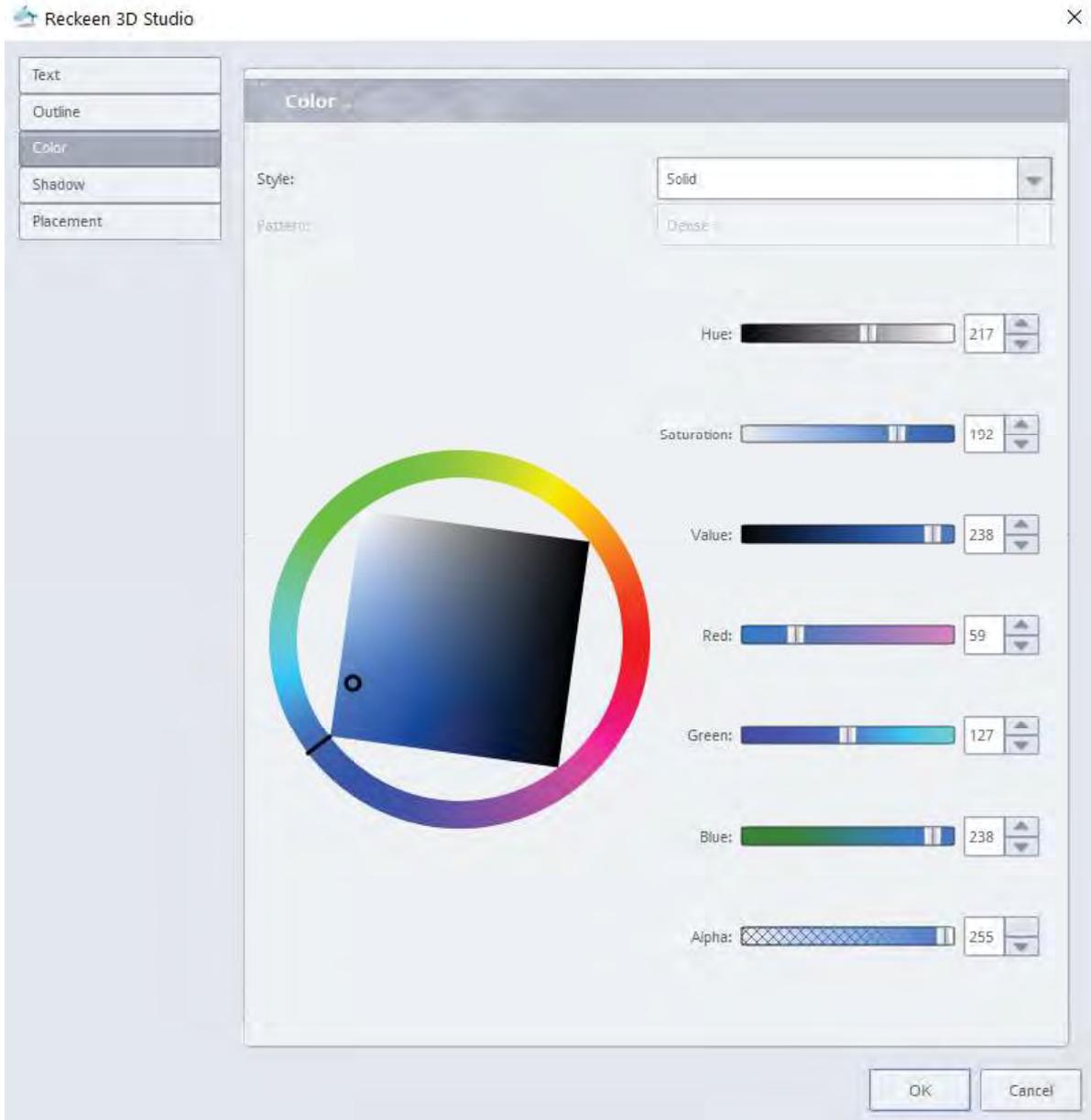
After opening the drop-down list of Style options, you have the following possibilities: (image below)
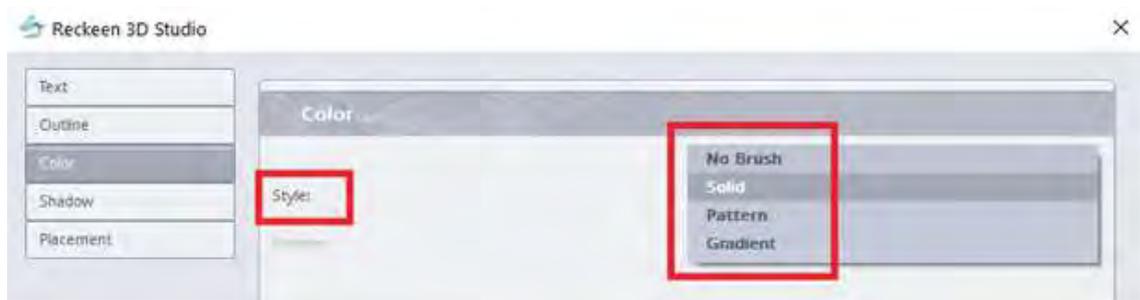
- No brush - the text will be filled with transparency, only the text's contour will be visible on screen.

- **Solid** - transfers you to the color wheel to adjust the text's color, it is done in the same way as described above, when adjusting the text's contour color – Outline (see the image below - arrows indicate the possibility to operate using the cursor)

- **Pattern** - after opening the drop-down list, select the interesting filling pattern. After selecting the pattern, you can choose the color with the color wheel. See the image on the next page.

- **Gradient** - when you choose a Gradient filling style, a window appears, as shown on next page.
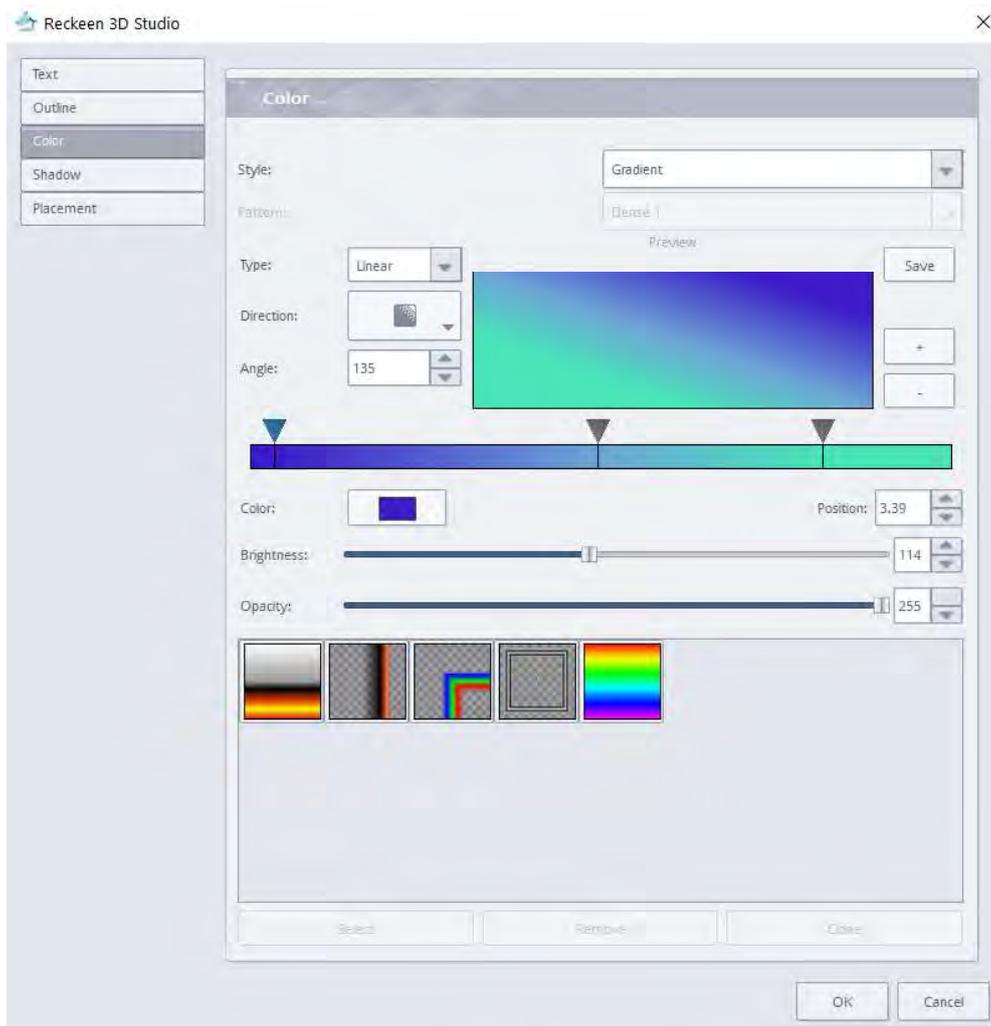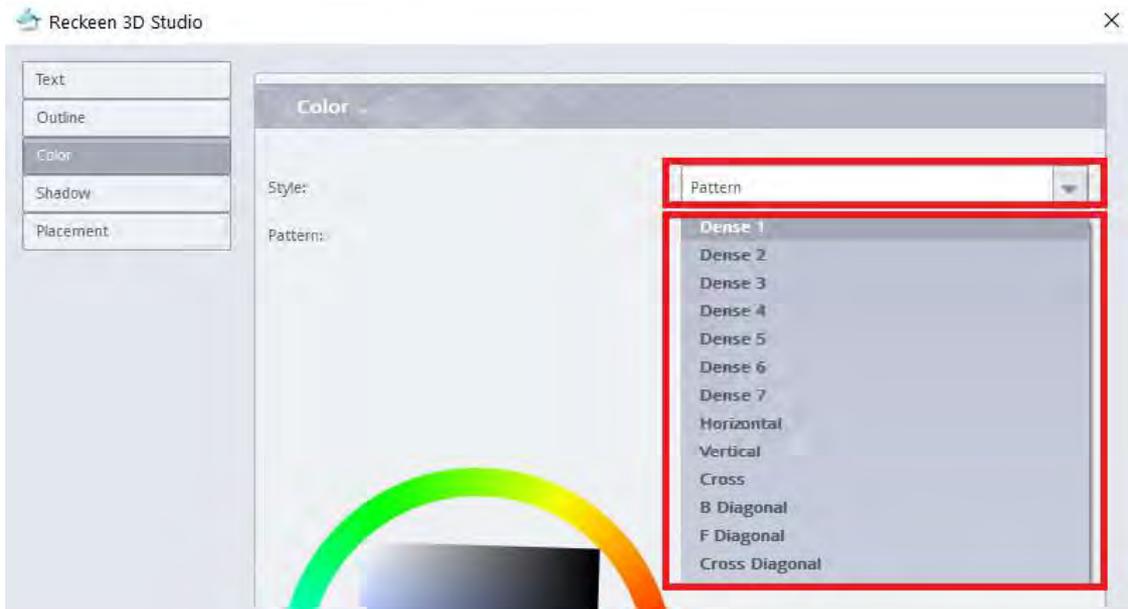
In the case of Gradient, the texts' filling will be of a gradient type selected at the bottom of the window.

Highlight it with a cursor and click on the select icon.

In the Preview window you can see how the gradient will be applied to your text. You can change the proportions of selected areas of your gradient with triangular markers. The markers are positioned at the colors' transitions. The color set with a specific marker will be visible in the Color preview window, when you select the marker with a cursor.

SHADOW FUNCTION

With Shadow function you can design a shadow surrounding the text, its color, radius and offset. See the image below.
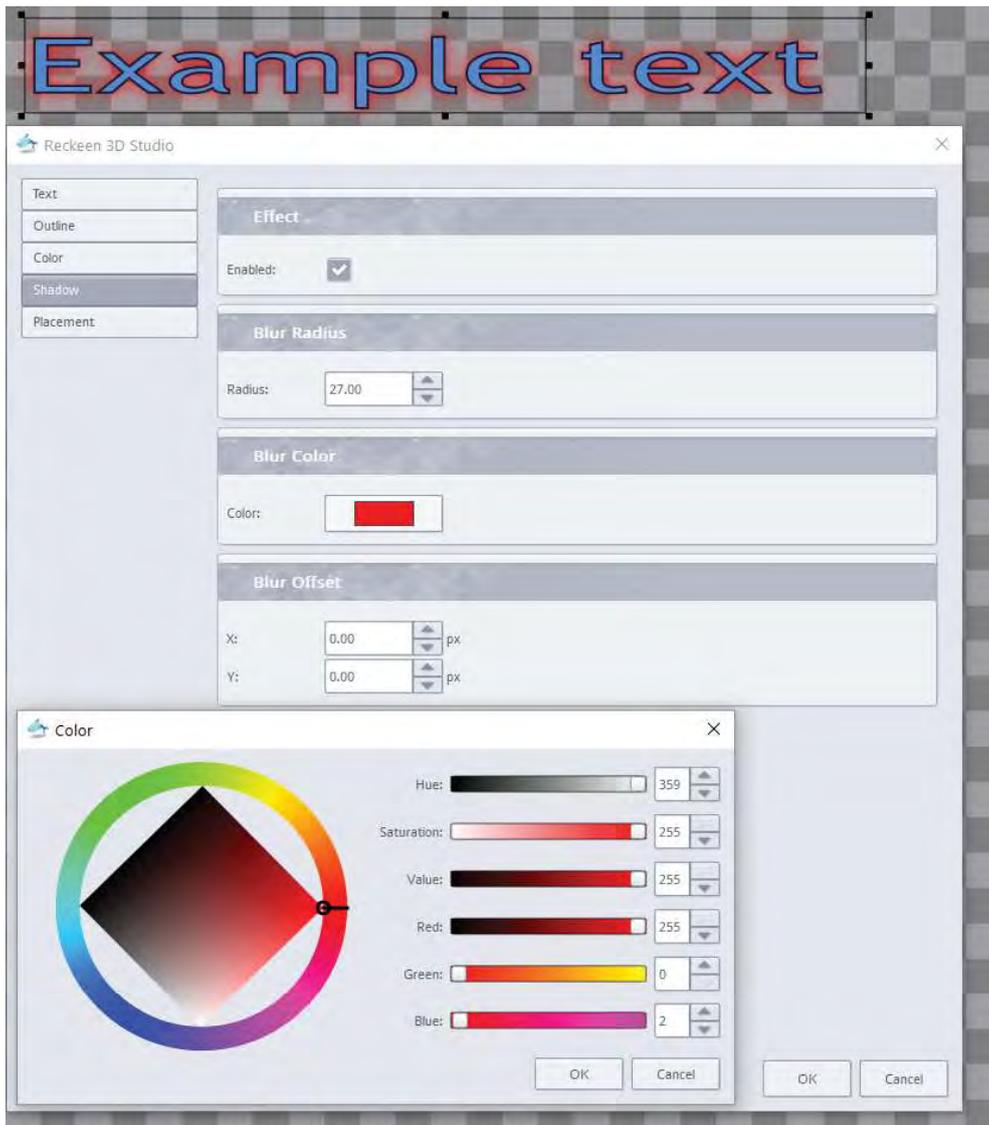
When you enable the Effect field, you can set the Blur Radius, that is shadow's range around the text's contour.

- Blur Offset - allows you to offset the shadow in relation to the text on the screen.
- Blur Color - when you click the color preview icon, the color window, as described above, will appear and you will be able to set the desired color of the shadow there.

POSITIONING FUNCTION

In the Positioning function window, there are several options that enable changing the text's size, its rotation, changing its scale and setting opacity. See the image below.
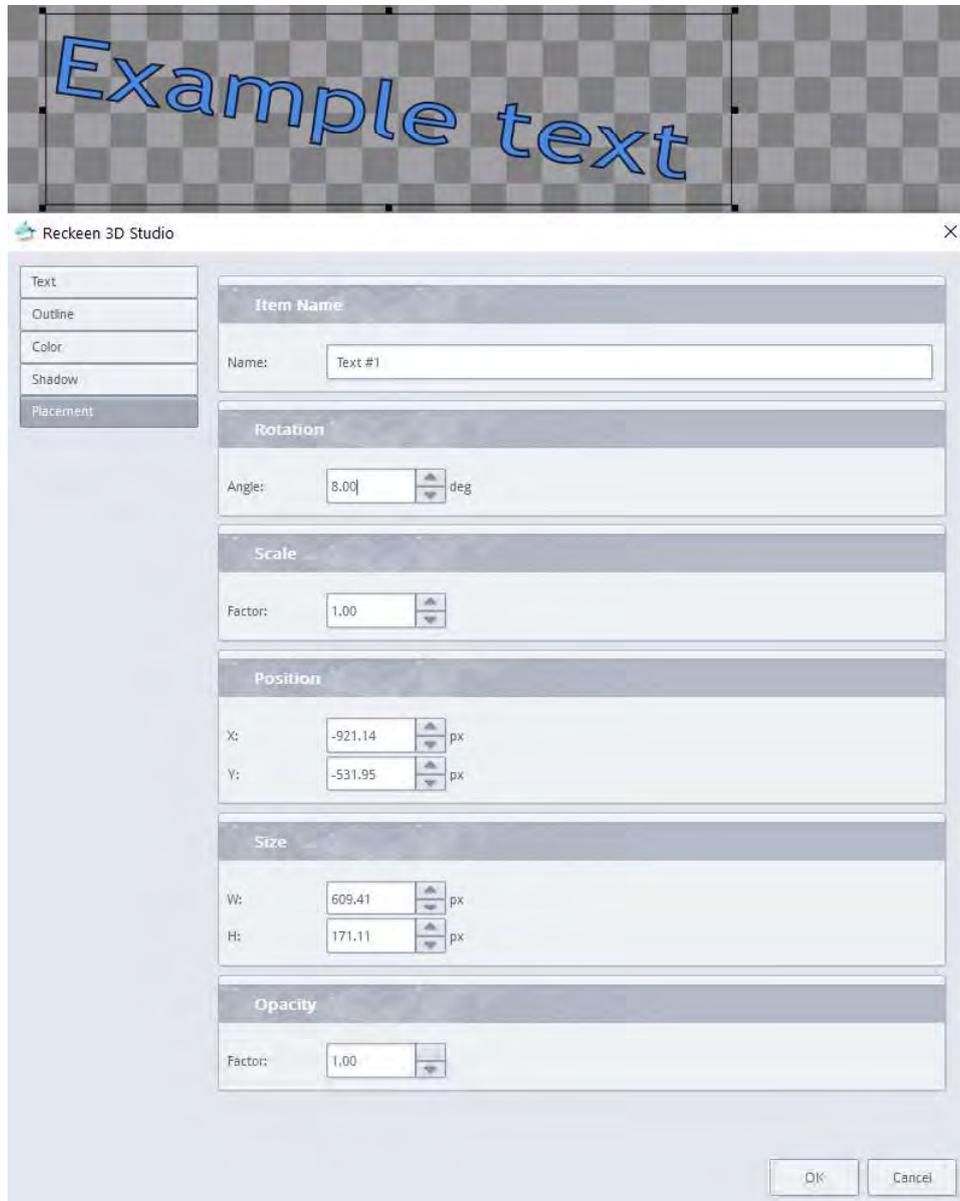
MENU BAR – VIEW

The View option allows you to enable showing the column of color editor or contour editor view at right side of the screen. See the image below - as indicated with a red line.
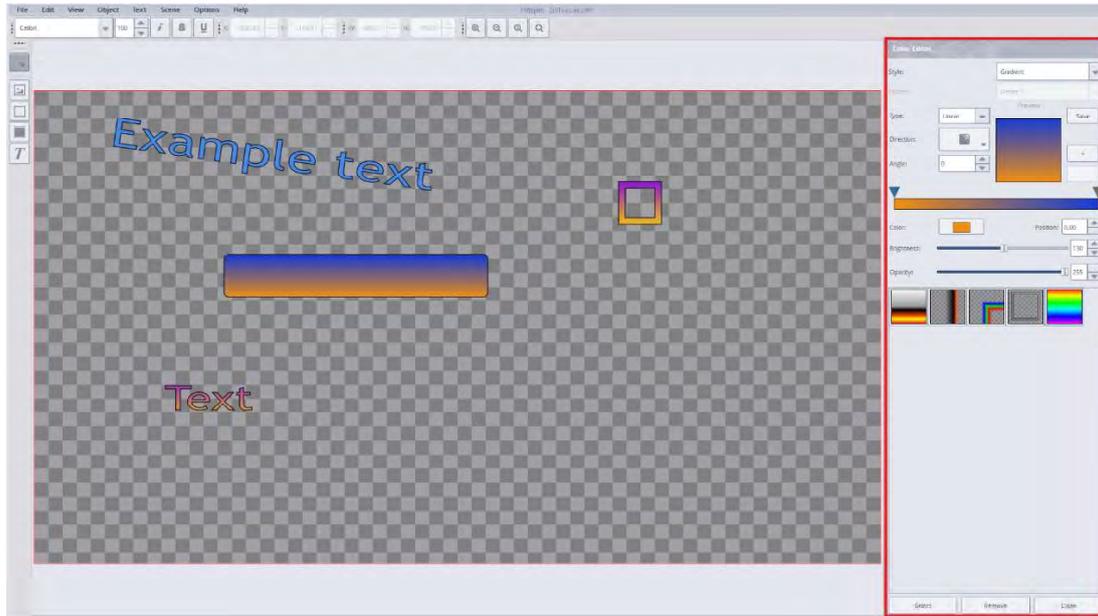
MENU BAR – OBJECT

The menu option Object allows you to determine the order in which objects are visible, in case they overlap.
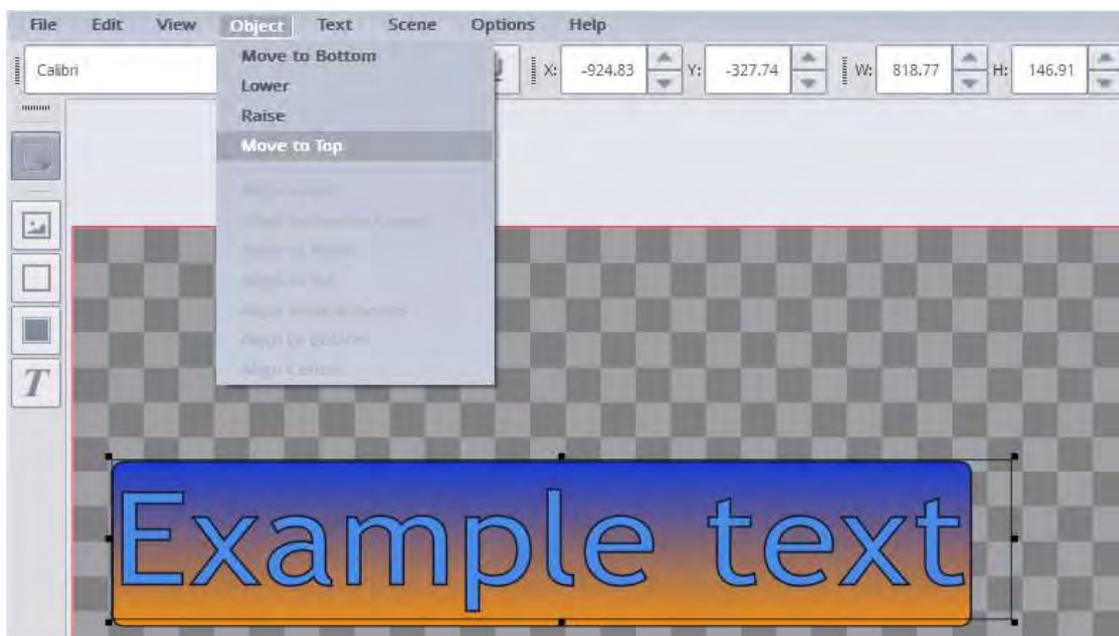
For example, if you want to put a caption on a colored bar (rectangle), you have to move the text to the top, otherwise it will not be visible, as the bar will cover the text.

MENU BAR – TEXT

In this window, you can set all the parameters of the font being used, such as Font type and Size, Font Style (Demi Bold, Bold, Demi Bold Italic and others), Effects (Strikeout, Underline) and you can also select the Writing System. The changes will be visible in the Sample preview window in the lower right corner.
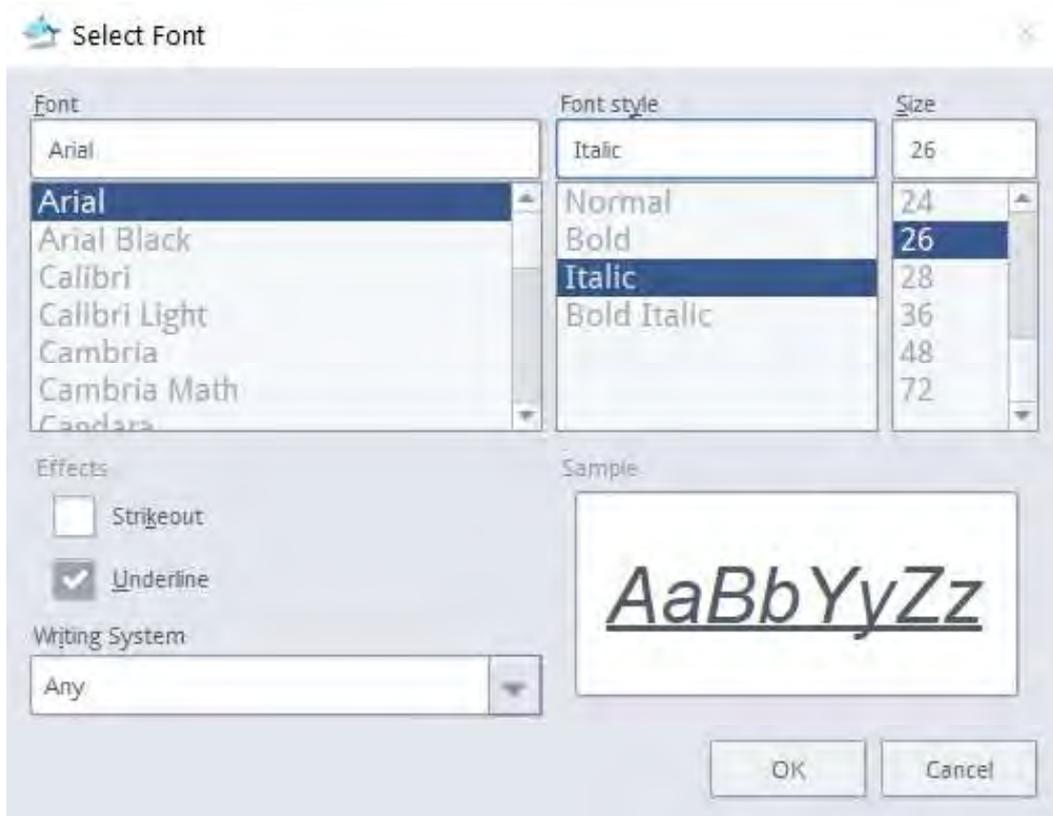
MENU BAR – SCENE

- The Scene Menu option has three sub-options: Properties, Scale and Preview.
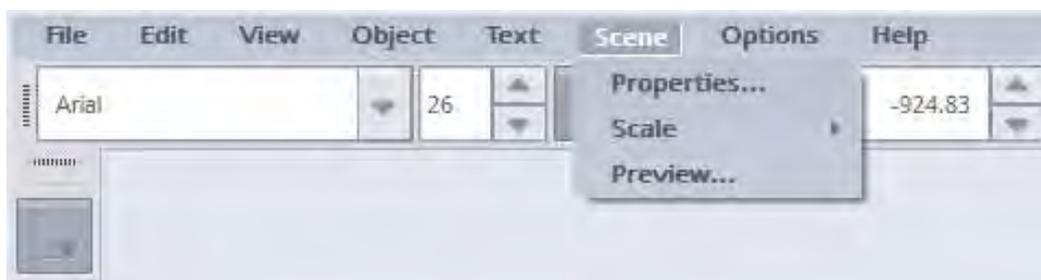
- Properties - this option allows you to change the parameters of the scene's background (Grid). You can change the applied grid's size, as well as the two colors of chessboard squares. See the image below.
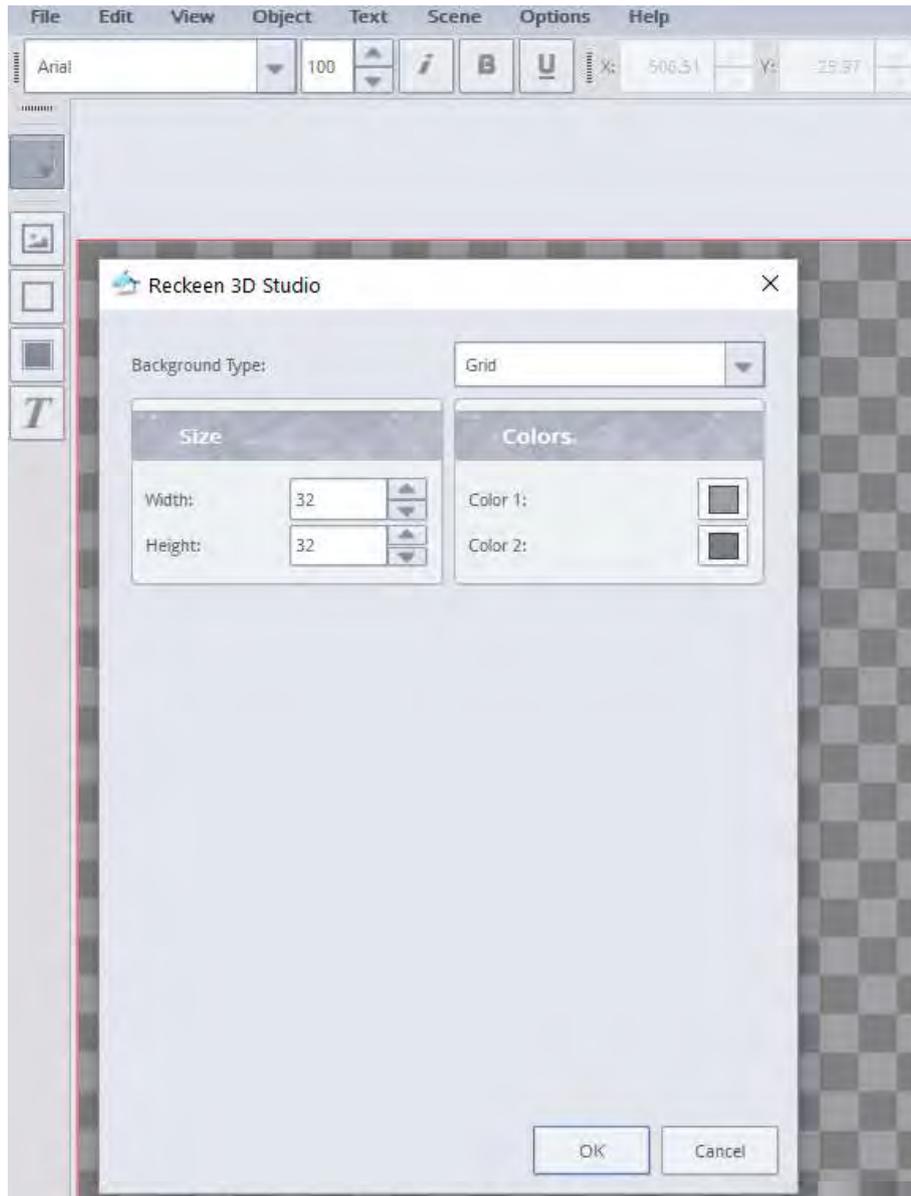
- **Scale** - this option allows you to set the background's scale. You can set the scale ranging from the lowest value of 10% to the highest at 1,000%. The image below shows the scale of 10%.
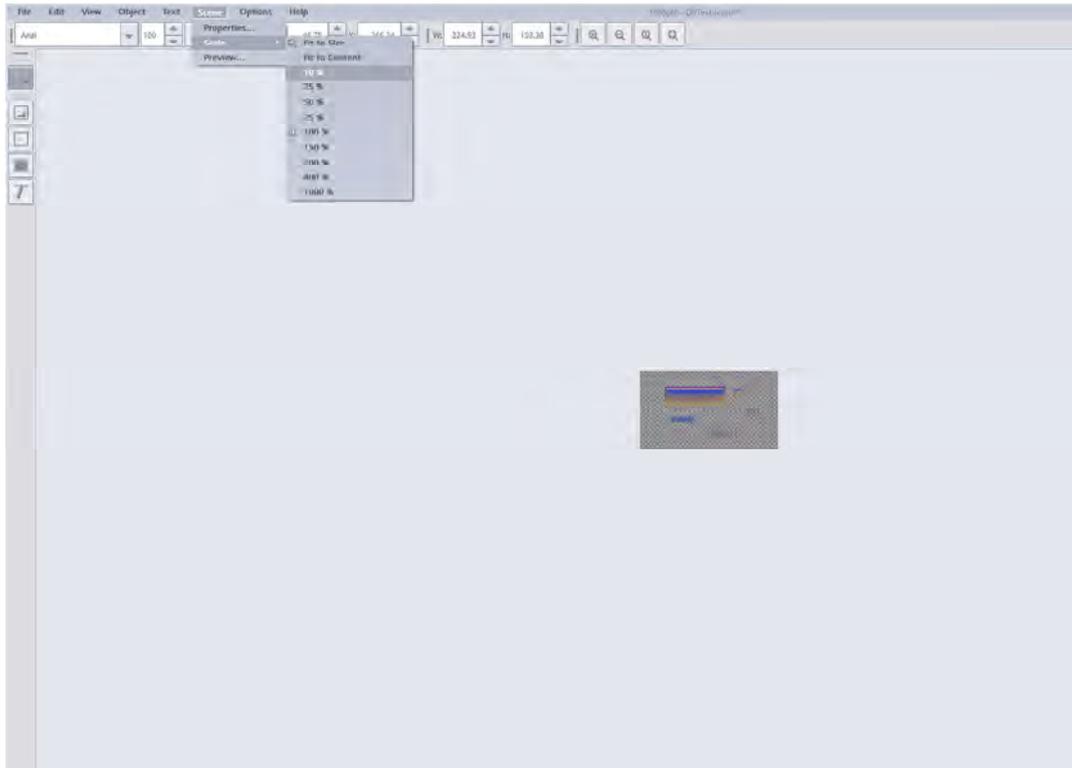
- **Preview** - this option enables the preview of an entire screen during the detailed editing. This way you can check the layout of all the elements. See the image below.
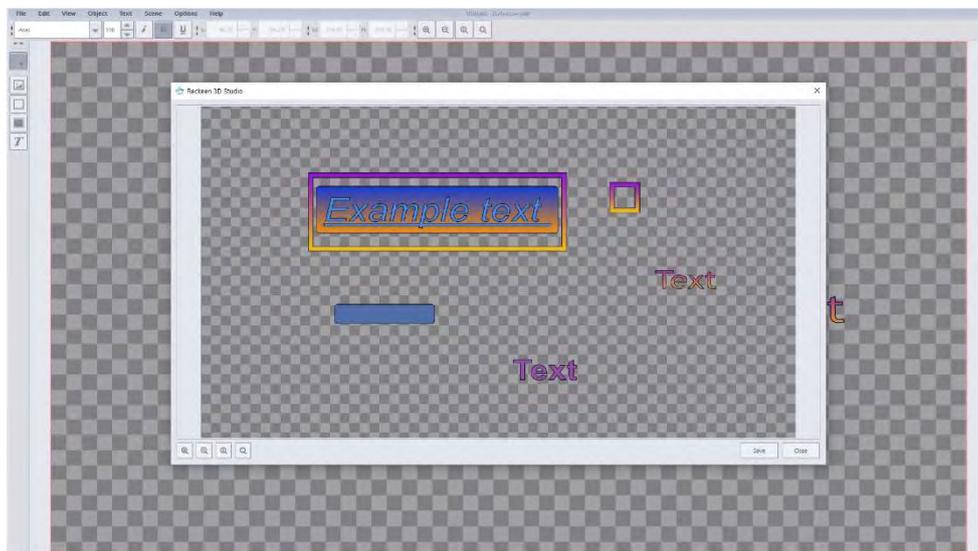
MENU BAR – CONFIGURATION

The Configuration option has two sub-options: Language and Configuration.

The Language sub-the option allows you to change the language of the Still Editor program. See the image below.

The General Configuration sub-option allows you to enable/disable the rendering. By default, the rendering functions are enabled. This allows you to create objects, like texts, in high resolution (quality).

Disabling the rendering option allows you to increase the speed of editing the texts in Still Editor, but at the expense of their quality.
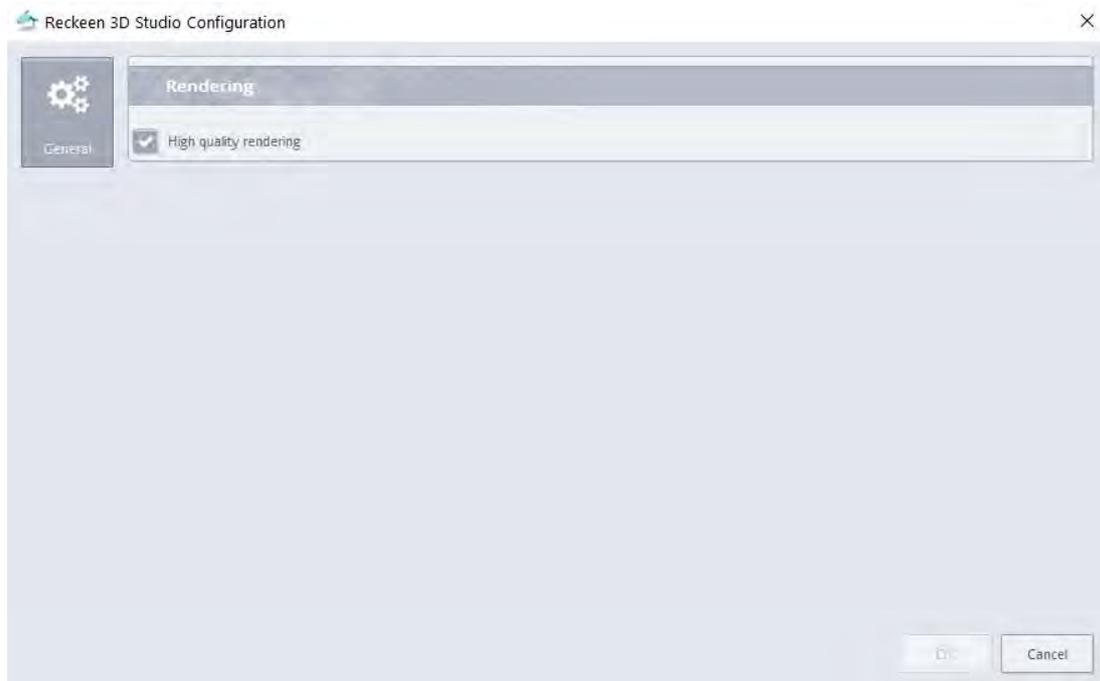
MENU BAR − HELP

Here, you can scan the QR code to open the Reckeen website. When you click on the About the program icon, the End-User License Agreement (EULA) appears in the window, along with a number of the current software version and the card's serial number at the bottom.
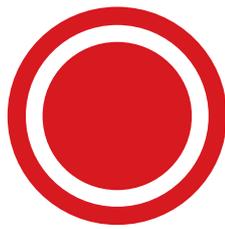
9

3D Production module screen

After clicking on the 3D Production icon on the start screen, the main module of the system appears on the screen. It's a kind of an executive center, where most of the Reckeen 3D system production functions are activated from.

The screen of 3D Production for Reckeen 3D Studio (White Style)
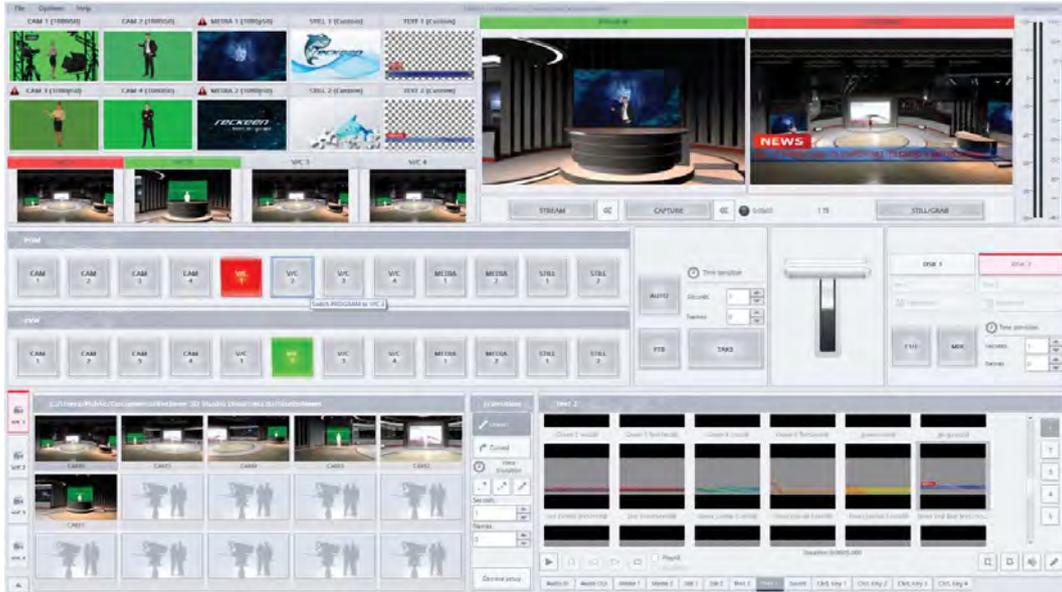
The production screen area can be divided into five main areas, as shown below (Black Style):

1. Toolbar

2. Multiview Panel (previews panel)

3. Vision Mixer (production switcher)

4. Virtual 3D studio Configuration Panel

5. Media trays

TOOLBAR

There are three options on the toolbar: File, Options and Help

Options – File
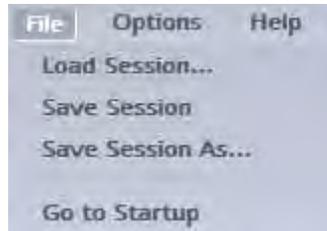
- • File – Load Session . . .   - opens a session file with a previously saved production.
- • File – Save Session   - saves a current production file.
- • File – Save Session As . . .   - saves a current production in a file under a different name.
- • File – Go to Startup   - takes you to the start screen

SESSIONS' STORING

This section will explain which components are being saved in a session.

Session's extensions:

- • For 3D Studio: *.recSession
- • For 2D Lite: *.recSession2D

Structure of saved session

Saved parameters in a session include:

1. File's version (Older software versions may not fully support newer updates - incompatible parameters will automatically be set up to default values)   <Session Version="'1.0.0'">

2. Type and parameters of input sources

   • Pan, Zoom, rightness, Flip Vertical, Flip Horizontal, Contrast, Rotation, Saturation, Hue, Tilt, and Stream setup.
   • Live / NDI (with source path saved) / Media (along with the file path and AutoCue setting).

3. All chroma key parameters for all input sources (type of keying, all faders set-ups, colour picker etc.)

4. Talent configuration: Chroma Key settings, AutoDetect values, shadows settings, and position in a virtual studio.

5. Media Tray content for Media, Still, Text 1 & 2, and Sound - all uploaded files with file paths on a hard drive, MIMO settings for each files and its length. Status of PlayAll Tray for sequences, Loop and AutoCue (on/off)

6. Media Tray clocks' parameters (on/off) for Media 1 and 2, and Still 1 and 2.

7. Audio mixer functions:

   • Solo mode (on/off)

- Channel faders - sound levels
- Audio Follows Video (on/off)
- Type of audio fader settings for all volume sliders
- Mute (on/off)

8. Virtual camera shots positions for each V/C and transition parameters (time and type of transition - Smooth/Linear).

9. Settings' parameters of ABCD mixer sources - position, scale, rotation, Keep/Stretch option.

10. PGM/PVW mixer:

- Sources on PGM/PVW mixer.
- Transition parameters Mix/Take and FX settings with chosen transition effect
- T-bar position.

11. AutoPlay settings on main PGM bus, DSK sources, and ABCD mixer sources

12. DSK 1, DSK 2 - sources, speed of MIX entry, DSK set-up on Preview and Program, position, scale and rotation for a chosen source

13. Triggers' settings for F1-F10 banks, both for simple and advance mode. Parameters of all functions are saved within a trigger.

14. Capture parameters settings*:
- Codec type
- Quality value, bitrate - for default and custom settings.
- File path of captured file.

15. Streaming parameters:

- RTMP - URL, server name, quality settings, user and password.
- NDI - output channel name

Note*: In case of different HD or 4k resolution, the recording quality value is billed proportionally to the given resolution. For example, if the minimum value of 3000 on the slider was set for HD and the sessions file was saved, for 4k format loading this session will set the minimum value but 4k equal to 9000.

Options – Layout

In this option, you can choose the number of screens to display and their arrangement on the monitors.
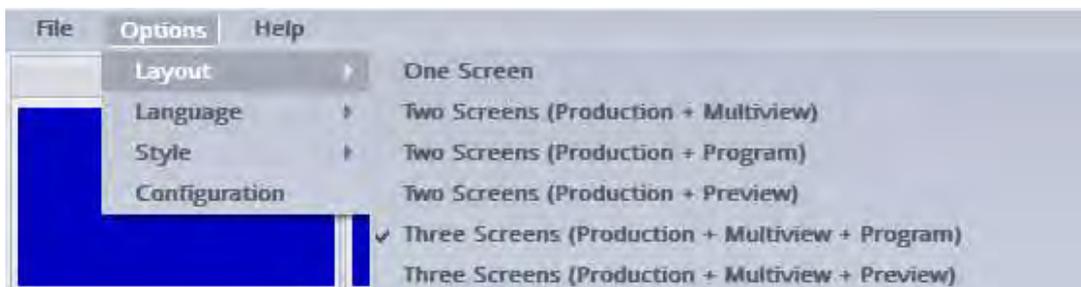
Options - Language

Here, you can set the system language by selecting it

Options – Style

Here, you can choose the color of Style skin : White or Black

Options – Configuration
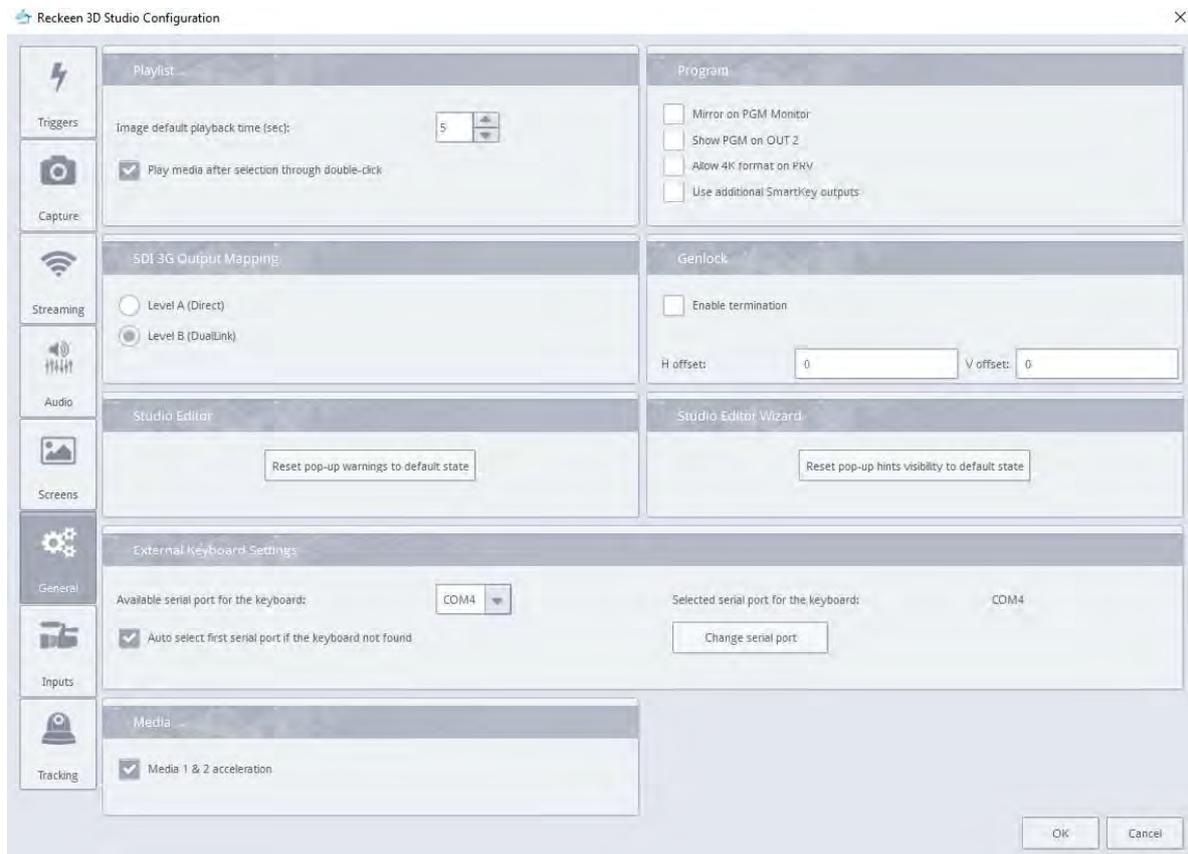
When you select the Configuration option, a window opens with tabs in its left side containing the available categories of settings:

- Triggers - settings of Triggers for the physical PC keyboard or VKEY-100 control panel. More in the section: Control Panel / external keyboard

- Capture – quality settings for recording to a file on your hard drive. More in the section: Capture function

- Streaming - streaming settings. More in the section: Video program Streaming function.

- Audio – audio settings . More in the section: Configuration Window: Audio Tab

- Screens - assigning production windows to monitor screen. More in the section: Setting the displayed content on the monitors.

- General – general system options are described below. Configuration Window see picture below.

- Inputs - replace system inputs as NDI inputs

- Tracking - configuration for PTZ and Tracking setings.
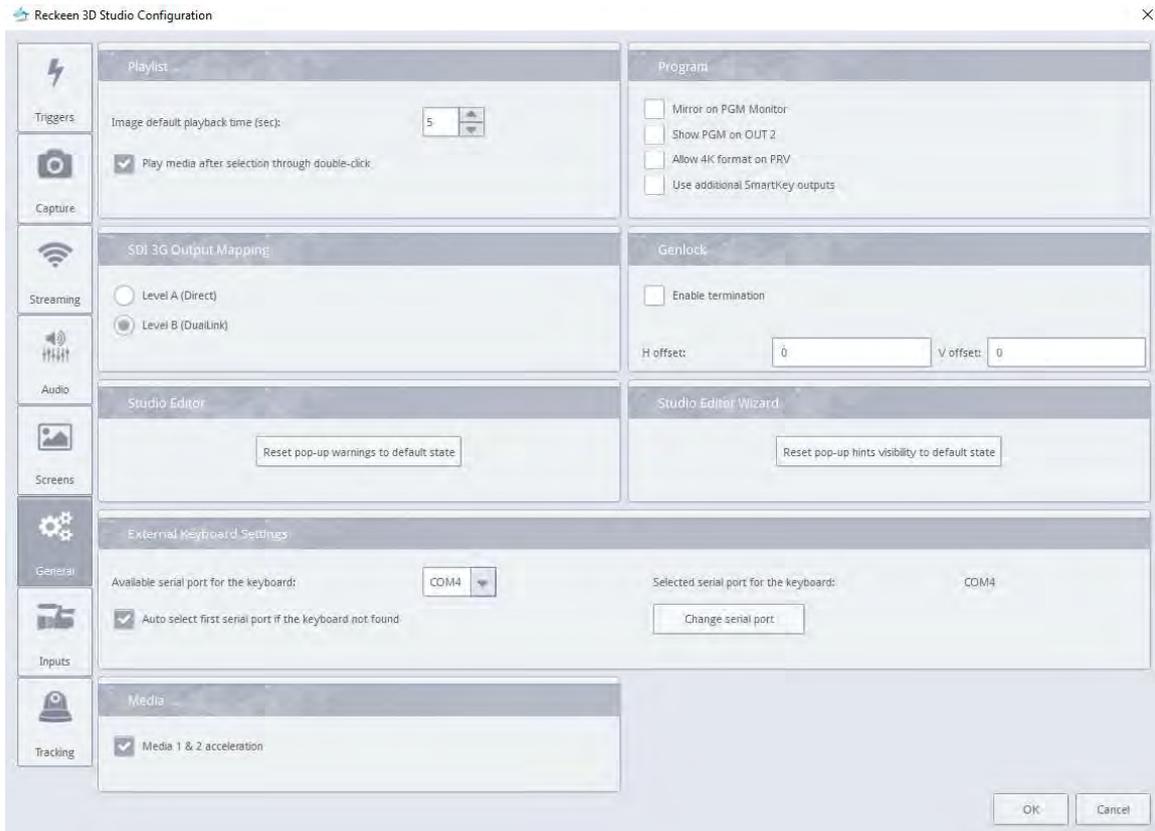
Configuration Window: General Playlist window:

- Image default Playback time - default playback time for still images in seconds.
- Play media after selection through double click, described in the section: Preparing media for broadcast

Program window:

- Mirror on PGM monitor - enabling this feature allows you to view the mirror image on the Preview monitor, giving you the possibility to use it as a preview monitor for the presenter. More in the section: Setting the displayed content on the monitors.

- Show PGM on OUT 2 - in Reckeen 3D Studio as a default, a signal corresponding to PGM is set on the first card output and a signal from PVW is set on the second card output. After selecting Show PGM on OUT 2 function, you get the PGM image also on the second output.

- Alow 4K fromat on PRV (only with 3DSproX8) - limits the PRV output format to FullHD resolution. By default, this option is enabled, which means that the PRV outputs are signals in FullHD resolution. Limiting the format to FullHD has an impact on system performance and FullHD is recommended if these outputs are not used or 4K format is not necessary.

- Use addtional smartkey output (only with 3DSproX8) - allows you to disable SmartKey 1-4, SDI outputs.This is recommended if you are not using these outputs. Thanks to this, the sytem gains additional efficiency because no transfers are made to these outputs.By default, these outputs are turned off.

SDI 3G Output Mapping window:

- When the Reckeen 3D Studio system operates in 3G format (1080p), you have two possibilities of

SDI output operating modes: Level A (Direct), Level B (Dual Link). If you want to convert SDI signal to HDMI, or your monitor requires a suitable signal mode (Direct or Dual Link), you must select an appropriate option.

Studio Editor:

- Reset pop-up hints visibility to default state - described in the section about Performance

Studio Editor Wizard:

- Reset pop-up hints visibility to default state - described in the section about Wizard

MULTIVIEW PANEL

In the Multiview area, in the windows at the top left of the screen, you can display image from cameras or every video signal source and other multimedia files . There are two preview windows on the right side of the production screen:

PREVIEW (caption on the green bar) and PROGRAM (caption on the red bar)

- PREVIEW - presentation of an item chosen to broadcast next
- PROGRAM - presentation of a currently broadcasting signal (system output)
  Mulitiview view on the production screen for Reckeen 3D Studio, as shown below.

Description of Multiview view elements

Cam 1	Preview window of a camera 1
Cam 2	Preview window of a camera 2
Cam 3	Preview window of a camera 3
Cam 4	Preview window of a camera 4
Media 1	Preview window of a video file 1 from the hard drive
Media 2	Preview window of a video file 2 from the hard drive

Still 1	Preview window of a still image 1 from the hard drive
Still 2	Preview window of a still image 2 from the hard drive
Text 1	Preview window of a text panel 1 from the hard drive
Text 2	Preview window of a text panel 2 from the hard drive
Preview	Preview window of a program prepared for broadcast
Program	Window with a preview of program's current production
Stream	Icon enabling online streaming of a program
Capture	Icon enabling recording of a program to the hard drive
Still/grab	Icon enabling saving a single PROGRAM image frame to the hard drive
Volume & Set volume	Two vertical bars showing Audio output signal level and a slider controlling the Audio output signal level
V/C1	Preview window of a Virtual Camera V/C 1
V/C2	Preview window of a Virtual Camera V/C 2
V/C3	Preview window of a Virtual Camera V/C 3
V/C4	Preview window of a Virtual Camera V/C 4

Multiview view can be set on a separate monitor in order to facilitate the operator's work. See: Additional monitors support.

Multiview view on a separate monitor for the Reckeen 3D Studio system.
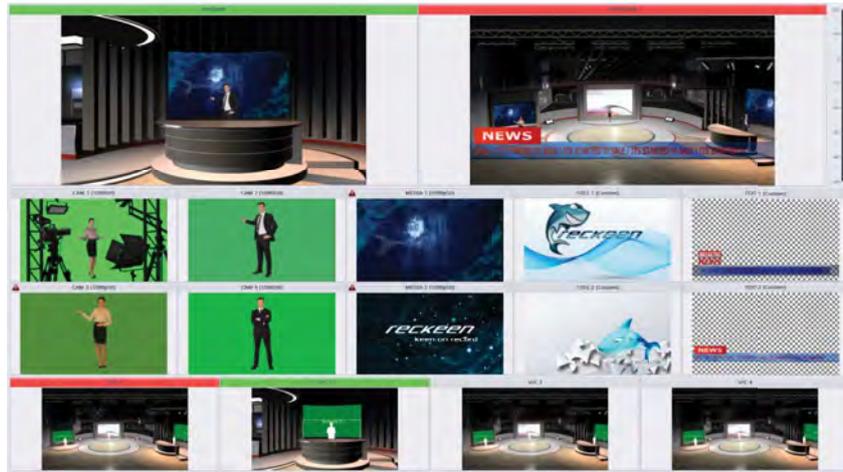
OVERLOAD

Up to 4 signal sources in the FULL HD format, i.e. 1080p60, can be connected to the Reckeen system's input card.

Depending on the system version, it can support two 2160 p30 input signals or 2160p60. The 2160p30 resolution is equivalent to the need to process twice as much data as with 1080p60. If you connect one 2160p30 signal to the system, you can connect only 2 additional signal sources in FULL HD format to two other sockets. In the case of connecting another source to the card's input, an "Overload" graphics will appear on the display. Such a signal source will not be supported in the system.
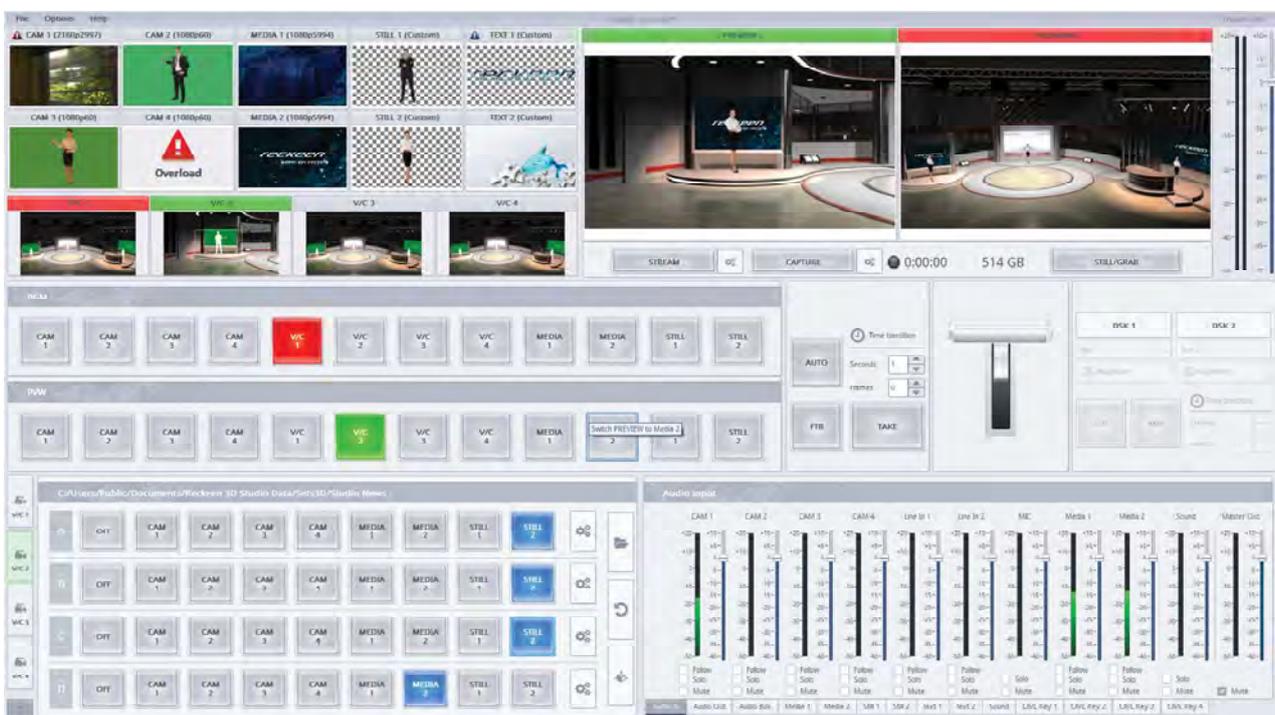
Warning !!!

If OVERLOAD appears on the input preview, it is necessary to physically disconnect such source from the Reckeen system.

The maximum system throughput is checked each time a source cable is plugged in and a correct communication with the Reckeen system occurs. Priority is given to a source a signal of which is detected first. NDI inputs do not participate in the calculation of the physical inputs' allowed transfer and are governed by their own rules described in the NDI STANDARD section.

Possible system configurations:

- 4 inputs x1080p60

- 2 inputs x2160p30 (card type 4x HDMI)

- 1 input x 2160p30 and 2 inputs x1080p60

- 1 input x 2160p60

for 3DSpro X8 - Input bandwidth is twice as high, see chapter Connections - Reckeen 3DSPRO X8 inputs/outputs for details

SYSTEM PERFORMANCE

Many parallel processes are responsible for the performance of the system.
Which include the following factors: Hardware configuration, software version, resolution in which we produce.

Hardware configuration:
Depending on the period of purchase of the system, the system has different generations of CPU from the 8th to the 11th generation, DDR memory speed and bandwidth up to 2660 MHz up to 3200MHz, GPU from Radeon 580/5700XT to 6800XT. From software version V1.6, the recommended and required GPU card is the RADEON 5700XT.

Software version:
Each subsequent version of the software brings additional possibilities, but also increases the requirements for hardware support, if you want to use all possible functions at the same time.
The Reckeen system does not limit any scenario of using the system and its configuration. It is the user who guarantees the correct preparation of the project that will not exceed the system performance.

Design resolution:
Performance is affected by: the complexity of the 3D scene, the amount of textures, materials, and GPU memory usage. The amount of media, their resolution, the codec format used. Number of input streams functions such as chroma key, smartkey, NDI, NDI streaming, Streaming, Capture. All the above elements are an exponential function of the resolution in which the project works, remember that 4K p60 resolution is 4 times more than fullHD.
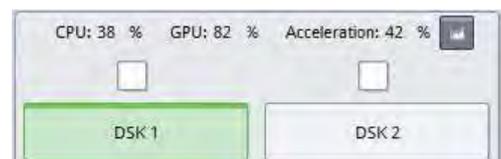
PERFORMANCE MONITOR:

From version V1.8, the system offers a performance monitor that measures and presents the instantaneous power demand for CPU, GPU, Acceleration. This version also brings support for playing files implemented in hardware, i.e. media acceleration, which is described in more detail in subsequent chapters, such as Inputs or Media tray. The acceleration process is performed on the GPU graphics card, shifting most of the computation related to media
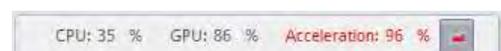
playback from the CPU to the GPU.

The performance monitor is located on the main panel above the DSK buttons, it can be reduced to a single icon and when pressed it expands the remaining indications.
picture below:

How to use GPU, CPU and Acceleration - Performance Monitor:

After configuring the scene and the entire project, check the power demand on the performance monitor. We also recommend that when creating a project, pay attention to the monitor's performance indicators and thus learn what resources are used depending on, for example, the media used and their resolution.

If the efficiency of all processes does not exceed 80 - 90%, the system will be very stable.

Monitors indicate that the power consumption has been temporarily exceeded by 90% by flashing red, but this behavior is still acceptable. However, we recommend that you set the process below 90% during production.

Exceeding over 100% (the maximum value of the indicators is 100%) may result in the loss of the frame at the system output.

What can we do in case of system overload.

GPU

If the monitor value indicates overload in the GPU area - 3D Scenes - you should consider optimizing the 3D design. Another solution is to change the graphics card to a stronger one, in which case you should contact the service. Please also read the section 3D performance, which describes the more detailed monitor available in the **Virtual 3D studio editor** that determines the occupancy of your 3D project. This will help in possible evaluation before optimizing the 3D scene.

Support for decoding on the GPU is implemented in a separate decoder created for this purpose, although it is a separate unit that does not take up the scene rendering process, because it shares memory with the GPU, Acceleration also reduces the redirection power of the graphics card, it is not a big value however, this fact should be taken into account in the final configuration of the project.

- If possible use the same VC for PGM and PVW:

When rendering a scene, System 3D generates it in the required number of FPS frames, i.e. from 30, 50 or 60 frames for PGM and independently the same number of frames, i.e. up to 60 for PVW, which gives a total of 120 frames at maximum FPS. The system generates this amount only if the PGM out content is different from PVW. Working on one common VC for PGM and PVW, we reduce the demand for GPU card power, but we achieve it at the cost of limiting the production functionality.

CPU <-> ACCELERATION

As we described earlier, acceleration frees the CPU from this task, so if your project has a high load for Acceleration and a small load for the CPU, we can trigger the opposite process by turning off acceleration for playing files in "Inputs" or "Media trays". This is described in detail in the sections on these beats like "Inputs" and "Media tray".

Disabling media acceleration automatically transfers the indicated processes to the CPU, increasing its load and releasing the Acceleration load. In this way, we can strive to distribute the media playback processes in a balanced way for the CPU and Acceleration.

However, please try to leave more free power for the CPU because it is also responsible for other work processes of the entire system. Acceleration only for media playback.

10
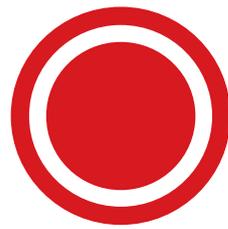
Inputs, their configuration and correction feature

We're going to describe new features regarding inputs, their configuration and correction feature.

In the system there are 4 physical inputs, and 2 media signals available. Their preview can be found on the production screen. On top of each input window you can find a gear symbol. If you click on it, a window will appear where you can configure input's setup. Picture below.
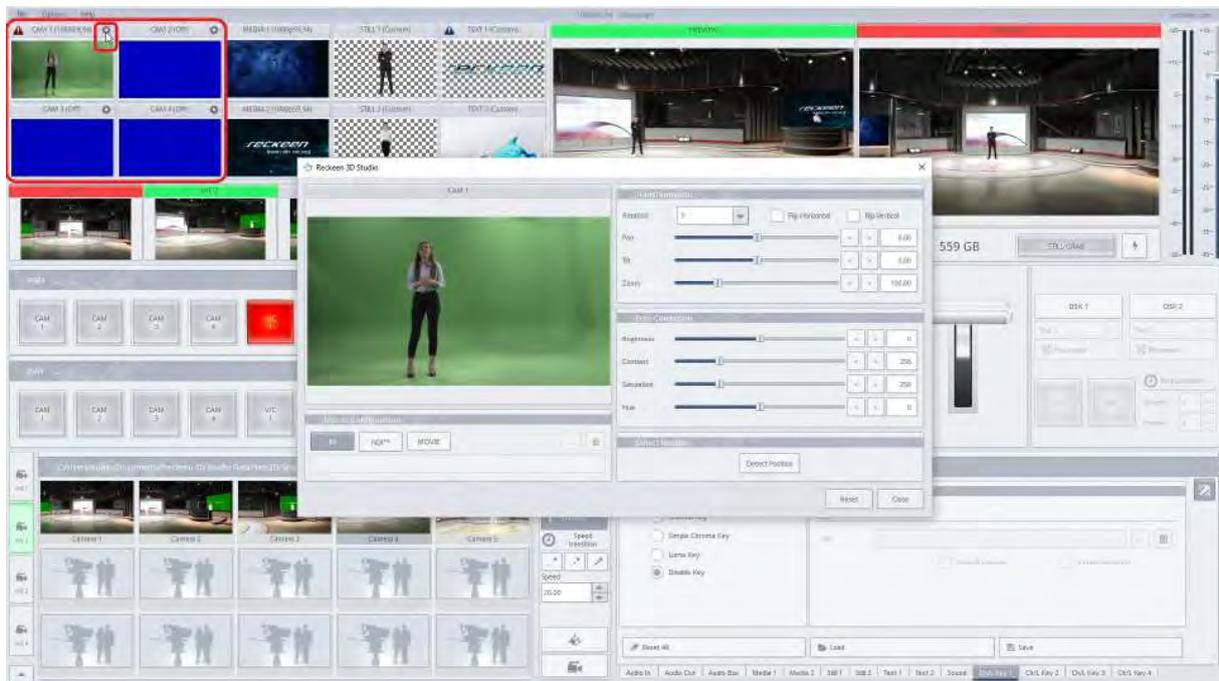
As an input signal you can choose a physical SDI or HDMI input marked as IN, an NDI stream from a local network, or a video file from a local disk. CAM inputs can now support the same formats as MEDIA inputs. We're choosing a physical input IN.

TRANSFORMATION

On the right side of the window we can find configuration features: Transformation and Correction. Picture below.
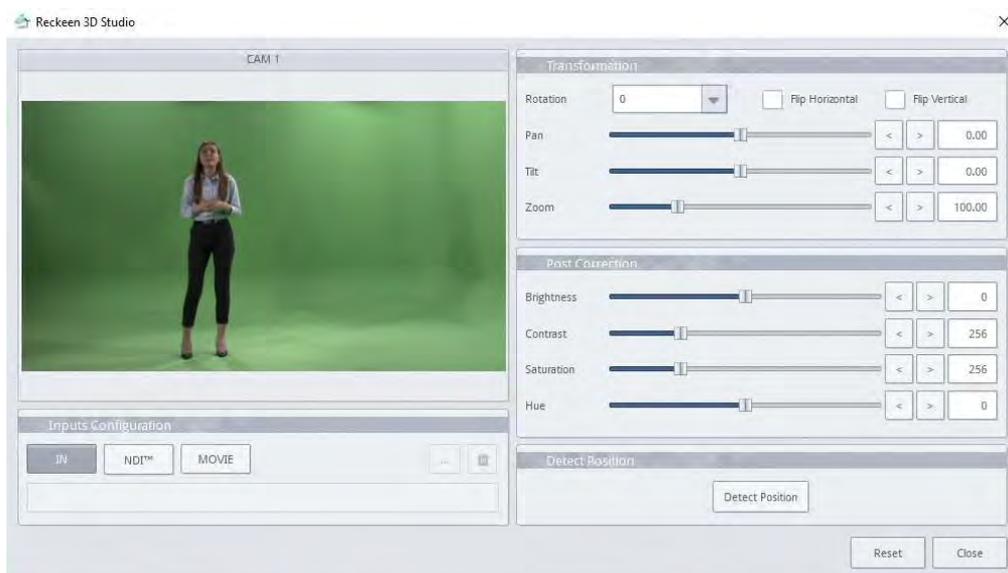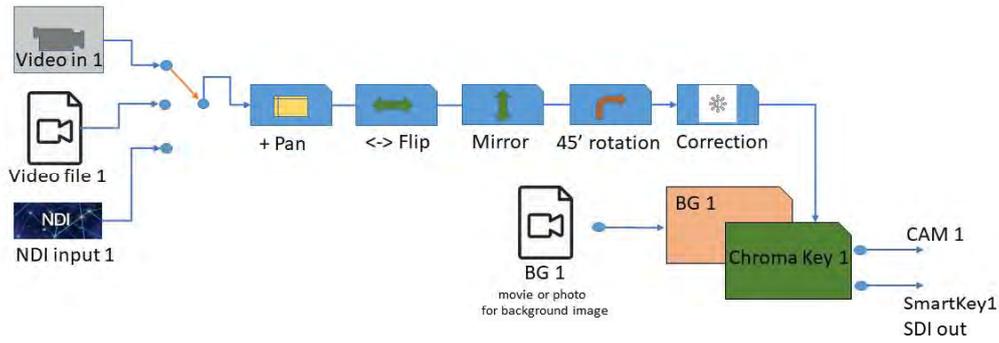
First slider "Pan" allows to move an image right and left. Blank spots will be filled in by transparency – if signal is used as a talent, or with black - if the signal is used as a SCREEN. Picture below.

Second slider "Tilt" moves an image up and down. Picture below.
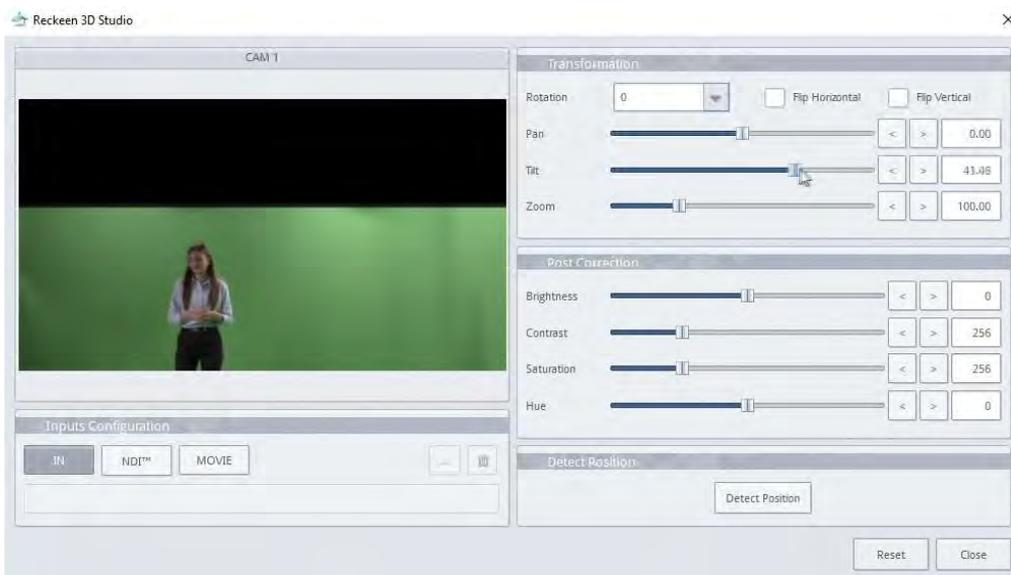
Slider "Zoom" allows zooming and image in and out. The sliders can be used together or separately, depending on the needs. Picture below.
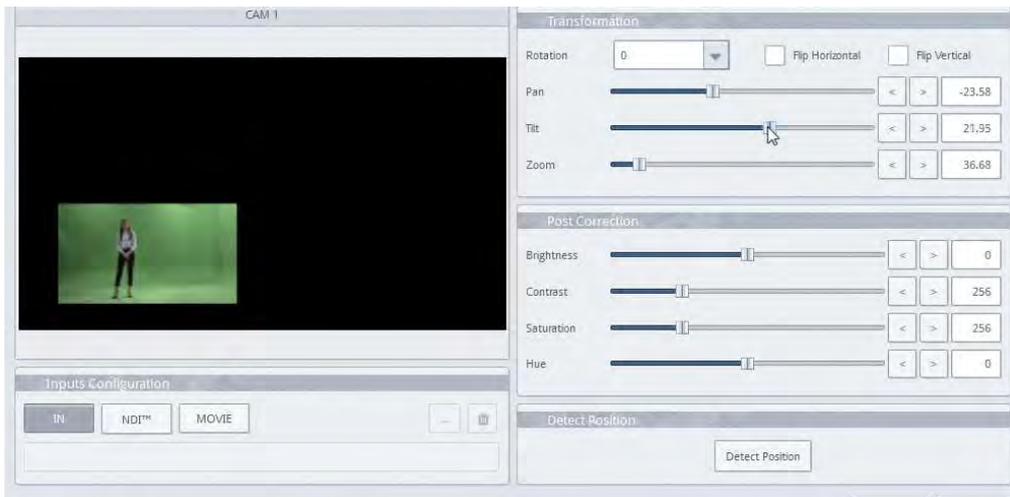
Above the sliders we can find checkbox for horizontal and vertical flip. Let's have a look at how they work flipping, mirror image horizontally or vertically. Flip vertically . Picture below.
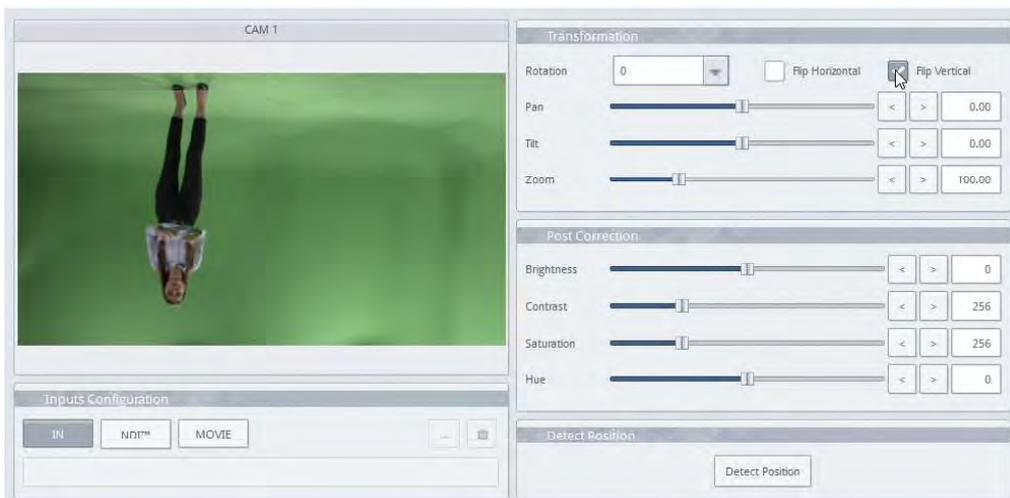
Another function visible above the sliders is "Rotation".

We're going to use a sample media file. To achieve better quality of an image, we can film a talent with a physical camera being rotated by 90 degrees. Picture below.

That's why we now need to rotate the image back by 90 degrees to a proper position. Picture below.
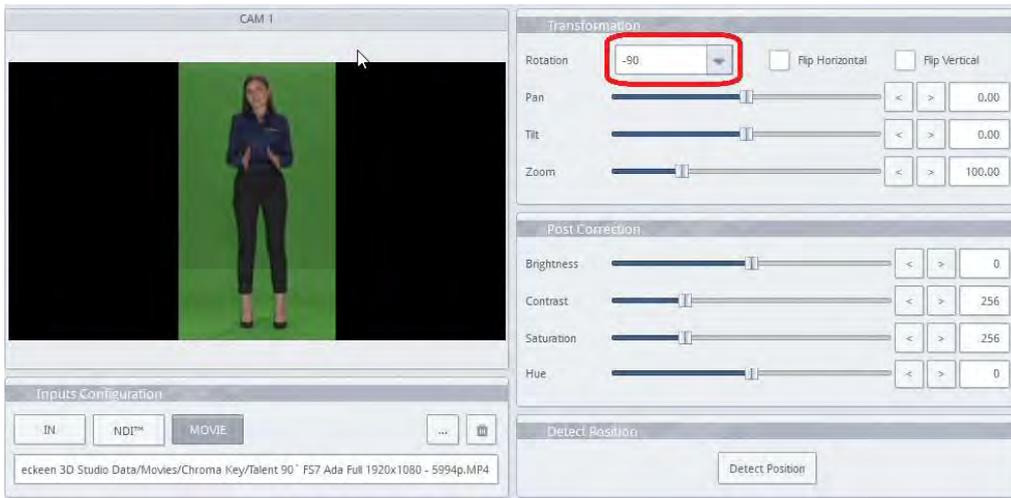
POST CORRECTION AND DETECT POSTION BUTTON

Let's have a look at correction features. If a Chroma Key on a CAM input is on, those functions will be inactive. Now keying for CAM1 is off, therefore the sliders are active. Here we can change the intensity of BRIGHTNESS. Picture below.
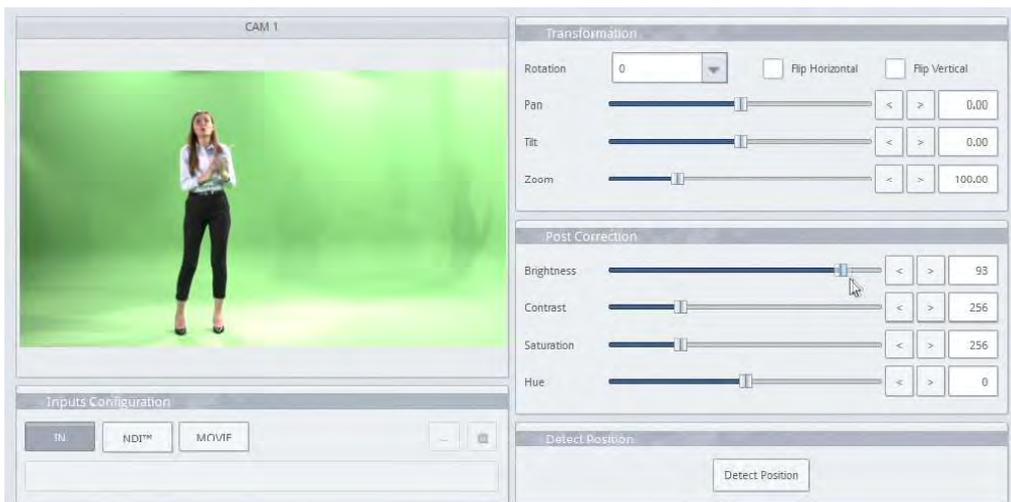
Colour CONTRAST. Picture below.
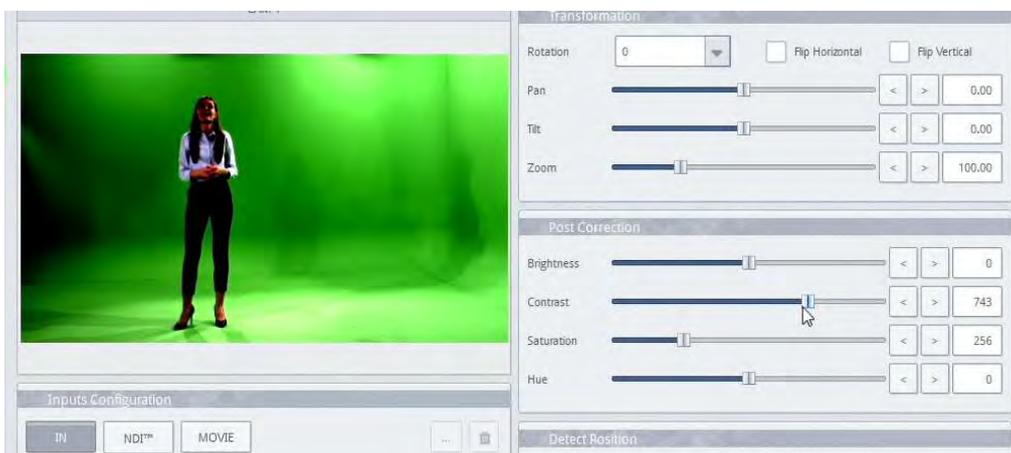
SATURATION. Picture below.
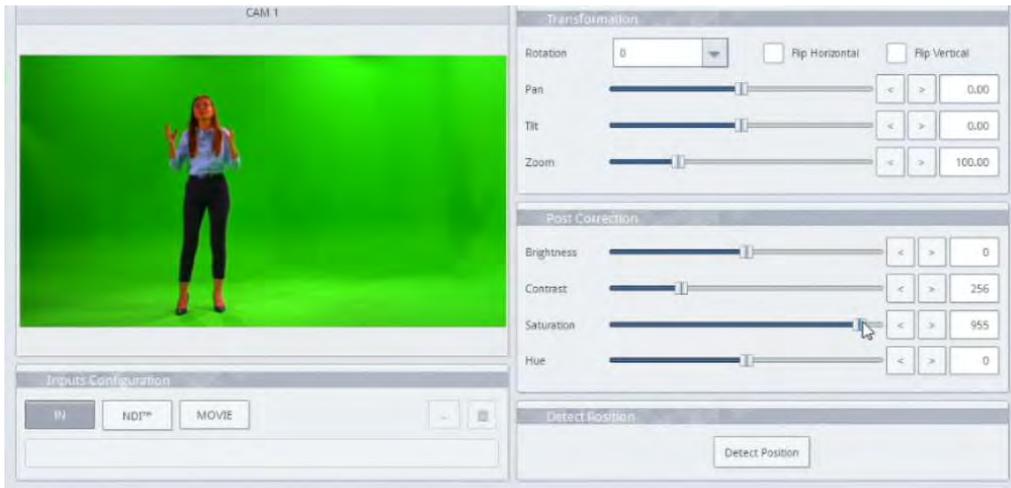
And HUE. Picture below.
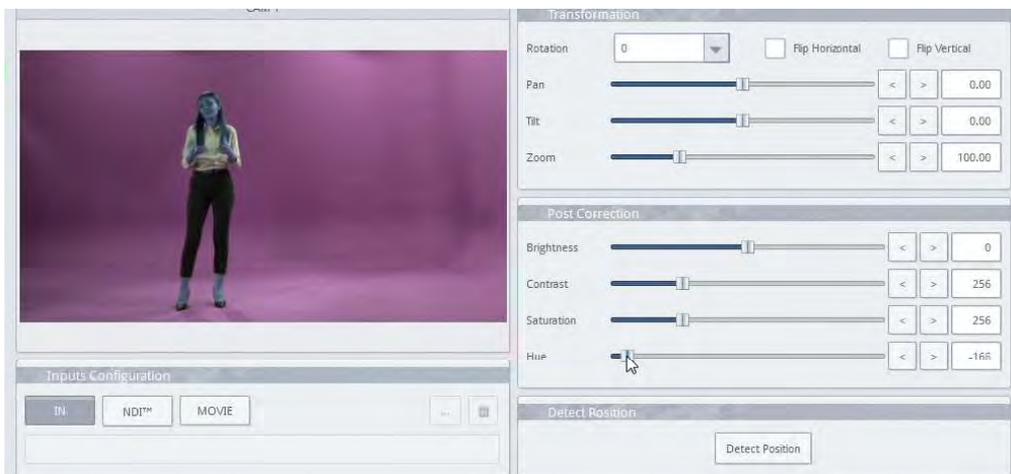
At the bottom we can find a button "Detect Position", which detects rim of person's feet, to then pin them to a virtual studio's floor.

And "Reset" button restores default sliders' settings.

IMPORTANT NOTE. If you press the "Detect Position" button and then save the Session, these settings will be saved in the session file.

NOTE: Changing the post-correction value on the signal input affects the behavior of the chroma key, so remember that parameter changes should be made before setting the key. Try to change these parameters only in the system that needs to be changed

CONFIGURE INPUT'S SETUP ON MULTIVIEW MONITOR

In the system there are 4 physical inputs, and 2 media signals available. Their preview can be found on the production screen and also on Preview Mutiview Monitor. Smilar hear on top of each input window on multiview monitor you can find a gear symbol. If you click on it, a window will appear where you can configure input's setup. Picture below.
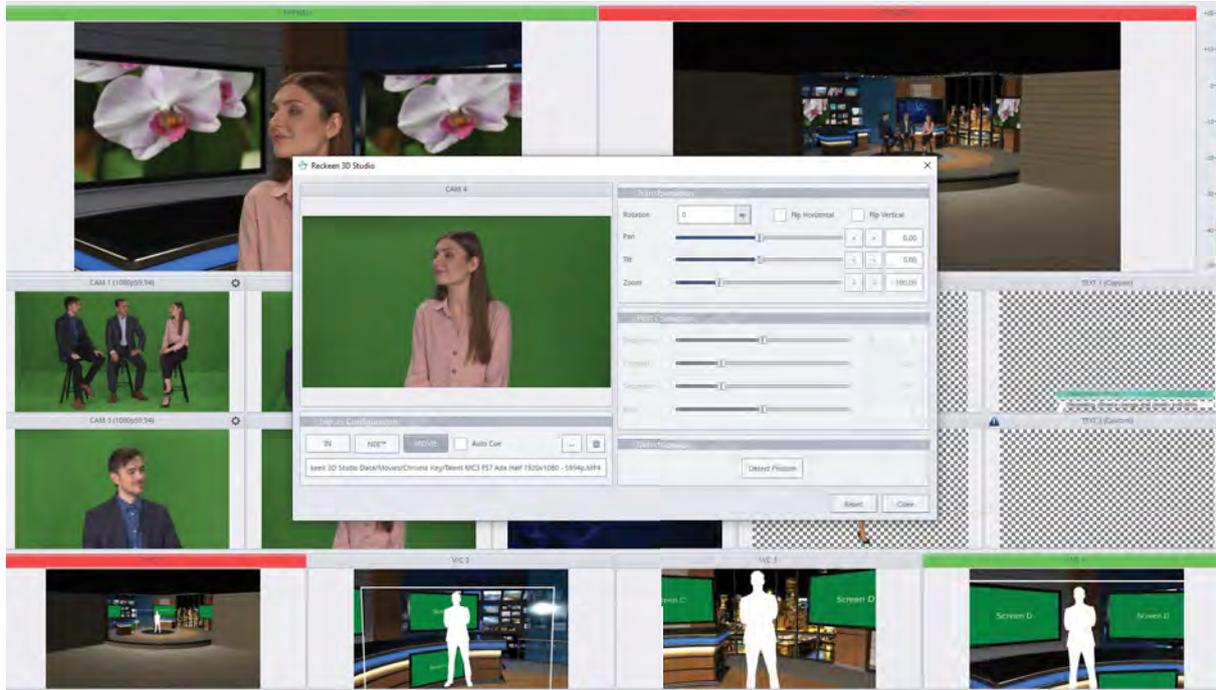
Input source selection is also possible from the configuration "input" tab, but from this window it is only possible to indicate the source as physical input, NDI, or paths for the video file. Picture below.
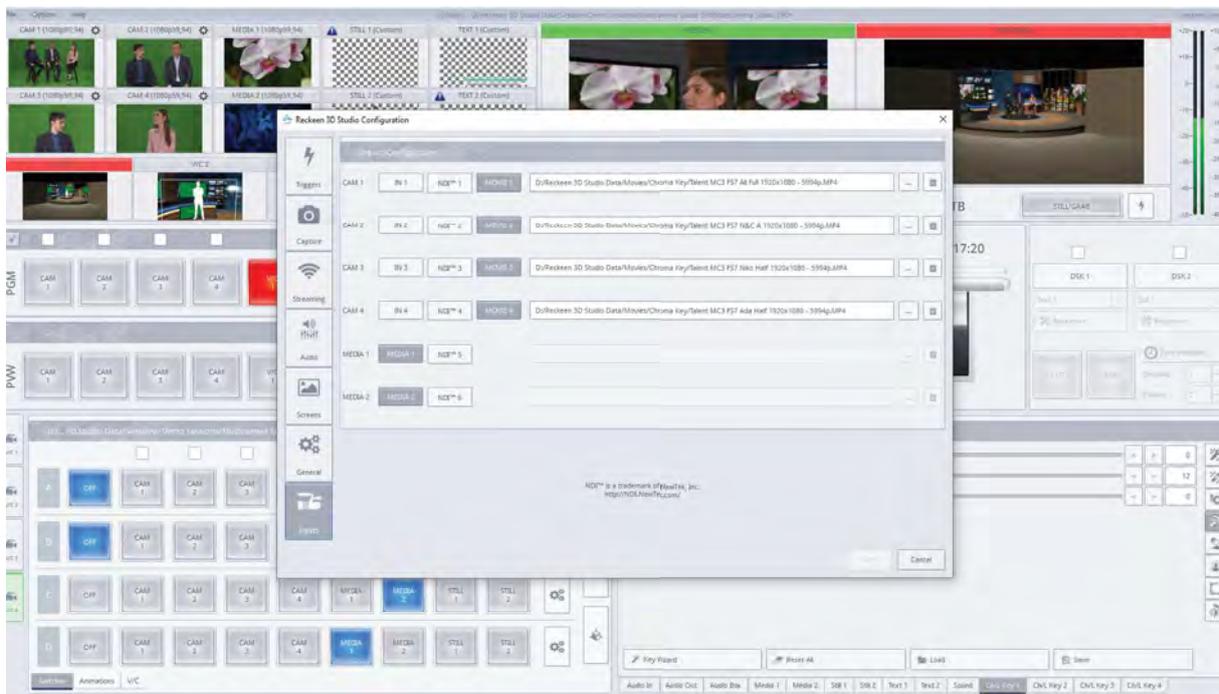
CONFIGURE INPUT'S AS ADDITIONALLY MEDIA TRAYS, AUTOPLAY & AUTOCUE FUNCTION

Inputs with a preset for the video file can also be used as additional media trays. Thanks to this, we can play up to 4 additional video files independently of Media 1&2 on CAM1 to CAM4.

Selected files can be automatically played back from the beginning with the pressing of the CAM1 .. CAM4 keys under the active AutoPlay function, the activation of which is located just above the CAM1 - CAM4 keys on the PGM BUS panel. Activation of the AutoPlay function we need to tick the "AutoPlay" box. picture below:

AutoCue functions are also available here, this function at the end of the file automatically triggers the transition to BUS PVW.

Activation of the AutoCue function we need to tick the "AutoCue" box. picture below:
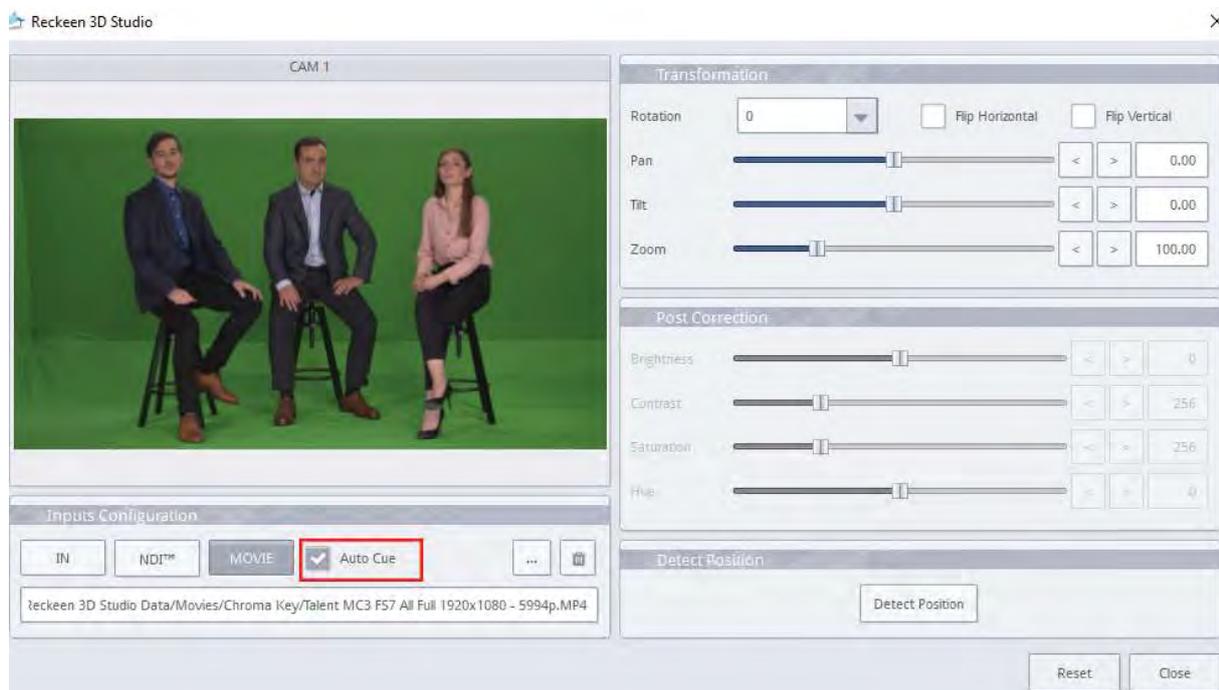
TRIGGER OF MEDIA INPUT - GENERAL RESET

Inputs with a preset for the video file can also be used as additional media trays. Thanks to this, we can play up to 4 additional video files. If you want to play all inputs with the media loaded synchronously at the same time, use GENERAL RESET for this task, see the figure below:
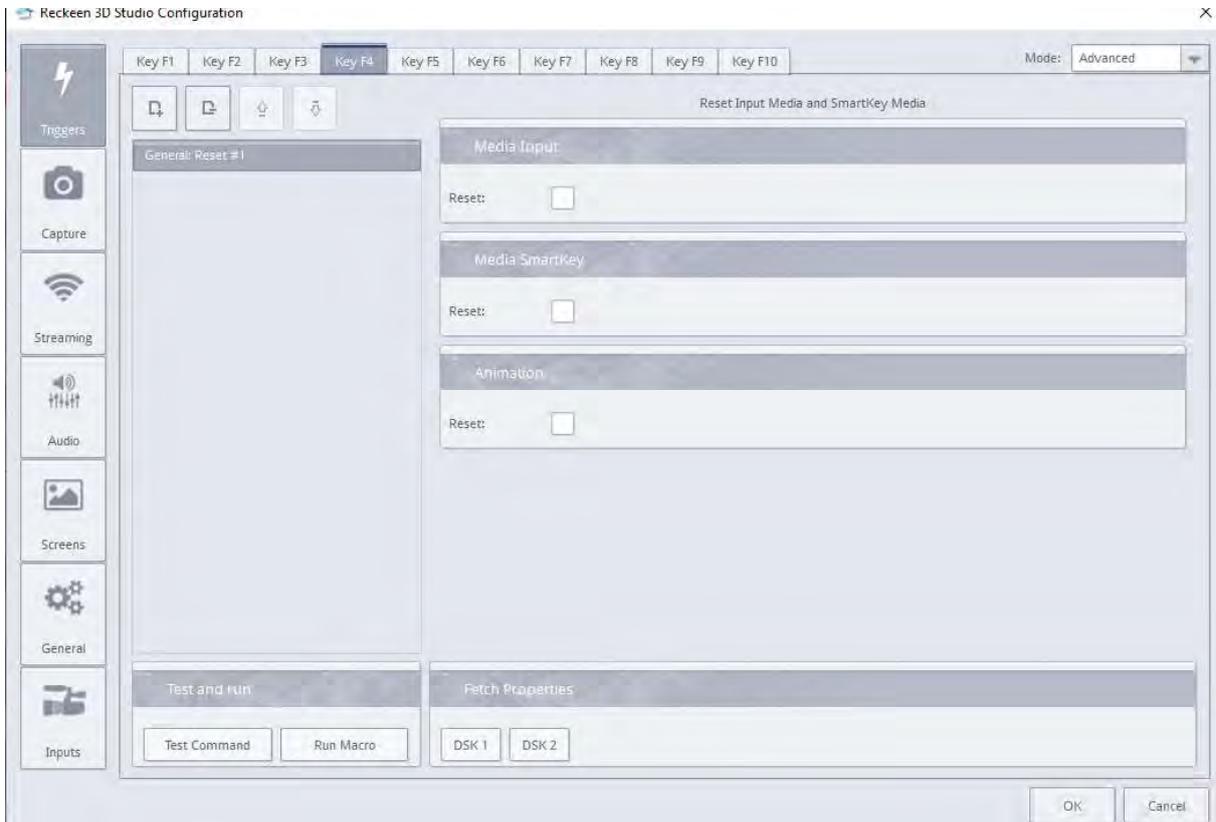
Check the options below and call the trigger with the function set - GENERAL RESET - MEDIA INPUT all media in the iputs will start playing back to the beginning, this function is very useful, among others, if we use the 3D Multicamera function with many recorded shots simultaneously in post-production.

SUPPORT OF VIDEO PLAYBACK - GPU ACCELERATION

Supporting video playback in Input.

Integrating the AMD / NVIDIA GPU with relatively strong graphics systems in Reckeen systems from version V1.8 also provides hardware support for video playback.

After enabling this function, the graphics chip takes over most of the calculations from the CPU, which results in a lower CPU load. Reducing the CPU load after enabling hardware acceleration increases the "reaction" speed of the video itself, as well as of background tasks. Enabling GPU acceleration shortens the conversion time of sample video material, especially in 4K formats.

In the case of AMD and Nvidia graphics cards, multi-functional stream processors are most often used for simple calculations. Nevertheless, Hardware Acceleration achieves an excellent result. Computing with acceleration enabled is performed in half as fast and does not burden the CPU.

The Reckeen system allows the user to choose whether the file should be accelerated or not. This applies to the INPUT function.

For the acceleration to work, we must select the acceleration options before loading the file. If the file meets the conditions of acceleration formats, the system will confirm the acceleration of such a file by a green stamp.

In order to release the file from acceleration and tray,

it is necessary to delete it by using the recycle bin function or press the movie acceleration green stamp again, the file will be automatically reloaded. The recycle bin does not physically delete the file from the disk, it only frees the tray.
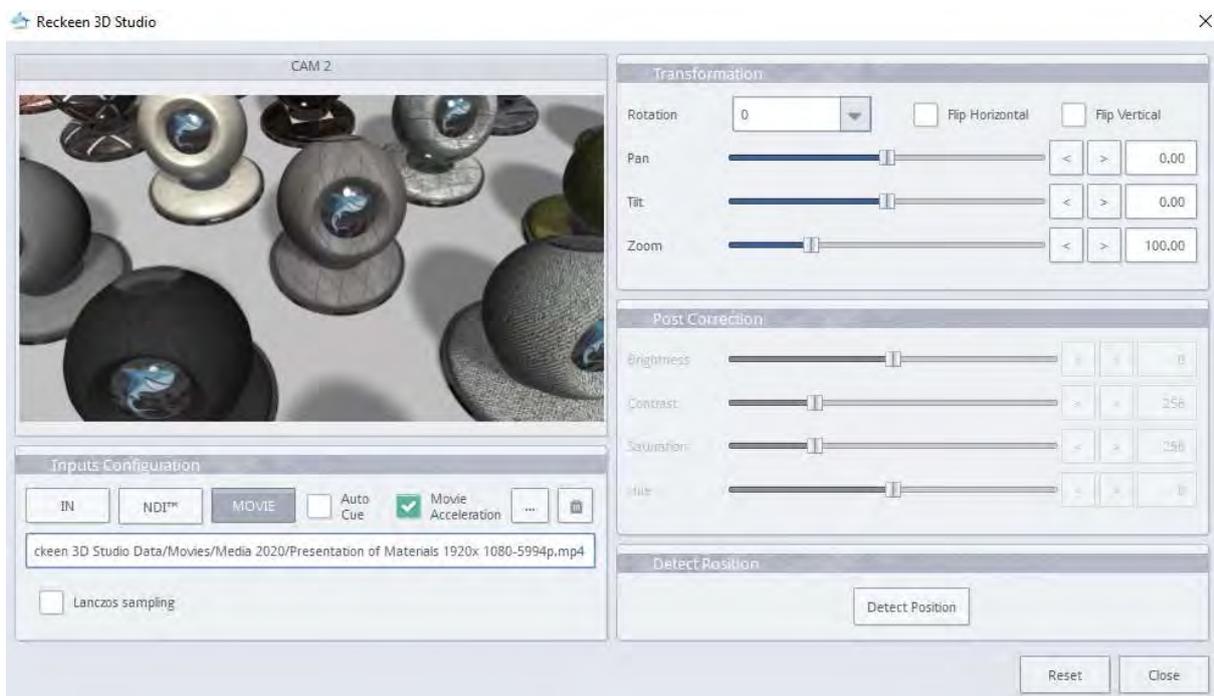
Note - Not all formats can be accelerated.

LANCZOSE SAMPLING OF INPUT VIDEO SIGNAL

Lanczos filtering and Lanczos resampling are two applications of a mathematical formula. It can be used as a low-pass filter or used to smoothly interpolate the value of a digital signal between its samples.

Lanczos resampling is typically used to increase the sampling rate of a digital signal, or to shift it by a fraction of the sampling interval. In Reckeen 3D Studio system is used also for multivariate interpolation, for example to resize or rotate a digital image from inputs.

What gives the use of this filter, first of all, improving the quality of image scaling, such as talents.

Higher profits from the use of the filter may appear when we use weaker cameras and lower resolutions, such as HD. it is also easy to see the effect of the filter on an image that is differentiated as a PC motherboard placed in front of the camera, or on a shirt with some dense patterns.

This filter, however, requires GPU processing power, which grows with the size of the talent area that fills the entire screen. Conversely, if the tealent is small on the screen, this filter will charge the system with less power.

Due to the reduction in power of the GPU card, this filter should be used with caution.

This filter works dynamically, so it is easy to check whether it will bring benefits in a given case.

Enabling the filter requires check-box in the INPUT window, picture above.

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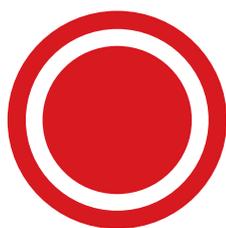
Vision Mixer – Production switcher

An executive area - a Vision Mixer (production switcher), - occupies the middle part of 3D Production module screen. The mixer's panel is composed of two rows of buttons with executive keys block on the right side of the screen. It is used to direct the chosen content on the air and to prepare the next materials for broadcast. See the image below.

Mixer buttons are located on Program and Preview lines. You can switch between different sources of signals on PGM and PVW by clicking the corresponding buttons. The image below.
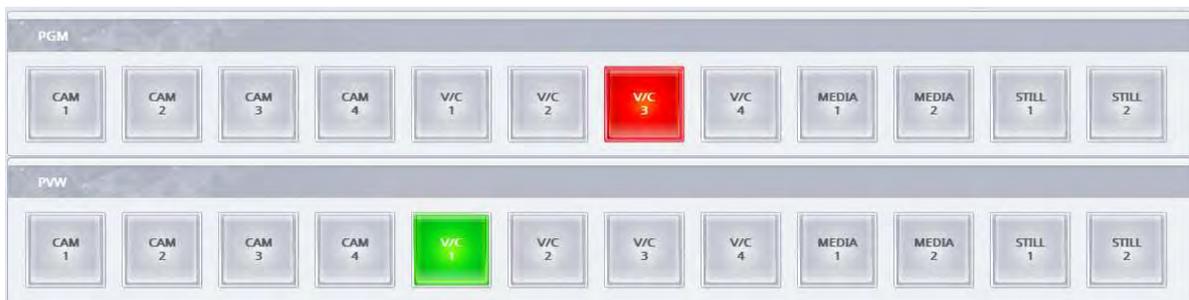
The top line of buttons - PGM - indicates the image the source of which is sent directly on the air. The selected source button directed to be broadcast at the moment is highlighted in red.

The bottom line of buttons - PVW - allows you to indicate which image source will be aired next. An active button is marked in green. The chosen material is visible in the PREVIEW window.

12-inputs main mixer:

- 4 x CAM - allows you to select an input source, to which a signal from a camera is usually directed. You can use chroma and luma key on the signals from this channel.   You can also use a signal from an external source e.g. PC, camcorder, video player or another video source such as NDI input instead
- 4 x V/C - allows you to select one of four virtual cameras (virtual cameramen).
- 2 x Media - two video files from your hard drive
- 2 x Still - two graphic images from your hard drive

After selecting and editing the sources for the broadcasted program, the next step concerns using the function buttons: online streaming, transition effects, inserting a logo or an animation during the production process with the help of DSK and others. Descriptions of the individual functions are presented below.

PREVIEW AND PROGRAM WINDOWS – CHANGING THE SIGNALS

This block consists of several components, the most important of which is a Take button. Clicking it causes immediate switch between PVW and PGM signals. What was planned to be broadcast is broadcasted and the signal "removed" from the vision goes to PVW display. FTB (Fade To Black) button allows for a gradual transition of the broadcasted signal to black. This function is used for taking down the broadcasted image from the air and replacing it with black, for example in an emergency or at the end of a broadcast. Using this button cause a total quiet on the master audio output.

The same effect as with the Take button can be achieved by using the Auto button, with only difference being that the change of PVW and PGM signals does not occur at once, but smoothly, on a down-mix of both images and slow transition from one image to the other. You can set the time of this transition in seconds or in frames using the arrows located next the Auto button.

It is possible to control the Auto function directly from the production screen. You can operate the T-Bar slider displayed on the screen with a cursor. The same result can be achieved by using the T-bar handle on the VKEY-100 control panel.

DOWNSTREAM KEY – DSK FUNCTION

On the right side of the vision mixer (main switcher) block is an area with DSK functions. The Switcher allows you to decide which source or which image from the inside of a virtual studio V/C is aired. However, no program can go without graphics and text panels. They are put into the broadcasted signal in the final step, on separate layers, in the form of overlays on the main signal. They are commonly referred to as DSK (Downstream Key).

The Reckeen 3D Studio system allows you to place on the aired image up to two DSK signals at the same time. The source of such signal may be: Media (1 and 2), Still image (1 and 2), or Text (1 and 2). It can also be an image from a camera or laptop sent to CAM input. In order for the DSK function to operate correctly, the media sent to DSK must contain transparent areas. In this manner, they will be placed 'above' the main signal. Media without transparent areas used with DSK will completely cover the aired image with their content, which is not advisable (unless the program's creator desired so).

Usually, panels with captions, still graphics or short computer animations are used on DSK layers. For their preparation, video formats or graphic files with a definition of transparency (i.e. alpha channel/alpha) should be used. In the case where a signal from a camera is used as DSK, its use should be connected with keying. The Reckeen 3D Studio system is equipped with its own text panels editor - Still Text. With the editor, you can easily prepare subtitles to be used on DSK layers. An additional advantage of such created panels is the possibility of modifying their content from the broadcasting program level. Swapping the text content already on the air is also possible.

USING THE DSK FUNCTION

In order to use the DSK, you need to enable one of the buttons: DSK1 or DSK2 and select the source. Then, you have to adjust the location on the screen with Placement function. Entering on the air may occur smoothly (MIX button) or abruptly (Cut button). They operate independently of Take button on the switcher.

Example of the DSK layer usage: in order to use the DSK, one of the DSK buttons has to be enabled, then a source from a drop-down list has to be selected

- DSK button is highlighted in green,
- the caption is ready for broadcast,
- caption's preview is displayed in a PREVIEW window
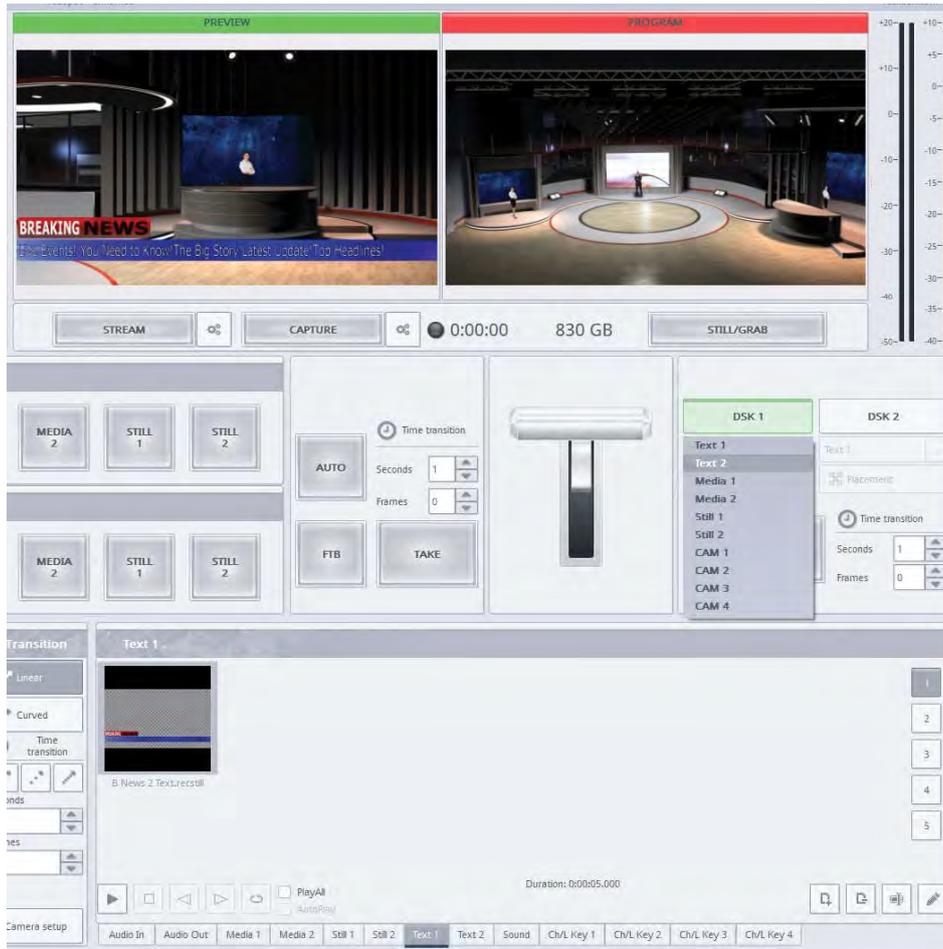
- to change caption's size and position on the screen, you can optionally use Placement button (Note - changing the caption's position is not possible, if it is being already displayed on the air!) - description in the further part of the manual.

- the caption can enter on the air smoothly (MIX button) or abruptly (Cut)

- the operation of MIX and Cut buttons is independent of the Take button on the switcher,

- when the caption is visible on the air, the DSK button's color changes to red
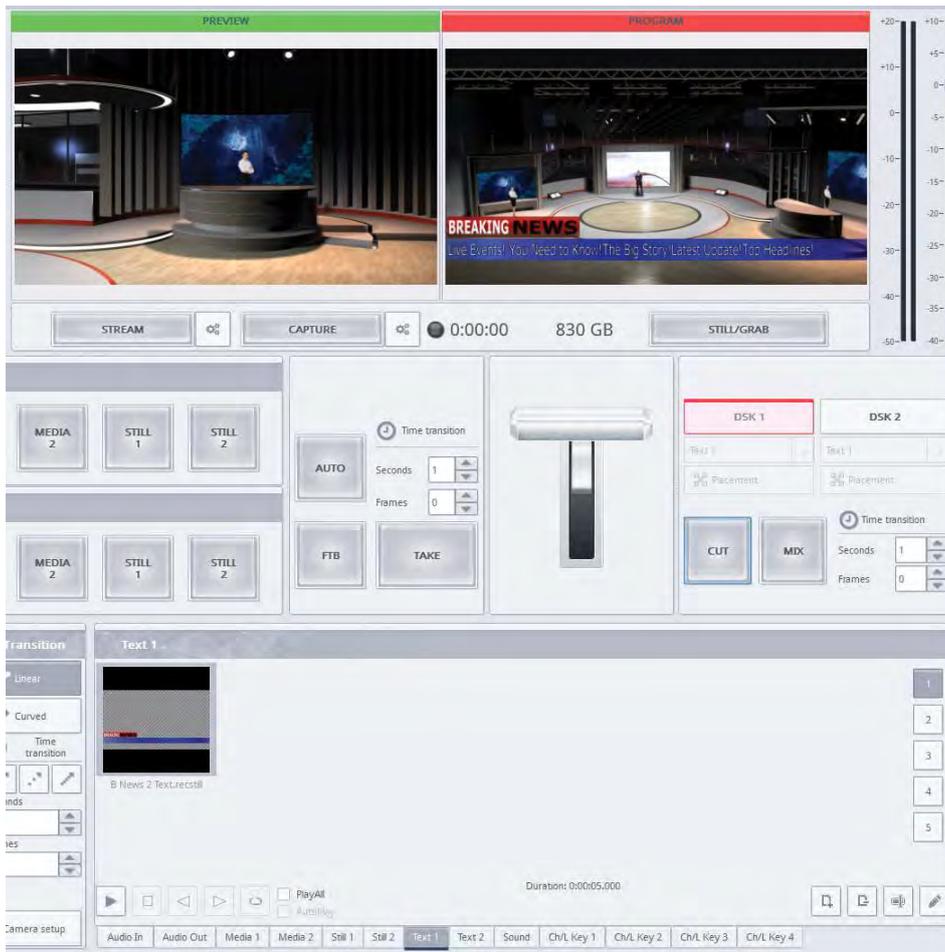
- to remove the caption from the vision, use MIX or Cut button again,
- after removing the caption from the air, the DSK button's color is changed again to green and the caption appears in a PREVIEW window.

Both DSK 1 and DSK 2 layers are handled exactly in the same way. This enables using common MIX and Cut buttons to support DSK 1 and DSK 2 layers, which allows you to show both DSK layers on the air in a synchronous manner, and to switch the caption from DSK 1 with the one from DSK 2. In this way, one caption will appear, while the second will be removed from the vision. To fully understand the principle of using the DSK function, you should perform several dry-runs with Cut and MIX buttons. A PREVIEW window, where the entered texts appear, should be watched simultaneously.

The MIX function's delay (length of transition run-time) can be set in seconds or in frames next to this function's button.

Click Placement button below the selected DSK 1 or DSK 2 button in order to configure position and size of the object inserted with DSK, a logo for instance. A window shown below will open then

Joystick: used to change the object's positions on a screen through rough manipulation (joystick hooks and steers the cursor) or accurate one by pressing 4 directional arrows around the joystick. On the other hand, a very accurate positioning is possible through pressing the up/down arrows displayed beside the fields with numerical values.

Central vertical controller : used to change the inserted object's size, - you can move it with the cursor

Right rotary knob: used to rotate the inserted object on the screen- you can move it with cursor.

DSK FUNCTION: AUTOPLAY

AutoPlay feature triggers automatic file playback, starting from the beginning of a video or a file sequence, when the chosen media goes on air and appears in PGM window.

AutoPlay for DSK triggers automatic files' playback of media assigned to DSK, when bringing DSK to Program window.

In order for this function to be active, you must first select the appropriate check box above the given DSK channel 1 or 2

DSK FUNCTION: SWAPPING THE TEXT CONTENT ALREADY ON THE AIR

When you have a file with the news ticker previously prepared in the STILL EDITOR, load it to the Text 1 or the Text 2 tray. Then, turn the DSK on by choosing the Text source from the drop-down list. The news ticker with the text will appear on the Preview screen. See the image below.
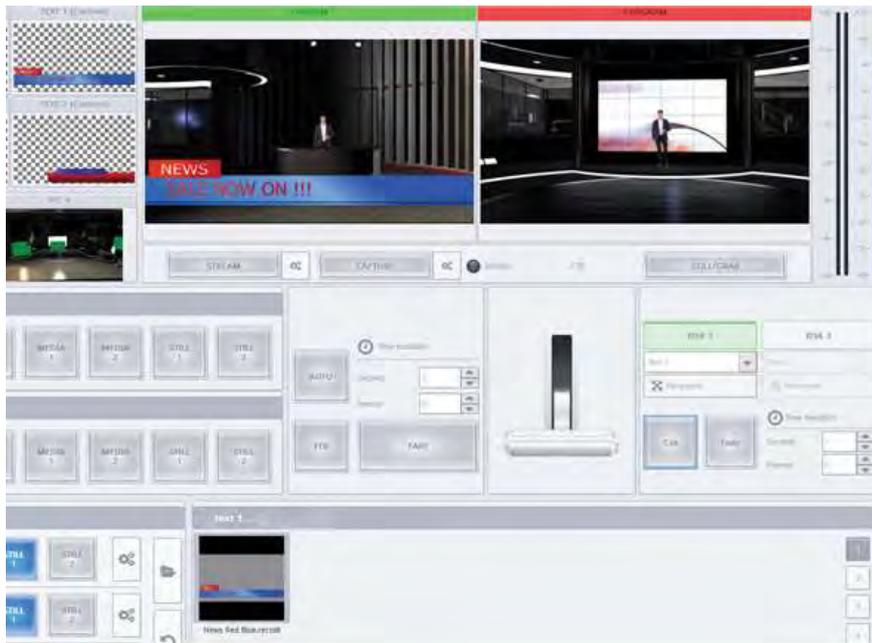
You can put your file on the air (Program) with DSK function. Image below.
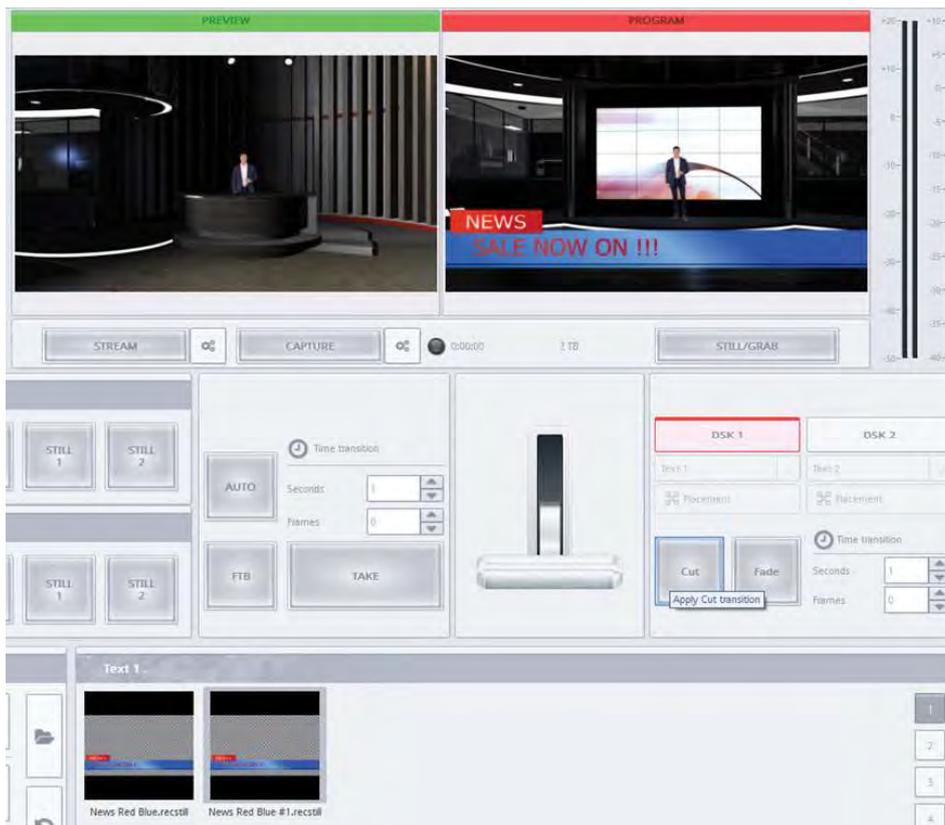
Any changes made to the *.recStill files are permanently saved overwriting the file, therefore you have to create a clone to avoid this situation. Right-click on the news ticker file's icon, and then select the Clone option from the drop-down list. For each new file clone, the filename copy with #1, #2, ... index is created. This way, you can avoid making unplanned changes to the original file.
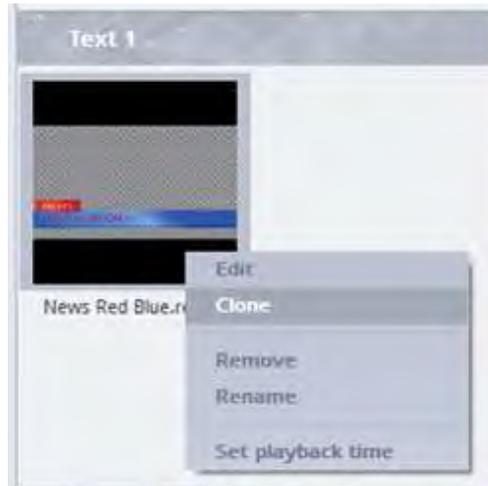
Let's change the text in the clone #1 to show it on the air next. Right-click on the cloned file and select Edit.
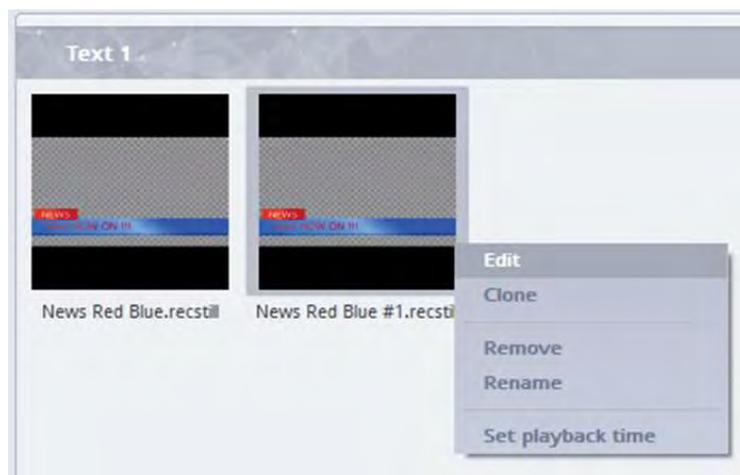
A window with a preview of the news ticker opens, as shown below. Now, move the cursor over the text you wish to modify and double-click the right mouse button.
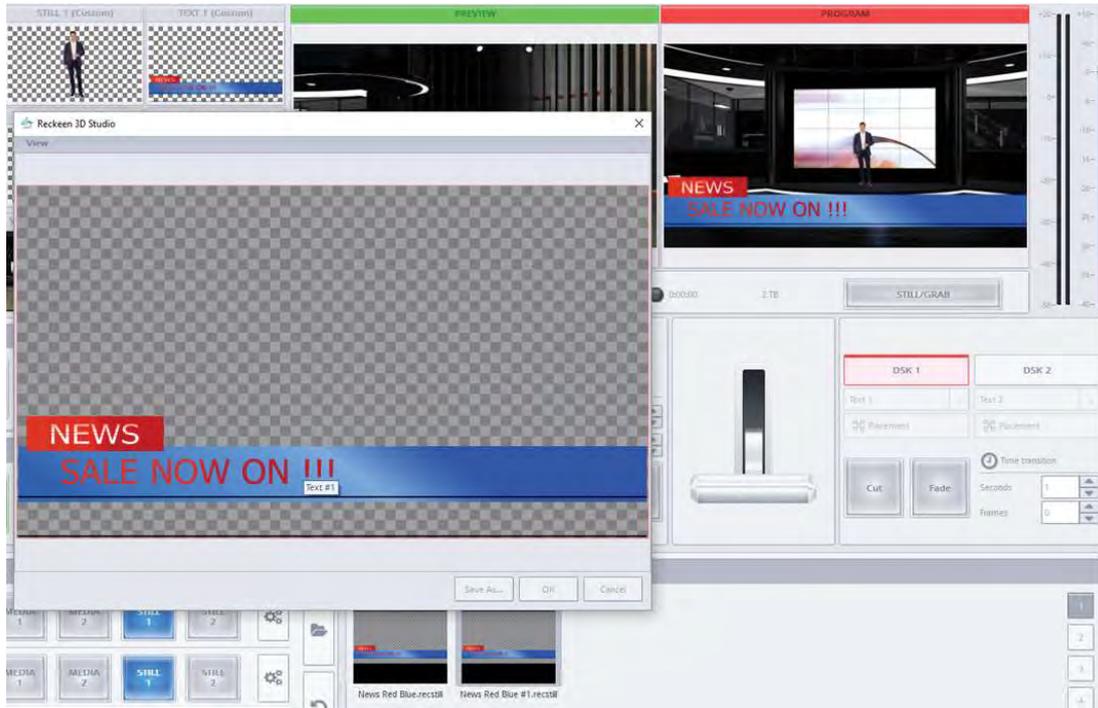
A window opens with a field for entering the text. The current text is displayed there.
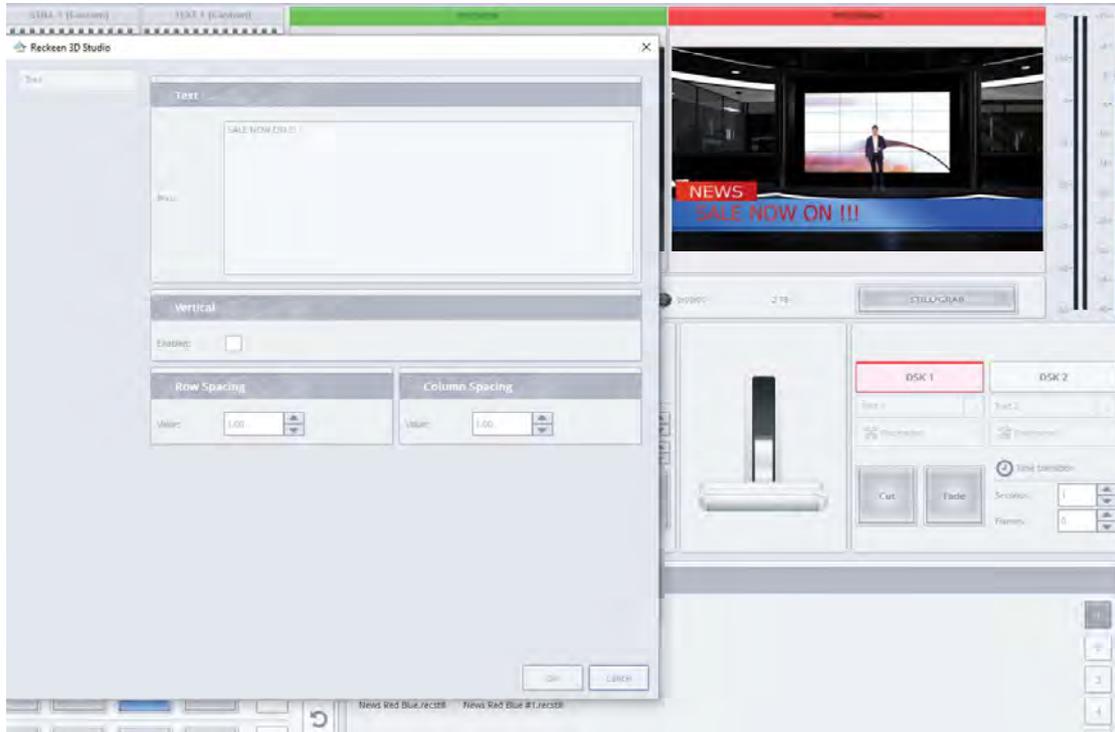
Enter the new text and click OK button at the bottom of the window.
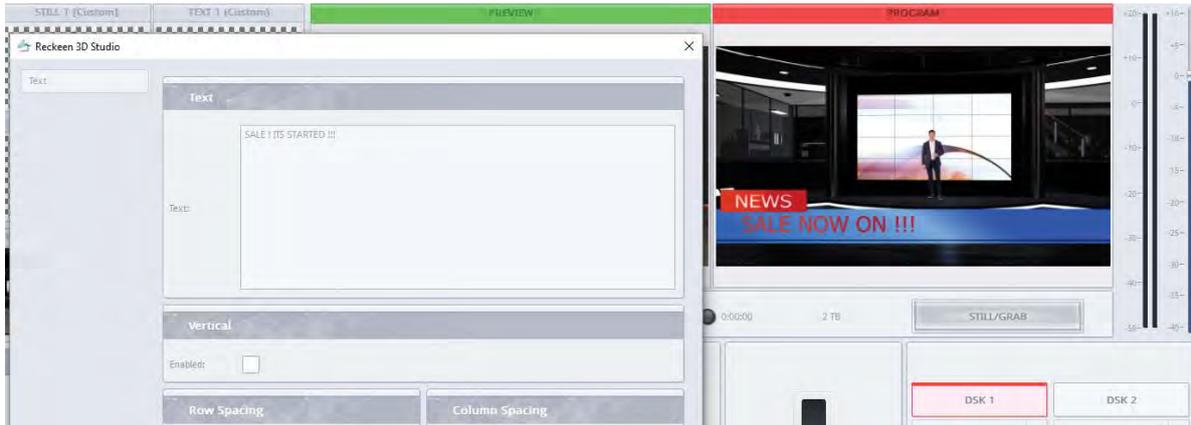
After clicking, you will return to the window with the news ticker's preview. Now you can check, whether the entered message is not too long - it does not "protrude" beyond the screen. If everything is in order, click OK button.
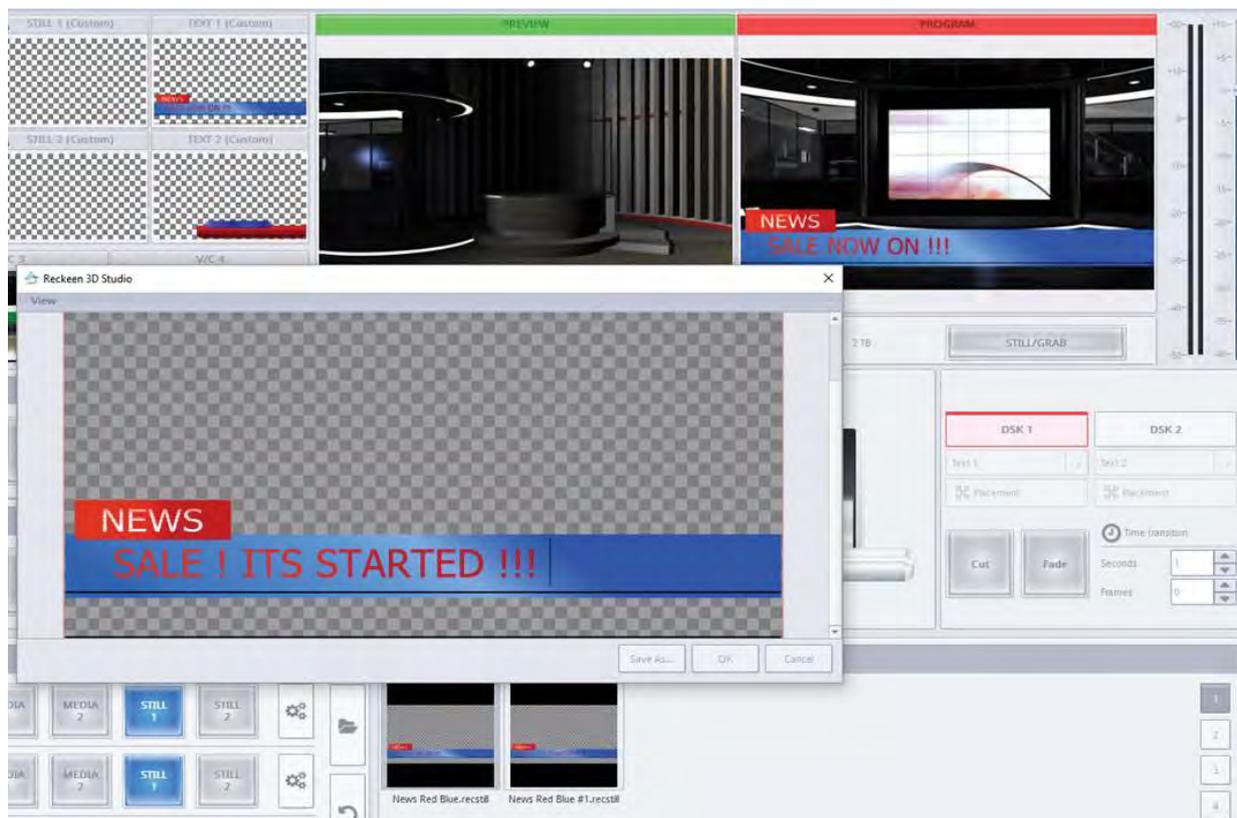
On the air, in the DSK tray you have the original file selected, so all you need is to select your newly created and edited clone from the tray. Double-click it with the left mouse button.

In this way, you have prepared the news ticker changing on the air, without changing the graphics. Image below.
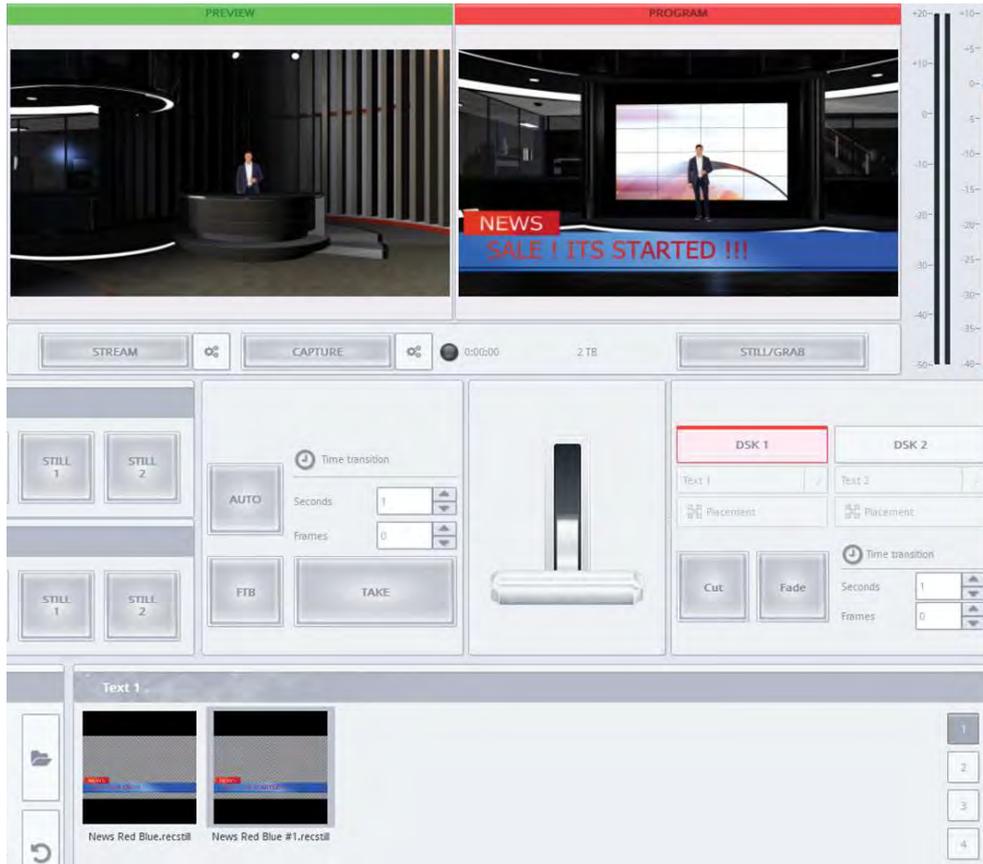
If you clone a couple of news tickers, you can run them in the LOOP by enabling the Autoplay function. Then, the whole sequence of texts shown on the screen with DSK will be playing non-stop (Image below). For more information see: Preparing media for broadcast section.
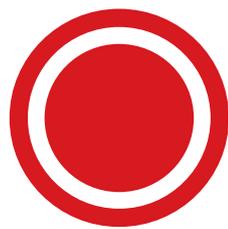
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Virtual 3D studio
Configuration panel

After opening a production screen of 3D Production, you will find the virtual studio Configuration Panel in the lower left corner. The Reckeen 3D Studio system will always open a new session with a starting studio loaded.

A studio file's path on the disk is displayed at the top of the panel. See the image below:

The Reckeen 3D Studio system is equipped with 4 V/C channels, that is Virtual Cameras.

The backlit buttons V/C 1 to V/C 4 on the left side of the configuration panel allow you to choose which group of V/C shots you can currently configure.

The V/C buttons in the panel are fully compatible with the main video mixer. If you change the status of the main mixer (switch the V/C on the mixer), whether it is in PREVIEW (PVW) section or PROGRAM (PGM) section, the button in V/C control panel will switch automatically. V/C tab button is highlighted in red when the virtual camera V/C to which it is assigned, is on the air, that is, in a live signal on the PROGRAM screen. And when the button is highlighted in green, it means the virtual camera V/C image is displayed on the PREVIEW screen. See the image below

However, the other way around the system behaves differently, due to the safety reasons and functional facilitation. There is no recommended of controlling the PROGRAM (PGM) section of the main production mixer with configuration panel V/C buttons. Accidental change could cause unexpected result on the air. It is, however, recommended to control the PREVIEW (PVW) section. When you change one virtual cameraman to another by clicking the V/C button in the control panel, a new button will be highlighted in green, and this change will be also immediately visible on the production mixer buttons in the PREVIEW (PVW) section and in the PREVIEW window.

Each V/C group is displayed on the screen in the form of up to 15 images showing respective virtual camera shots. The image of an active shot, which will be shown on PROGRAM or PREVIEW screen, is highlighted in a frame. (Picture above)

In order to help you fully understand the idea of working with the system, you can imagine that each of the V/C groups is a separate virtual camera in a studio, and each of them is led by an individual cameraman.

See the picture below.
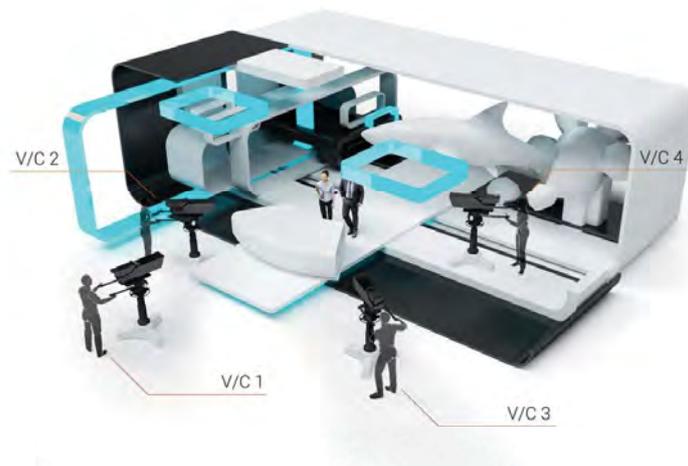
Shots, on the other hand, are specific positions of a cameraman in the studio They can be defined for each V/C camera and its cameraman - separately. Picture below.
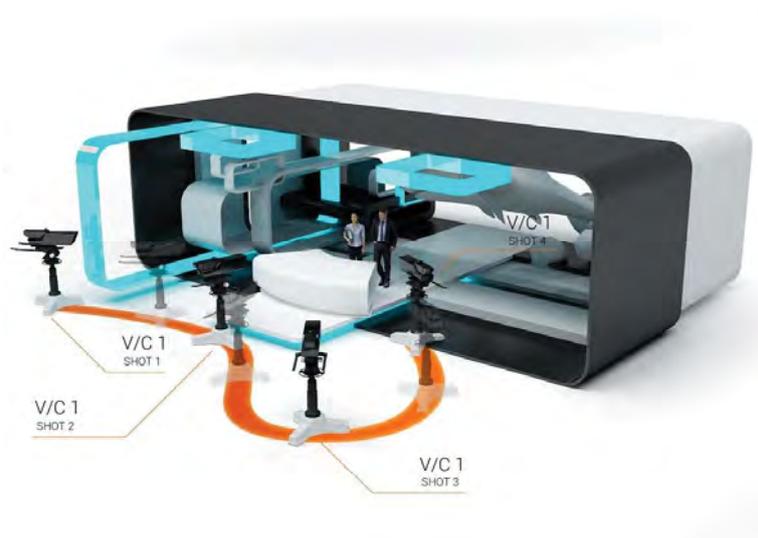
When launching the 3D Production module with a new session, you get a starting studio loaded with four (virtual camera) groups V/C 1, V/C 2, V/C 3 and V/C 4 provided with loaded shots (cameraman positions in the studio).

The initial shots - their number and the way they will look like - are determined by a studio designer.

You can specify up to 15 camera shots during a studio file design. Each of the shots is named by the designer, and, in this example, it will be a default name - 'Camera 1', 'Camera 2', 'Camera 3', and 'Camera 4' - respectively.

Therefore, this starting studio will have, the same four shots loaded at the beginning for each of the 4 V/C cameras.

It is a Reckeen 3D Studio application's session file (* .recSession) and not a studio file (* .recSet) that determines which shot is selected as a first one within the V/C group. Note that, by default, in the starting session file the V/C 1 camera with the shot 1 (Camera 1) is set on the PROGRAM screen, while the V/C 2 camera with the shot 4 (Camera 4) is set on the PREVIEW screen. It is done on purpose, in order not to show the same image on these screens. Picture below.

CAMERA SETUP

The startup application allows you to use the default shots immediately after loading. Each user has their own preferences, so there is a possibility to change these settings freely to suit your needs. Here, it will be shown with a case of the second virtual cameraman (V/C 2)

If you want to change a position of a camera handled by a virtual cameraman V/C in a studio - first, click on the V/C 2 tab. A view of a shots group opens. Then click on the Camera setup icon. Picture below.

A window with settings of virtual cameraman's positions will open along with the loaded shots. Picture below.
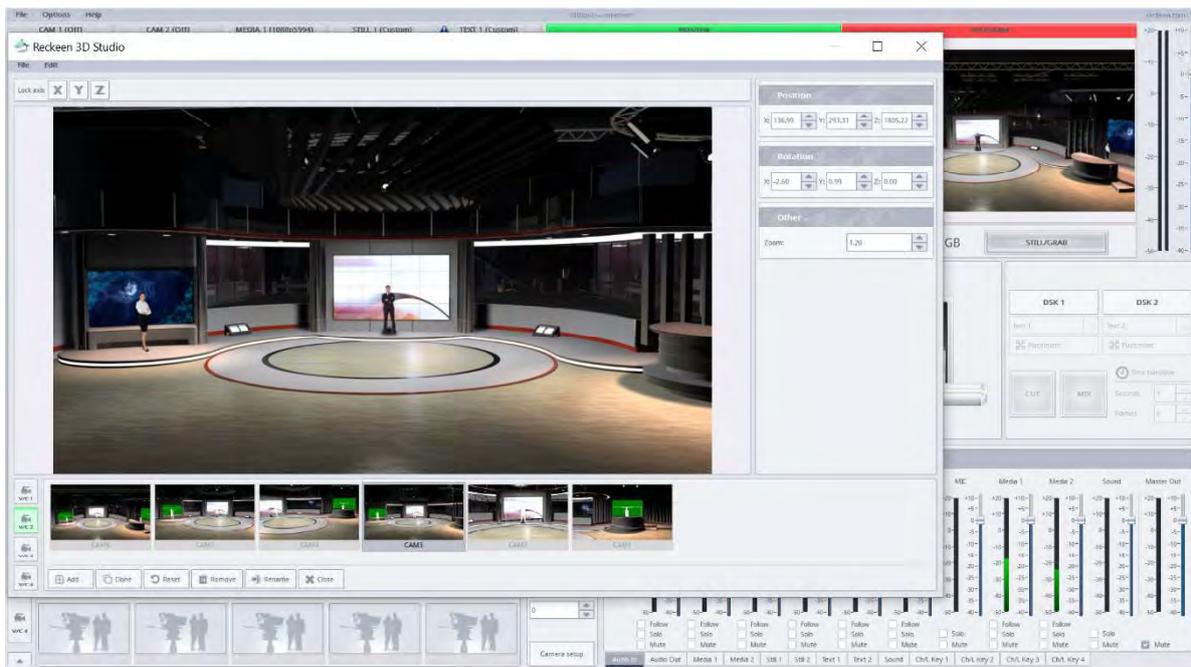
At the bottom left side of the screen, you can see a menu with a list of functions concerning camera settings (shots). Picture below.

You can, for example, delete shots - by clicking first on the shot image at the bottom of the screen, and then on the Remove button. You cannot remove all of the shots - there always has to remain at least one.

There is a possibility to create a new shot with the Add button. The first shot that was set as a default for the studio (here Camera 1) will be always loaded as a first view.

You can clone, that is copy, a position of a camera, and create a new shot on its basis. This is done by selecting the current shot, and then using the Clone icon.

Reset button allows you to reverse the current shot to the default settings, i.e. to the first shot (Camera_1).

Rename button enables you to assign your own name to the shot, e.g. associated with a camera position in a studio.

SETTING CUSTOM CAMERA V/C SHOTS

Now, you set your own camera positions for virtual cameraman V/C 2.

Click on the first window on the list of shots - Camera 1. In a large window, a studio image your chosen camera 'sees' at the moment will appear. You can now adjust its view by hooking the mouse cursor on the screen.

With a left mouse button, you can move the camera in along X Y axes (X - horizontal, Y - vertical). If you want to move the camera forwards or backwards - use the mouse scroll. The same effect can be achieved by pressing the middle mouse button (usually the scroll roller) and moving the mouse up and down.

Let's imagine that the camera is on a trolley which can be moved - from side to side, and forwards or backwards, - and the camera can be raised or lowered vertically when the trolley is standing still. Picture below.
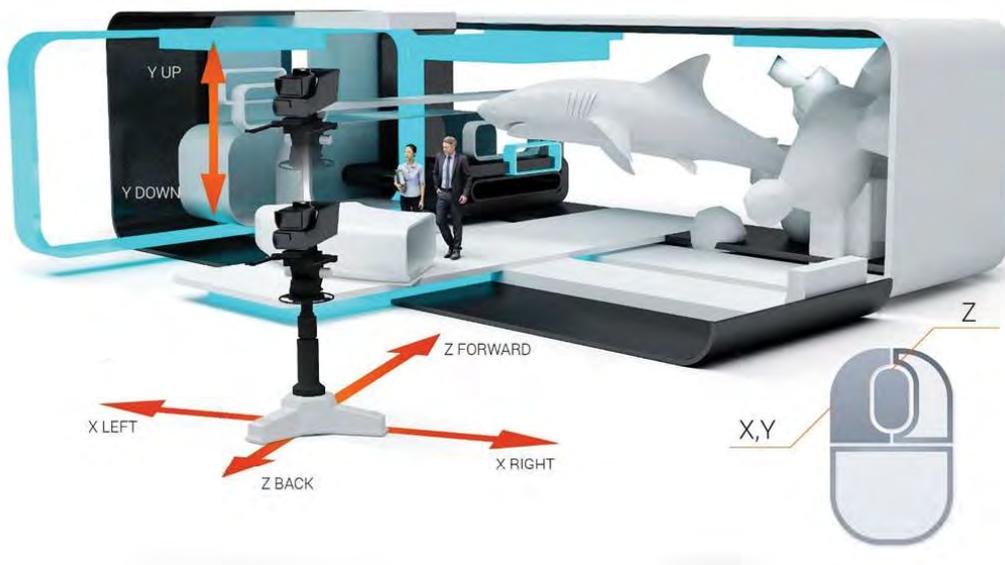
The movements a virtual camera performs due to the mouse movements correspond to the actual camera movements in a studio (see the image below): movement of the trolley from side to side - Track right, Track left. movement of the trolley forwards and backwards - Dolly in, Dolly out raising and lowering of the camera vertically - Pedestal up, Pedestal down

Description of real camera movements in a studio . Picture below

Now let's use the right mouse button.

Click the right mouse button, hook the cursor on the screen and direct the view of your camera.

This reflects a real situation, where a camera stands still on a tripod in the studio, and you only change the direction of its vision on a tripod head, that is rotate it horizontally and vertically.

This corresponds to the actual camera movements in the studio - turn to the left and to the right, that is Pan right and Pan left.

Rotation in the vertical plane: turn up and turn down: Tilt up, Tilt down.

In addition, there is a Zoom function - not available with a mouse, but from the screen level in the Other section.

In the Zoom function, you can adjust the image from the camera, zooming in and out without making any changes in the perspective or on the image plane. This is an equivalent of changing a focal length of the lens.

SECTIONS: POSITION, ROTATION, OTHER

At the top right of the Camera setup screen, there are 3 sections available: Position, Rotation and Other with Zoom function. Picture below.
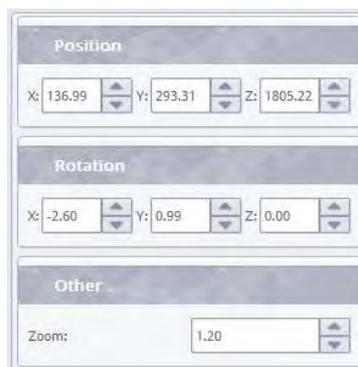
Position

The X, Y, Z coordinates show the exact position of the camera in the studio in relation to a point X = 0, Y = 0 and Z = 0, the position of which was set by a graphic designer of a particular studio. If you want to find this point in a studio, type a 0 value in the fields X, Y and Z - and a camera will move to this point. In the case of the presented studio, this point is located more or less on the floor behind the desk.

To enter a specific value, position your cursor at a beginning of a value field and drag (select) the entire field, then type in the desired value with a keyboard. You can also change the value by clicking on the white up/down arrows on the right side of each value field.

Movement in the X axis: moving the camera trolley to the right will mean increasing the positive values for our studio, and moving the camera trolley to the left - increasing the negative values.

Movement in the Y axis: raising the camera above the floor - increasing the positive values, while lowering the camera below the floor - the negative ones.

Movement in the Z axis: if you increase the positive values - the camera moves away from the desk, and if you increase the negative values - the camera moves forwards, deep into the studio.

Our virtual camera has no limits!

Note: in the studio ,all the values of X, Y, Z are given in centimeters when they represent a linear motion. This means that, for example, a value of 100.80 means 100.8 cm in a virtual 3D studio. If the values refer to the circular motion, they are expressed in degrees, that is, for example, a value of 45.00 for Rotation stands for 45 degrees.

Rotation

The coordinates represent a rotation, that is, an angle at which the camera is pointed. The camera trolley is stationary and the camera stands still, but it can 'look' in all directions. In this set design, the Rotation 0 point means that the camera is pointed exactly straight at a Talent (a presenter) behind the desk.

Movement in the X axis means increasing the positive values for this studio - namely lifting the camera lens on a tripod (up until the camera is looking at the ceiling). Increasing the negative values - tilting the camera lens down (until the camera sees the studio floor).

Movement in the Y axis: camera rotates to the right with the increase in the negative values, and to the left - when the positive values increase.

Movement in the Z axis means tilting the camera from side to side. In an actual film or TV studio, this movement is called cant and is used, for example, to achieve the Dutch View, where a camera is tilted slightly to one side in relation to a vertical axis, all resulting in tilting of the image. (See the picture - a description of camera movements at the beginning of this section).

Zoom function: this feature sometimes substitutes a shot where a trolley moves straight ahead, but the difference between these two methods of operating the camera is significant. Zoom enlarges or reduces the camera image without causing changes in a perspective and in the image of a studio space. The trolley movement, on the other hand, brings you closer to an object, just as zoom does, but at the same time it changes the perspective and image of a studio the camera 'sees'.

LOCKING X, Y, Z AXES

Setting several camera movement parameters at the same time can be difficult at the beginning, so you can make this process easier by disabling some of the movement possibilities. This is done with a

function that blocks the axes (Lock- unlock axis). The icons of this function are located in the upper left part of the screen (see the picture below)

In the picture above, you can see a situation where a camera movement in Y and Z axes has been locked.

Axes' icons have turned color and picture of padlock has appeared. Movement in the X axis is allowed (if you also block the X axis, the camera will be completely immobilized).

In the case shown above, the camera will be able to move only to the left and to the right when you use the left button of the mouse, and to rotate up and down when you use the right button.

To illustrate this situation, you can imagine that the camera moves along a long tube and can move only lengthways or along its perimeter . Picture below.
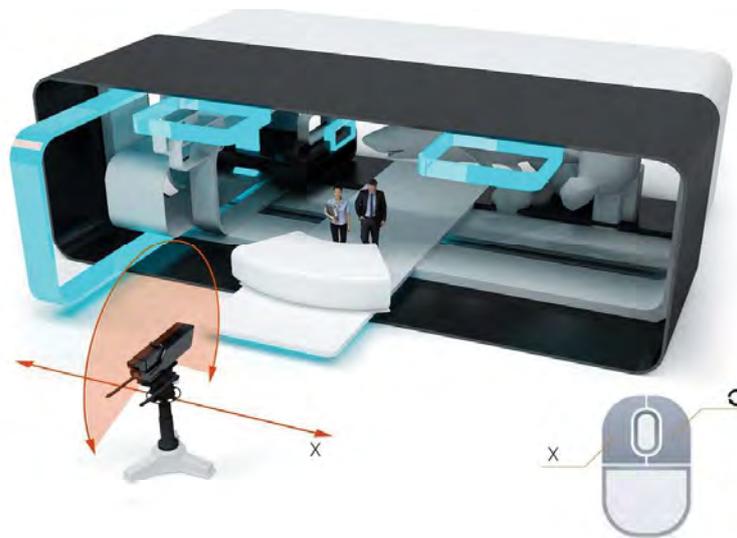
When you lock X and Z axes - Y axis is unrestrained. In this case, the camera will be able to move only up and down when you use the left mouse button, and to rotate to the right and to the left if you use the right button. Picture below.
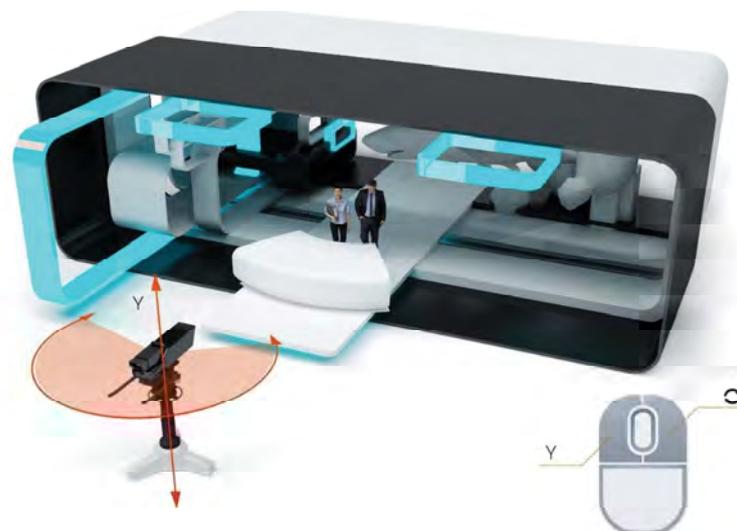
In case of locking X and Y axes - you have Z axis unrestrained.

In such circumstances, only a mouse scroll operates, which corresponds to the camera trolley movement forwards and in backwards. The rotation can be achieved through changing the Z value in the Rotation section (by clicking on the up and down arrows).

(As shown below)
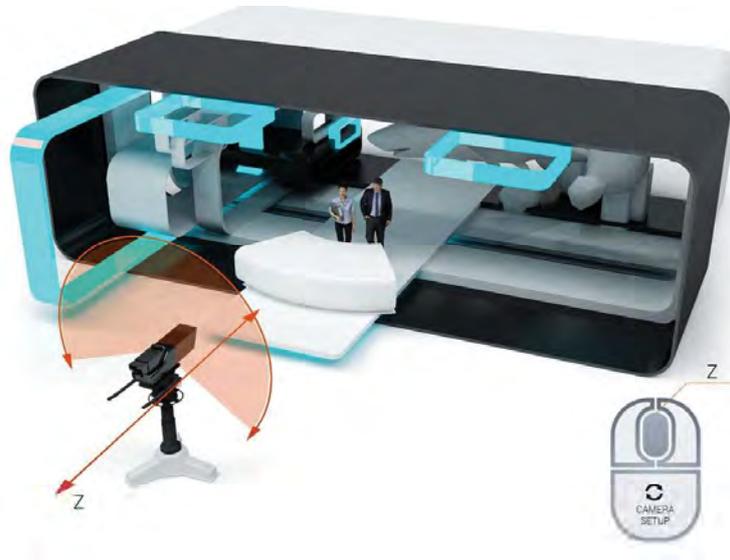
This kind of blocking the two axes allows for accurate and precise positioning of the camera in the studio, in one of the selected axes. After adjusting the camera in this axis, you can move on to the next one, and so on, until you achieve the desired camera view. You have then an exact position of the camera (a shot) set.

You may also block just one of the axes, enjoying the greater freedom of camera movement, but it is then more difficult to position a camera accurately and precisely.

ORBIT MOTION

Another type of movement that can be executed in the 3D studio when setting the camera shots, is an Orbit motion. Imagine that you are sitting on a rotating carousel looking all the time at the center of a circle, namely at an axis of rotation. A camera in the studio can make a similar movement - a circle around a selected item, all the while pointing at it.

Note: To better explain what the Orbit motion is, let's assume the camera always looks straight ahead at an object, for example, a Talent. Orbit motion can, in fact, maintain any chosen angle direction of viewing. For example, if you move a camera by an angle to the side in Orbit motion, seeing the Talent on the side of the screen, as if 'from a corner of your eye', the moving camera will keep this angle the whole time. This means that during the subsequent shots you will see your Talent 'from a corner of your eye' all the time, namely on the side of the screen.

You can, for example, set several virtual camera V/C 2 positions around the Talent. See the image below.
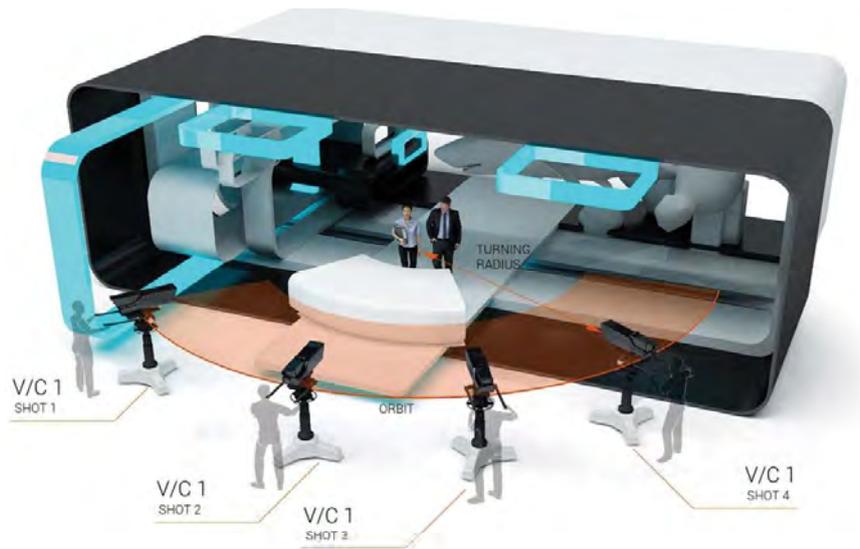
Positioning a camera in Orbit motion starts with selecting an object in the studio, which will be the center of rotation for the virtual camera orbit (circular motion).

Click the left mouse button on a figure of a presenter. A whole rectangle with the Talent figure lights up in red - it represents a view from the real camera. A 3D Gizmo appears on the rectangle - it will facilitate setting X, Y, and Z axes in your studio.

Additionally, 3D Gizmo facilitates determining the center of, for example, a group of objects, if such a group has been created by a graphic designer. A group of objects, e.g. lights in the studio, can be highlighted all in red, but thanks to the 3D Gizmo, you will be able to specify where the center of the object is, that is where the camera will be pointing at. Picture below.
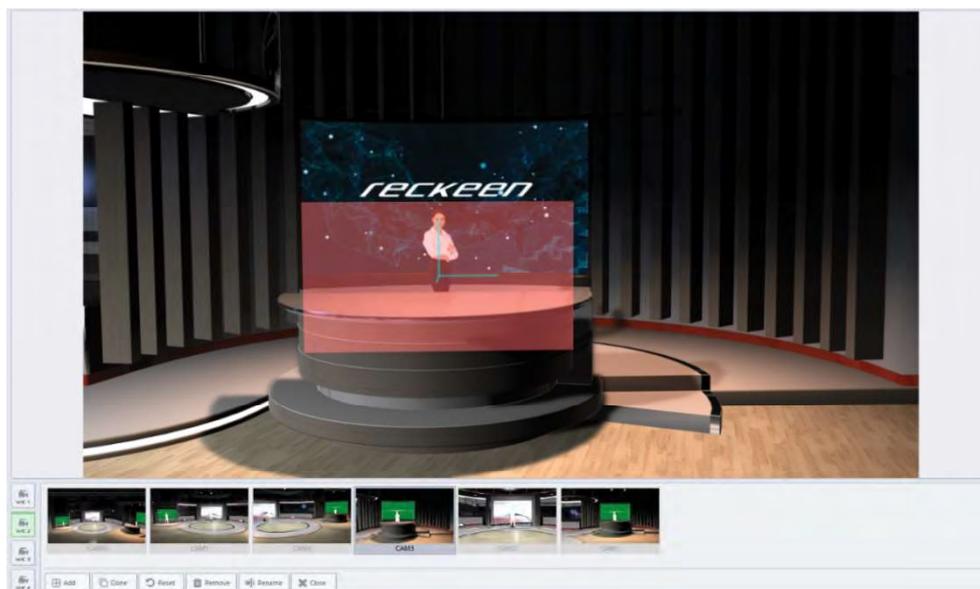
Then, with a right-click, you can change and select more virtual camera's positions around the Talent in the studio.

Your camera will be able to move to a different position on a circle (orbiting), and also up and down, all the while facing the Talent. You can, for example, select a position in a circle, but under the studio's ceiling - the camera is pointing at the center of the selected object all the time. See the picture below.
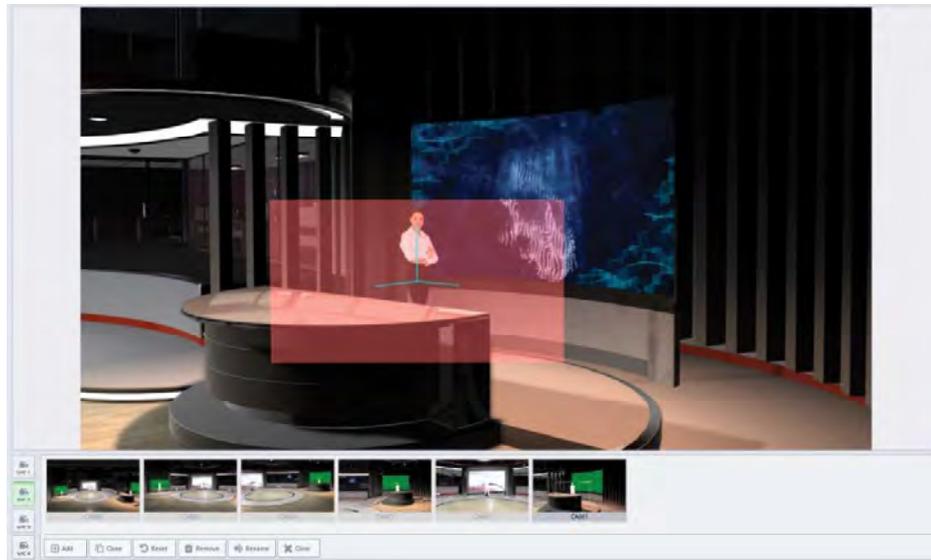
If you want to achieve Orbit motion solely along a circular track without changing the height of the camera, you should use Lock axis function and block X and Z axes.

The Orbit motion is possible also with axes Y and Z locked. You get the effect of a camera moving along a circular track, but vertically. Just like the Ferris Wheel: you can imagine that the cameraman is sitting in the wheel's carriage and the camera is looking at its center, where the selected object is located. It means, at the starting position the camera can be, for example, at the floor level and then, with the circular motion, it can move to the studio ceiling - all the while facing the Talent. Picture below.
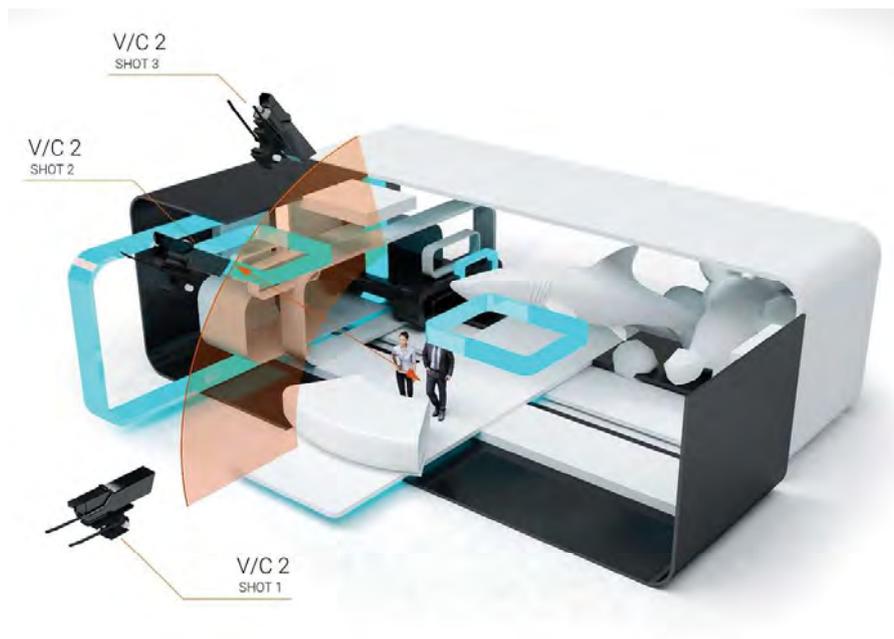
If you lock only the Y axis, then, in addition to a vertical Orbit motion ('Ferris Wheel carriage') carried out with a left mouse button, you can move the camera from side to side - to the left and to the right using a

right-click

ADJUSTING VIRTUAL CAMERA V/C POSITION AROUND THE TALENT IN ORBIT MOVEMENT

Select a virtual cameraman, V/C 3 for example. You start with one initial camera shot (preferably one where the camera is facing the Talent directly). The desired distance between the camera and the Talent is set with a mouse scroll (that is with 'riding the camera trolley' forwards and backwards). This will be a radius of a circle, a center of which is the Talent. With a left-click, select your object, which highlights in red. Remember not to move the mouse at the same time, as it won't select the object, it will only change the view.

With a left mouse button set a desired height of camera's view vertically. Now use Lock axis function and block X and Z axes (see the picture below) to get an Orbit motion solely along a circular track without changing the height of the camera.

Execute camera's Orbit motion (rotate) around the Talent with a right-click and select the first shot.

Make a clone of this shot. Then, in a new shot, move the cameraman to the next position using the right mouse button. Set the desired camera position.

Make another clone and repeat the steps to get a satisfactory number of camera positions. The more camera shots you create, the more accurately the camera will move along a circular track.

In this case, 6 camera shots, that will rotate around the Talent, were chosen.

As all the shots are Camera 1 shot clones, they have the same name. If you want to change them - use the Rename button. Six camera shots were created for the virtual cameraman V/C 3, starting from the left side of the studio and ending on its right side, all the time moving along a circular track. You can see the last shot in the picture. Picture below
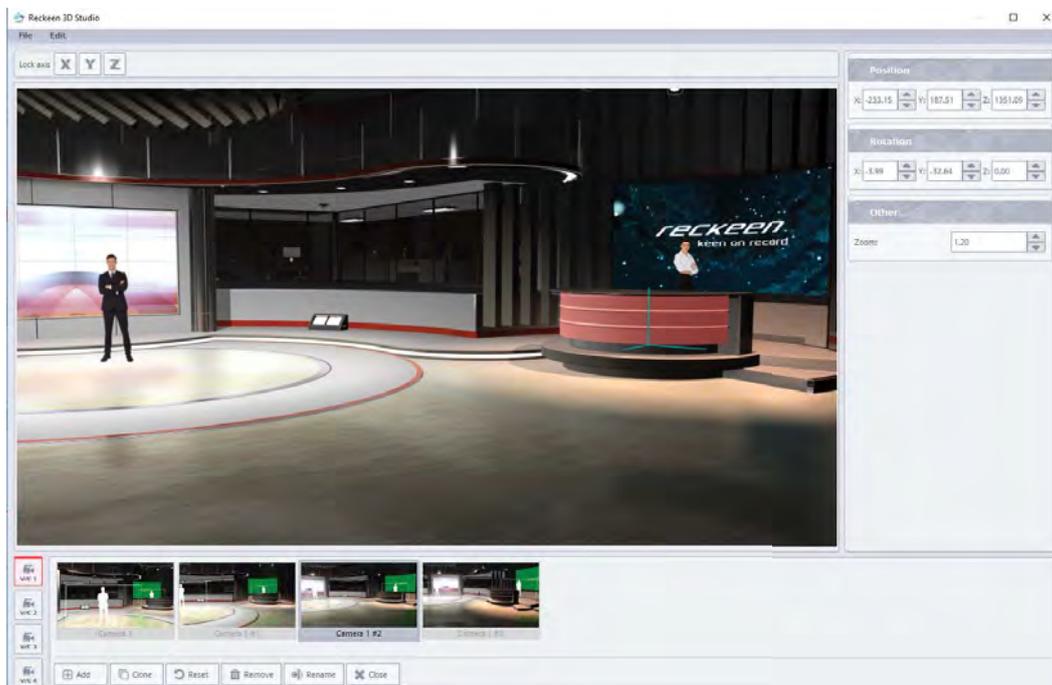
FUNCTIONS OF VIRTUAL CAMERA V/C TRANSITION MOVEMENT BETWEEN SHOTS

6 cameraman V/C 3 shots for ORBIT motion have been set in the previous section.

There are 3 ways to navigate between camera positions in the virtual studio: Cut, Linear or Curved. Remember that shots are set in the Camera setup window, and in the 3D Production module, the realization of transitions between the given shots takes place. As shown below.

It can be done with Cut transition, that is immediately, without any delay. Cut is triggered by right-clicking on the shot's thumbnail.

There is also a possibility to set the time and type of camera's transition movement from one position to another - Linear or Curved . These functions can be triggered with a left-click on the thumbnail.

If you choose Linear function, the camera will move between successive positions along straight lines, even though the camera positions have been set on a circle.

The picture below.

If you want the camera to move along an arc also between the shots - select the Curved function. The

camera will be moving on a curve calculated by the Reckeen 3D Studio system, as shown above. Camera movement will become 'fluid' and will recreate the Orbit motion more naturally.

Enabling the Curved function corresponds to a real camera movements in a studio (see the picture: Description of camera movements in a studio) - Arc right, Arc left (if you move the camera trolley on the studio's plane) or Tongue right, Tongue Left movement (if you operate a camera on a crane horizontally), or Crane or boom up / Crane or boom down (if you move the camera on a crane vertically).

SPEED OF VIRTUAL CAMERA V/C MOVEMENT BETWEEN SHOTS

For your convenience, default speed of transitions between camera shots had been defined in the Reckeen 3D Studio system. They can be switched on with S, M or F icons - Slow, Medium, Fast.

Speed of transition can be also controlled with up-down arrows located below S, M and F buttons.

WORKING WITH 4 VIRTUAL CAMERAMEN V/C

During the production, you can change the settings of each cameraman by clicking on the shots' miniatures. You can then wander around the studio with one selected cameraman, e.g. with a camera set to move according to the ORBIT motion, as in an earlier example.

Producer can also switch between V/Cs, choosing a virtual cameraman an image from whom will be show on the vision. Switching between views from different virtual cameramen V/C can be done with a production mixer and functions: Take, Auto or with a T-Bar handle.

After switching to a different cameraman, you can operate again on the shots defined in this V/C group.

Possibilities of cameras' movements provided by the virtual studio Reckeen 3D are the same as in a real TV studio. Hence, we can recreate diverse, complex camera movements used in TV or film techniques and assign them to virtual cameramen V/C.

If, for example, the loaded studio has sub-studios, then one virtual cameraman can operate in the main studio and a different one in the sports studio, with another in a the weather studio and so on

LOADING A NEW STUDIO

By clicking on the icon with the arrow in the lower left corner of the screen (image below), you can open an additional panel for selecting A, B , C and D signal sources for your studio. There are also Load, Reset and Studio Editor icons located on the right side of the panel. Picture below.

If you want to load a new studio, click on the Load icon (in the upper right corner of the picture above) and select a studio file from the disk. The supported 3D studio file formats are: *.obj, *.fbx, *.3mf, *.recSet.

Note! Remember that, if you introduced your own set of virtual cameras V/C shots earlier, then loading a new studio will erase the results of your work.

Select a file in a file selection window that opens up. When you click on the file, a preview of its set design appears in a window on the right.
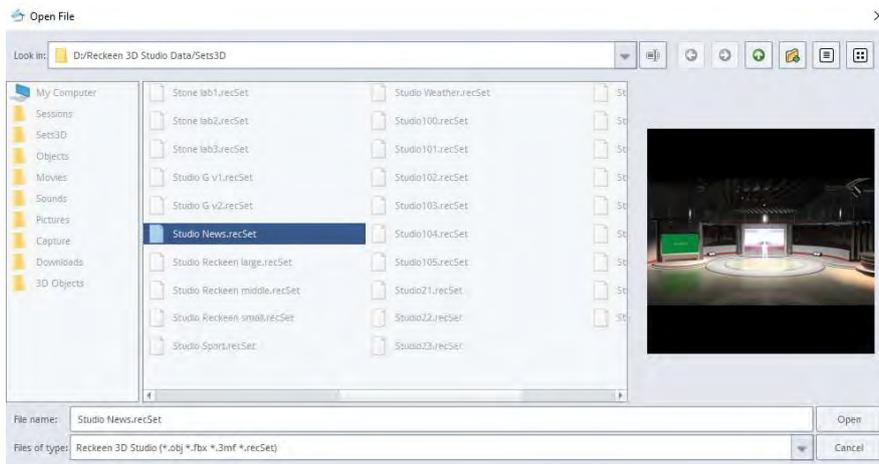
Remember: if, during the session, you Load a new studio with the Load icon (i.e. not using a previously created and saved session), then initially all the default shots are set in their first positions for all cameras V/C. You need to change that, as otherwise both PREVIEW and PROGRAM screens will show the same view.

The Reset button, located below the Load button, resets 3D studio cameras to the default shots.
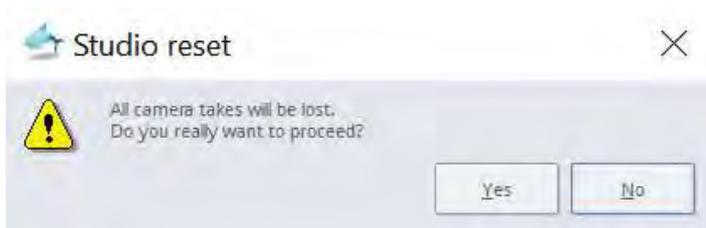
It means you return to the initial default camera settings, as if a brand new studio was loaded.

In order to avoid losing your work associated with setting virtual cameras' positions in the studio, you will be warned with a message when you press this button .

If you want to keep the results of your work, save a session file. In this file such settings as a kind of studio you used and all the virtual cameramen's camera settings you have created will be preserved. You can use them later in realization of your program.

SELECTION OF SIGNAL SOURCES A, B, C ,D

The setting all the A, B ,C and D sources is identical for all cameramen V/C.

The fundamental part of studio configuration is a selection of a source. Usually, a studio project allows you to place there 4 input signals A, B ,C and D that are set on the mixer in an additionally opened panel.

In a studio design, the first two of them, namely A and B, are almost always images of presenters (Talents), from CAM 1 to CAM 4 sources. A keying filter is applied to these sources.

The applied key removes a uniform background (e.g. green), on which the presenter is filmed.

The third and fourth signal source – C and D may be a film or a still image. They are usually displayed on virtual screens that are a part of studio scenography. Everything depends on the project. In the picture below, you can see tree images of presenters (source A, B, C) and studio screens, where a film (source D) is displayed
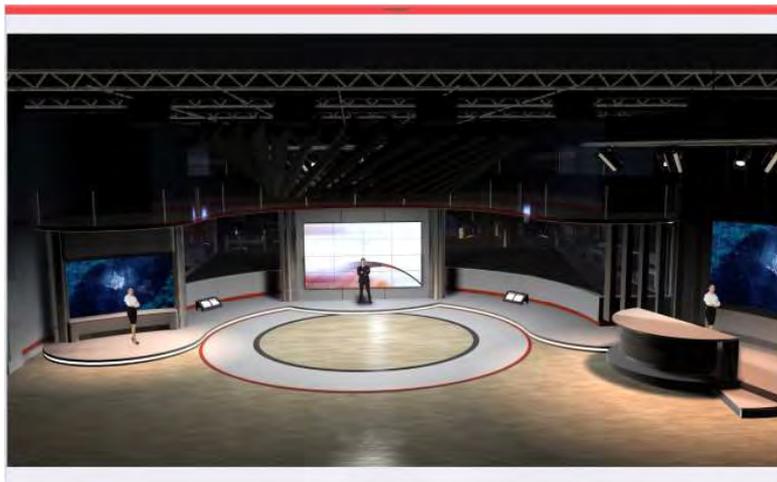
Most often the default A, B , C and D sources were defined by a studio designer, but you go to the Studio Editor and create your own settings, e.g. remove a Talent or add a screen. In each studio, signals can be used in a different way. Due to this flexibility, the signals have been described in a studio configuration panel in a universal way - symbols A, B , C and D (image below)

There are four separate rows of buttons with identical descriptions for sources A, B ,C and D. This enables a separate regulation of parameters for sources A, B , C and D.

The input signal for studio composition can be: a transparency (Off), a camera image (CAM_1, 2,3,4), a video file (Media 1, 2), an image/bitmap (Still 1, 2),

And so are called the buttons located in four rows below the studio previews. The button with selected source is highlighted . Changing the input source takes place immediately, so you can change it during the live broadcast.

After selecting the appropriate signal sources, a figure of a presenter will be displayed against a studio scenography, and a selected video file or a still image will be shown on virtual screens. If a keying filter has not been enabled for the source with a presenter figure, you have to switch it on and set its parameters. After applying the correct keying parameters, a background against which the presenter is filmed (e.g. green) will be removed and the figure of the presenter will be visible against the background of the studio scenography.

In order to make the figure of the presenter fit better into set design you have used, you can adjust the figure's size and position in the studio. A separate window is used for changing these parameters. The window can be opened with a button located next to the buttons used for the studio's signal sources selection.

This window works on the same principle as the Placement window earlier described in the DSK section. The only exception is an additional function Aspect Ratio: Keep / Stretch described on the following pages of the manual.

ASPECT RATIO FUNCTION: KEEP/STRETCH

With this function, you can set the aspect ratio for sources A, B, C or D, for movie files or for images.

The Keep option allows you to maintain the source's aspect ratio, while the Stretch option stretches the image to cover the whole desired area. See the following example.

If, for example, a video file with its aspect ratio of 4:3 is placed in a studio on a display, which has an aspect ratio of 16:9, the image file proportions will be maintained and the 'lacking' space on the screen will be transparent.

If you select the Stretch option, the image of an aspect ratio of 4:3 will be stretched to 16:9 proportions, and there will be no uncovered space on the display. You have to remember that the stretched picture will not have the previous aspect ratio.

SAVE SESSION FILES

In order to keep all the studio settings (selected sources, virtual camera V/C positions and settings, and others) and be able to use them for the next production, there is a possibility to save them in a session file. To open such saved settings, you have to load an appropriate session file at the start of 3D Production module.

Chapter7 - Session' storing contains information on the structure of data that is saved in session files.

13

Virtual 3D studio editor
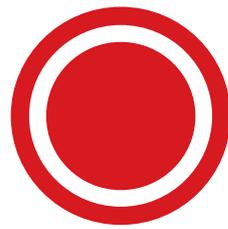
The goal of working with the editor is to prepare a studio before a live broadcast. You should keep in mind that, if one of the V/Cs is selected in the main PROGRAM mixer at the moment and you want to make some modifications in the editor - it can cause some unexpected changes seen directly by the viewers, e.g. a studio element disappears.

You can open the editor with Studio Editor button. As shown below.
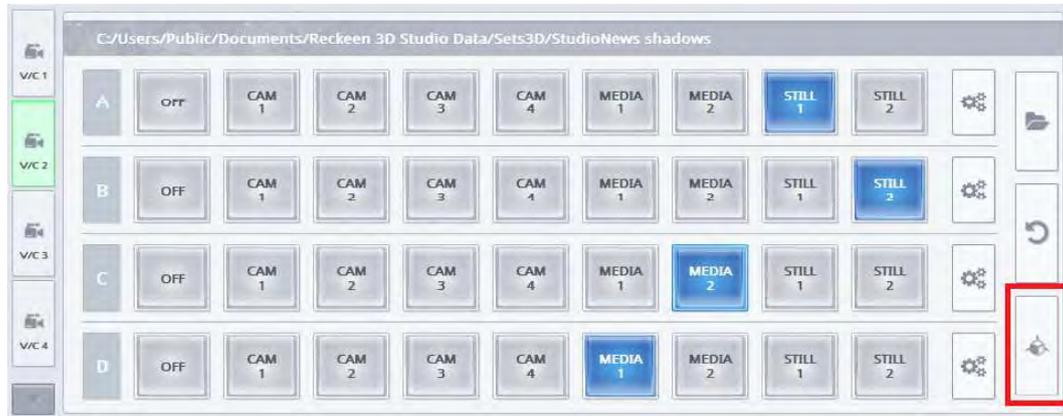
After opening, you can see the editor screen. The Reckeen 3D Studio system operates on a single file virtual 3D studio project loaded, but it can be a very complex one. You can add another studio project to the already existing one and place it on the same set, e.g. by its side or at the top. The second studio is added with the Add... button in 3D Editor.

This way you will have in one file , two different studios with the possibility of two (e.g. V/C1 and V/C2) cameramen in one virtual studio and two (e.g. V/C3 and V/C 4) in the other studio.

After adding a new studio, it may not have lights. If your studio is dark you have to add light to it.

See the picture below.
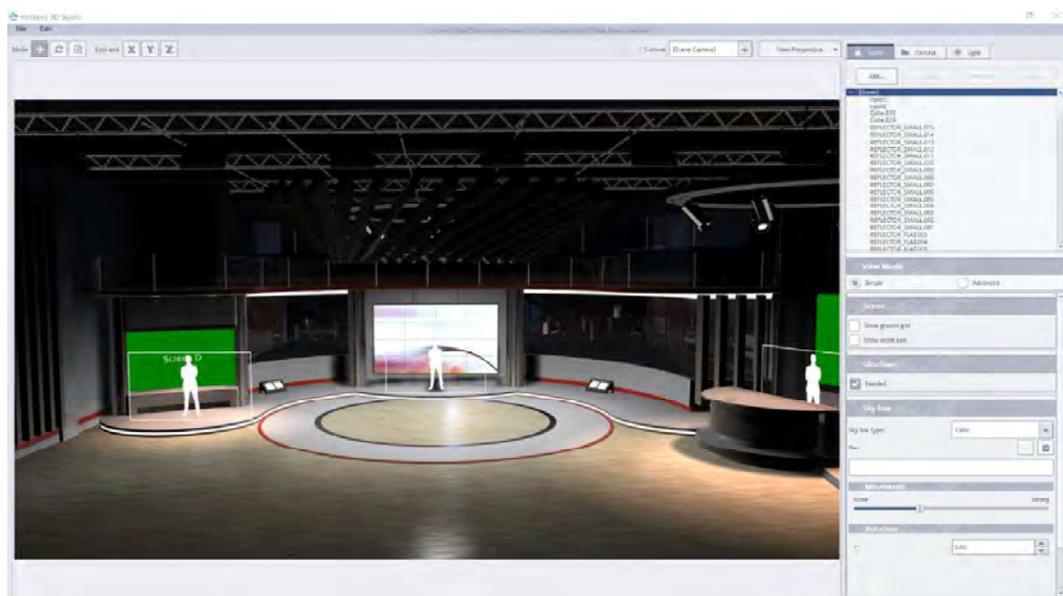
OPERATING MODES: CAMERA AND OBJECT

First, let's discuss the different operating modes of a mouse on the 3D editor screen:

Camera operating mode

Clicking with a simultaneous movement.
Left mouse button: change the camera's position/view in the studio in X, Y axes. Scroll - move the camera forwards and backwards in the Z axis.

Right mouse button: rotate the camera in a studio - to the left or to the right and up or down.

In this mode, the mouse can lock X, Y, Z axes in order to position a camera view accurately, just as in the Camera setup.

On the picture below – two axes (X and Y) are locked, so the movement is possible only in the Z axis.

Object operating mode

If you only click the left mouse button, you will select the object located at the cursor's position. The object will be highlighted in red and a 3D Gizmo, which is an indicator allowing you to edit the object, will be displayed for it. The type of the Gizmo indicator will depend on the selected object's editing mode (move, rotate or resize). You can see a 3D Gizmo portrayed with arrows in the following picture, it allows you to move the object in all 3 axes.

With right-click on the 3D Gizmo you can carry out an orbit operation on the highlighted object. This operation is described later on in this manual.

When the object is selected with a cursor and highlighted, you are still able to move your camera. Just click the left mouse button and move it simultaneously, but this time - beyond the red outline of the object. This allows you to position the object better in your studio, being able to see it from every possible angle.

If you want to disable the object's highlight - just click the left mouse button again on the object highlighted in red. The highlight will disappear, thereby signaling leaving the Object operating mode.

EDIT: UNDO AND REDO FUNCTIONS

There is an Edit option available at the top left side of the screen. You can trigger Undo and Redo functions from the drop-down menu or through the keyboard shortcuts. Undo: Ctrl+Z, Redo: Ctrl+Y

- Undo function - erases the last introduced change.
- Redo function - reverses the Undo command.

Note, however, that if you undo several operations and now you are performing a completely new operation, all undone operations will be deleted from the job queue (list of tasks). In case you perform a lot of operations, the system can limit the amount of memorized operations that can be used with Undo, Redo functions.

CAMERA TAB

There are the following tabs at the top right of the screen: Scene, Camera and Light.

Let's choose a Camera tab. Picture below:
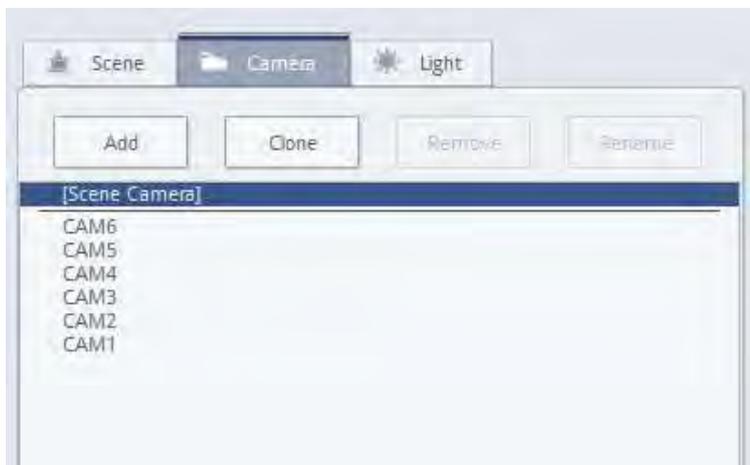
A list of default camera shots for the studio will be displayed. These shots (their number and type) have been defined by the designer of the studio.

If you choose Camera 1 shot, its view will be visible on the screen. You can change this shot by setting the camera differently with mouse buttons in the Camera mode. Remember that this way you will not be able to change in the editor the shots currently loaded to the production module.

These shots will be loaded into V/C groups only after reloading the studio project file to production. When you finish the editing, you can save such altered project as a new studio under a new name.

The studio file should be saved under a different name, because if you try to save it under the same name, the system will warn you with a message concerning an attempt to overwrite the file.
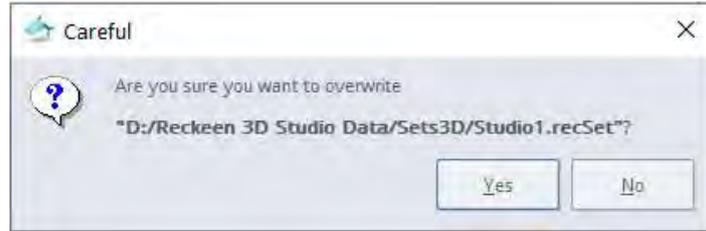
If you decide to overwrite the file and the given file is write protected, you'll get a message, as shown below.
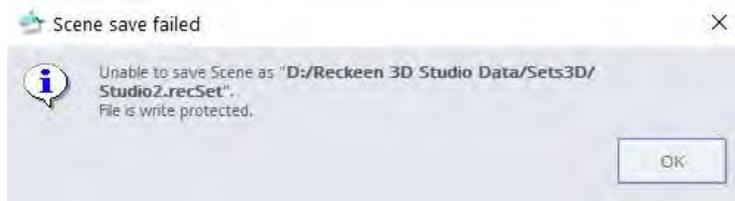
If you want also your new file protected against overwriting (changing), check the appropriate option during the process of creating this new file - saving it.

See the picture below.

You can also change the number of the new studio's default shots by: adding a new shot, cloning a chosen shot, deleting some of the shots or changing their name - with Add, Clone, Remove and Rename functions

The picture below - five new shots were added to the four shots created by a graphic designer.
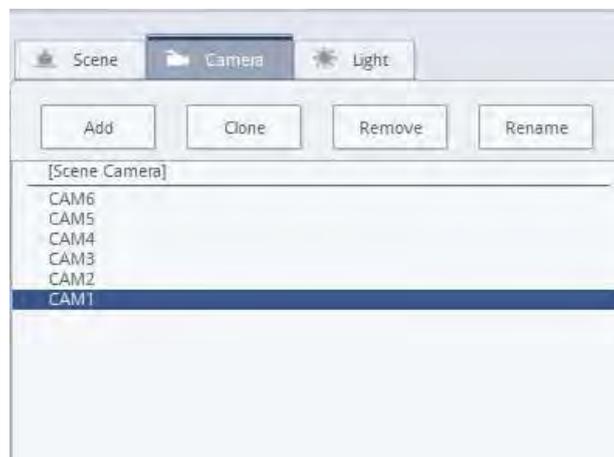
You can define up to 15 new default camera shots. They will be immediately visible in the Camera setup in the V/C 1 to V/C 4 after loading a new studio to production - exactly the same for each virtual cameraman.

It is very useful and therefore, in addition to the Camera tab, you also have a possibility to switch between the default camera shots (Camera_1 to Camera_4) at the top of the screen, next to the View Perspective icon. See the picture below.

This allows you to switch between the shots while working in the Scene or the Light tab, and to monitor on a regular basis how the changes introduced in one camera view look like in another one . See the picture below
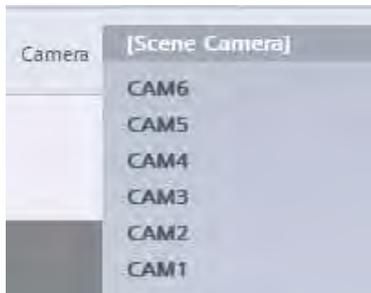
For the ease of use, there is also a possibility to work with objects in the Camera tab - you just have to switch to the OBJECT mode with your mouse. However, it's a SCENE tab which was especially designed for this purpose and so it has more options for editing the objects.

SCENE TAB

In the Scene tab, below Clone, Remove and Save... icons there is a tree with all the objects in the studio. See the picture below.
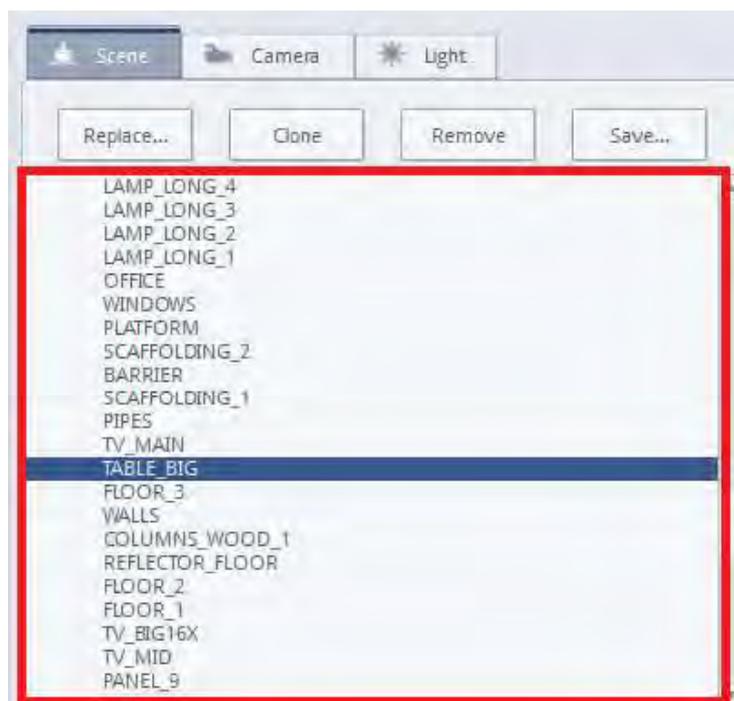
If you have a problem with selecting an object on your screen, for example, because it is obscured by another object located closer to the camera, you can select this object from the list. The object is highlighted in red on the screen then, and its 3D Gizmo, with which the object can be edited, appears.

A list of all the objects in the studio can be displayed in two modes. You can see the objects tree in a Simple mode in the picture above, with a list of whole objects created by the studio designer. When you enable the Advanced mode for the selected object (e.g. desk_background), you will be able to see its components. Picture below.

If you are working in the OBJECT mode, that is you have an object selected and highlighted in a studio, you will see additional icons above the tree: Replace , Clone, Remove and Save... .

As shown below.
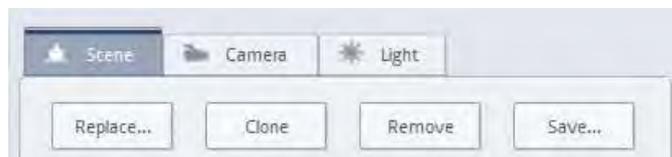
Replace - allows you to swap objects. We can, for example, replace the desk object on the stage to another desk. The new object will be exactly in the place of the previous object.

Clone - (enables cloning the highlighted object) - it adds a clone to the bottom of the list, and places a new object in the preview window in exactly the same location as the original. You have to move the cloned object in order to see that there are, in fact, two identical objects in the studio.

Remove - allows you to delete the highlighted object.

Save - allows you to save the selected object in a directory on your hard drive. If, for example, you like the studio ceiling or its another element, you can save it on your hard drive and use it in another studio project. In order to load the object, you have to go to CAMERA mode of the mouse. Then the

Add - icon will appear on the screen in the place of icons: Clone, Remove and Save. The appearance of the Add icon can also be called by clicking [Scene] on the tree with a list of all objects at the very top of the list. See the picture below.

After pressing ADD button... a window with available objects in the Reckeen system database is displayed. It allows you to view an object when you select its thumbnail. On the right side, you will see full information about the object and its location. It is possible to search for an object by typing in first three characters or by using categories and sub-categories. If you want to add an object to the set design that is not in the database, just press "Load file" button and then select an appropriate file from the disk.

You can load objects from files: *.recNode (the Reckeen 3D Studio system's own obcject files) , *.obj, *.fbx, *.3mf (external programs' files like Microsoft Paint 3D) and *.recSet (the Reckeen 3D Studio system's own studio files).
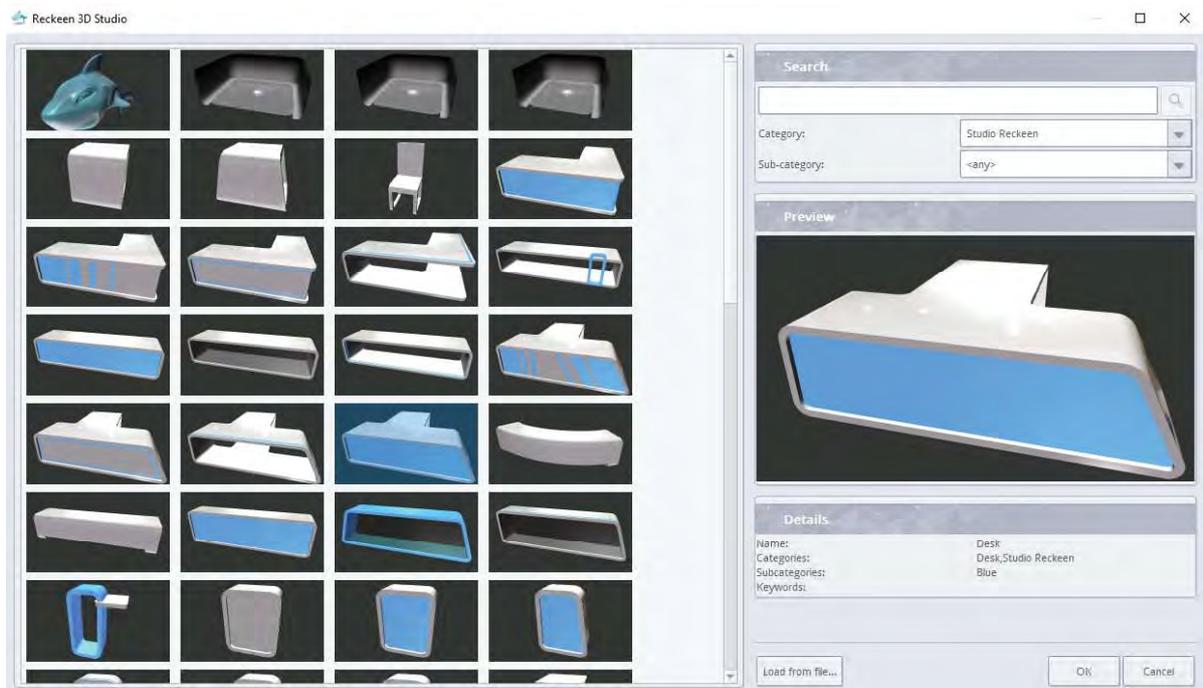
Node section

If you select an object in the studio and it highlights in red, a Node section will appear in the Scene tab below the View Mode section, along with its subsections: Position, Rotation and Scale (picture below).

These subsections show accurate numerical values of the studio object's settings in the subsequent modes that can be selected at the top left of the screen: Move, Rotate, Scale. Picture below.

Changes in the object can be also precisely set by clicking up or down white arrows on the right side of the displayed values. You can also enter your own numerical values of the object's settings. To do this, select the numeric field with a cursor, so that the value highlights in blue, and enter the correct number on your keyboard.

If the object you have selected in the studio is a Talent or a Screen, then you will see an additional subsection Source in the Node section

These are the objects for which you can change the sources with the A, B, C ,D mixer on the 3D Production screen, when the Live option is selected, as shown in the picture above. See section: Selection of signal sources A, B, C, D.
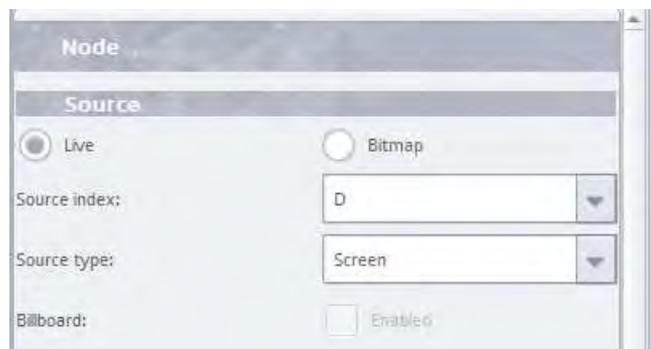
If you select the Bitmap option, it means that you will not use the A, B, C, D mixer in the project of your studio, but rather place an image as a source instead. For example, if you have a couple of screens in the studio, you can put different images on some of these screens with the Bitmap option, and a movie or a camera feed on one or a few displays with Live option. If you cannot select a single display screen in the Simple mode, as all the screens were grouped together by a graphic designer, you should use the Advanced mode.

Clicking on the icon with three dots will allow you to upload an image file from your hard drive. The path to this file will be displayed in the window. As shown below.

Click on the bin icon to clear the window.

To set the Source index, click on the drop-down menu and select the index type: A, B, C or D. Then, what you have previously assigned to the sources A, B , C or D in the mixer, will be shown in the studio. See section: Selection of signal sources A, B, C , D.
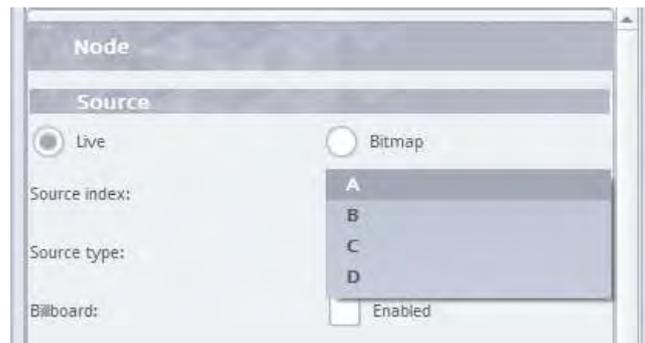
To set the Source type, click on the drop-down menu and choose the type. See the picture below.

- Talent Full - the Talent type - a view of the whole figure,
- Talent Middle – the Talent type - only the upper half of the figure is visible,

- Talent Desk – the Talent type - a figure sitting behind the desk,
- Screen – a screen view,
- Other – a view specified by the user,

You should take into account that if you have multiple Live sources of the same index (e.g. there are several A objects in the studio at a time), then changing the Source type of one of them (e.g. Talent to the desk) will automatically result in changing the type of all the instances of A.

The Source type function places an appropriate image on a studio miniature. You will be able to see it in the shot's preview in the production module. For example, if the studio designer envisaged that a source of the Screen type will be placed in a given location, then you will see a green graphics on the studio miniature. You will also be able to see a Talent figure in a position behind the desk on this miniature, if the Talent has been placed so. This facilitates operating the A, B, C , D mixer. See the picture below.
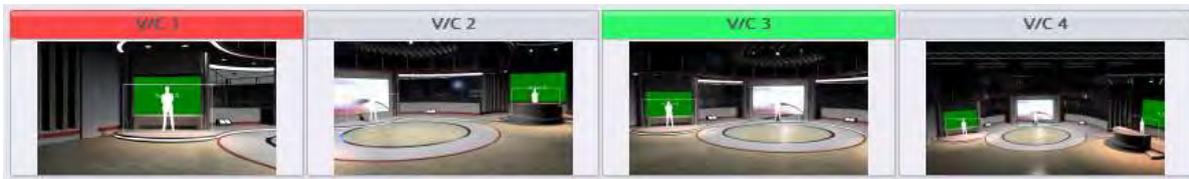
BILLBOARD FUNCTION

This function is very useful in the case of a Talent object. Picture below.
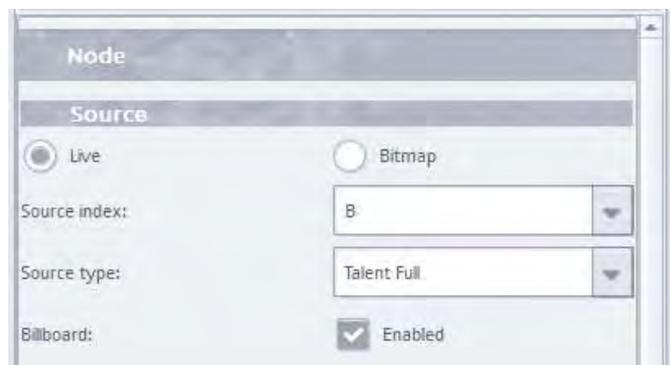
When you enable this function, the Talent will always be positioned 'facing' the camera, regardless of the shot. The camera will always point at the Talent at a right angle, as the Talent will rotate around a vertical axis Y. This way, a situation where the camera 'looks' at the Talent from the side, seeing only a vertical line, will be avoided.

Below the BILLBOARD checkbox you can also find ENABLE HIDE option. It is used to completely turn off a source of A, B, C, D type from a studio without the need to remove the object itself. The studio's author can provide in the project possibilities of placing, for example, a form of a talent in various places in the studio. Using them all at once in one frame is not possible, so such source can be switched off for a while.

You have to be careful in the case when the Talent figure stands close to some other object, like to a desk, not to move into it when turning around. The picture below.
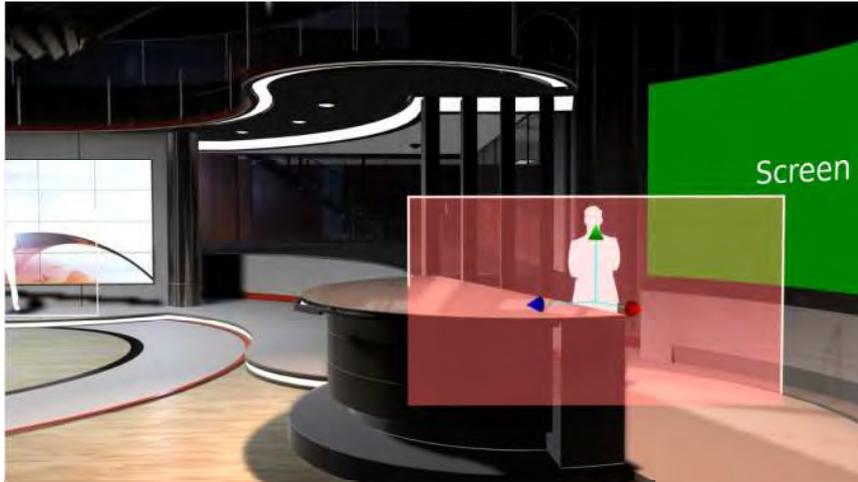
In such case, you should increase the distance between the Talent and the object, or even remove this object from the studio. Graphic designer can disable the Billboard function for the Talent in their project and in this situation you need to save the studio in a new file to change this.

MOVE, ROTATE AND SCALE MODES

Mode icons are placed in the upper right corner of the screen. Let's start with a Move mode.

Each mode has its own 3D Gizmo type which appears when you select an object.

To make the user's work easier, shortcuts ALT + Q, ALT + W, and ALT + E, allowing you to quickly switch between different 3D Gizmo modes, have been defined.

When you select the object, it highlights in red and the 3D Move Gizmo appears.

See the picture below.
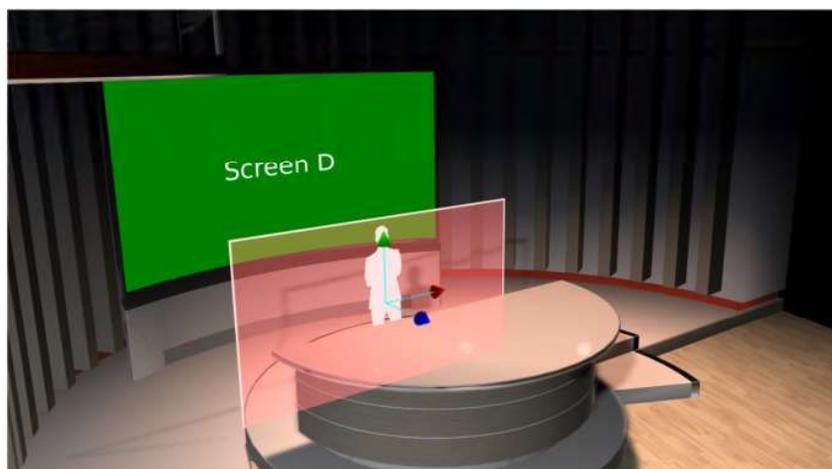
If you hook the mouse cursor on any of the arrows, you move the object in that direction. The currently

used arrow highlights in yellow.

When you move the cursor into the 3D Move Gizmo, you will find a place where all 3 arrows light up. You can change all values at once with the mouse cursor there, that is move the object in all three directions. However, it is easier to set the object's shifts in successive axes.

Setting the shifts in some axes may prove particularly difficult or even impossible with various objects due to the lack of appropriate view.

Imagine that you want your talent to move from the desk to the front. When the camera faces straight at the Talent, you will not see the Z axis at all. As shown below.
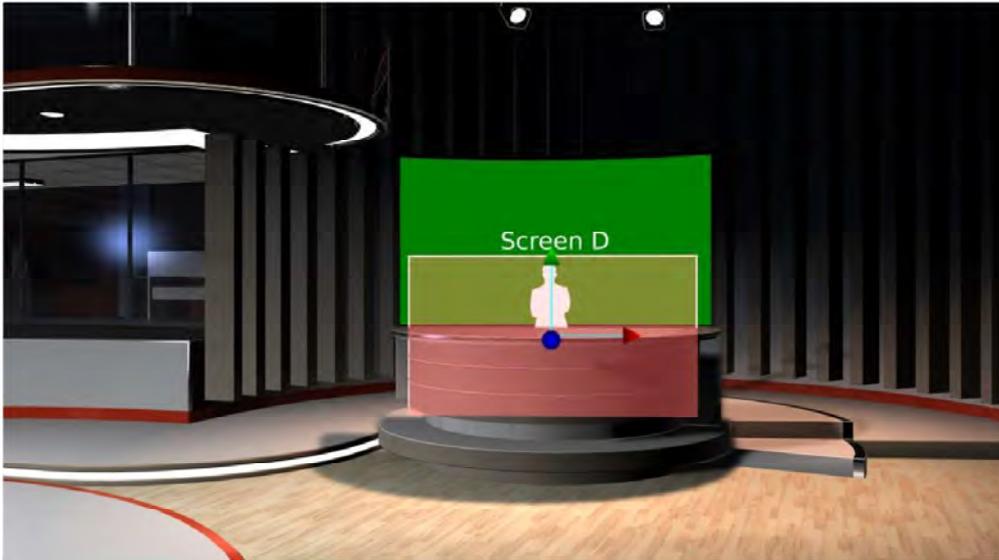
However, you can change the camera view perspective with the drop-down menu at the top right side of the screen. Let's choose View Left. Picture below.
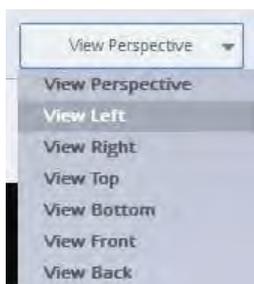
In this view, the Z axis is clearly visible, which allows for accurate positioning of a shift in this axis. Pulling the Talent forward from behind the desk, you can precisely set the position in the Z axis, and also the height in the Y axis.

See the picture below.

In the Position section of the Settings, you can see the values showing the exact location of the object inside your studio. Figures are given in centimeters and refer to the zero point set by the studio's designer.

Let's enable the Rotate mode now.

Select the object, it will become highlighted in red and 3D Rotate Gizmo will show up on it.

Picture below.
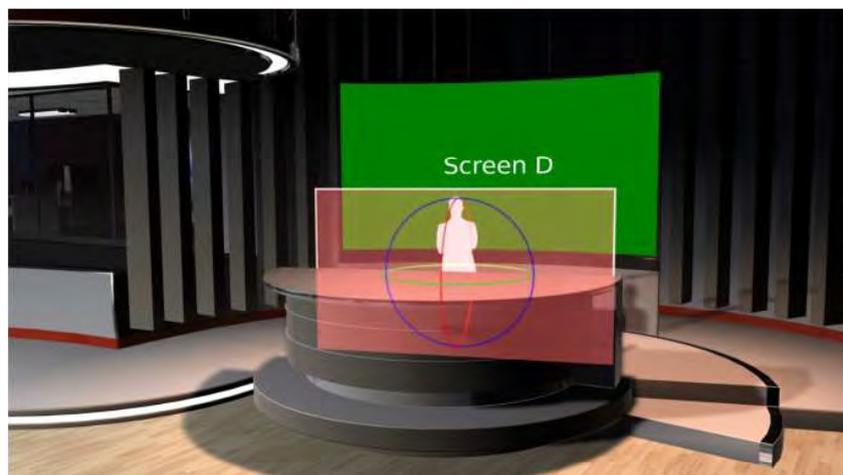
If you hook the mouse cursor on any of the circles, you can rotate the object. The currently used circle highlights in yellow.

When you move the cursor into the 3D Rotate Gizmo, you will find a place where all 3 circles light up. You can change all the values at once with a mouse cursor there, that is rotate the object in all three directions. However, it is easier to rotate the object with movements on successive circles.

Just as before, you can take advantage of additional views from different camera angles, if setting any of

rotations proves to be particularly difficult.

In the Rotation section of the Settings, you can see numerical values showing the angles of the object's rotation in the studio. The figures are given in degrees.

Now, let's enable the SCALE mode.

See the picture below.

Select the object in the studio, it will become highlighted in red and 3D Scale Gizmo will show up. Picture below.
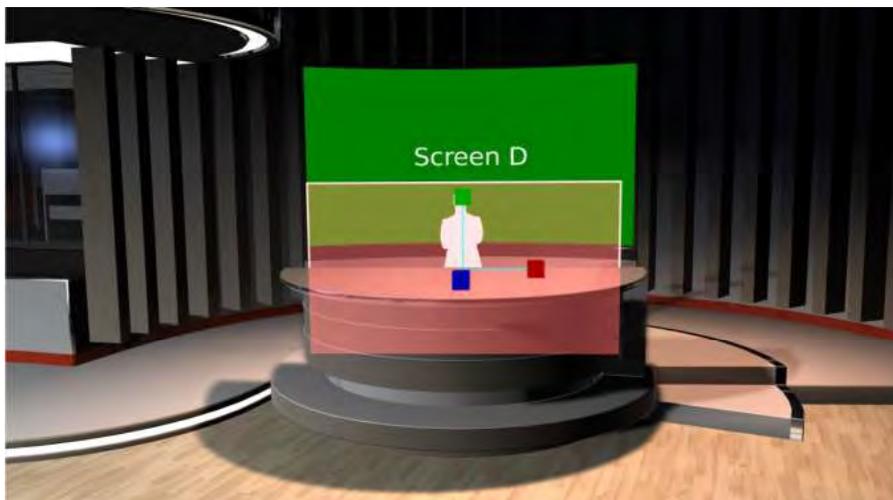
If you hook the mouse cursor on any of the cubes, you can increase or decrease your object in this direction. The currently used axis with a cube highlights in yellow.

When you move the cursor into the 3D Scale Gizmo, you will find a place where all 3 axes with cubes light up. You can change all values at once with the mouse cursor there, that is change the object's size in all three directions. However, it is easier to set the object's size in successive axes. Flat objects, such as Talent, can be enlarged or reduced in size in X and Y axes, but there is no possibility of "stretching" it in the Z axis.

Also in this case, you can take advantage of changing the perspective to get the right view helping you to set the changes in the object correctly.

SCENE SECTION

When you leave the Object mode in the Scene tab, that is the red highlight of the object disappears, then the Scene Section switches on below the View Mode section, with the following options: Show Ground Grid, Show World Axis, Shadows and Sky Box. As shown below.

Shadows - Selecting enabled allows you to turn ON shadows in the studio, both for objects and for talents. For more see chapter "Shadows" below.

The Show Ground Grid function - enabling this feature will result in displaying a grid on the studio floor, which will facilitate objects' positioning. Grid squares have sides with a length of 100 units, that is 1 meter.

The Show World Axis function - switches on an additional 3D Gizmo for the studio. This 3D Gizmo shows directions in the studio all the while making the orientation easier. Picture below.

The SkyBox function - it is an additional function for creating objects, a method that enables adding *.dds files to the studio project - that is, typical files simulating the space outside the studio depending on camera angles. This will be the most distant space, often completely outside the studio. You have several types of SkyBoxes at your disposal: 'Cube' (default) – *.dds files, 'Cylinder' – bitmap files (*.png., *.jpg, *.jpeg,*.bmp) , 'Sphere' - (*.png., *.jpg, *.jpeg,*.bmp) and 'Sphere reflect' - (*.png., *.jpg, *.jpeg,*.bmp). These files contain a flat image, which can be applied on the SkyBox of a given type, yielding e.g. a three-dimensional view of the sky.

Sky box type: Cube

After loading a Cube type Sky Box, you can set the following image parameters:

Movement - this parameter simulates bringing a SkyMap closer to the studio and moving it away. You can observe how the SkyMap moveWhen you are creating a set design, you can use a measuring instrument that will show current overall performance of the Reckeen system. You can turn this function on with a button in the Studio Editor (see the image below).ing the slider on a range from None to Strong.

Rotation - by default, values for this parameter are assumed in degrees from 180 degrees to (minus) -179.99 degrees. When the SkyMap file is loaded, this parameter is set to 0. Entering further Rotation values will make the SkyMap rotate on its axis to the right or to the left. If you type in '180', then the SkyMap will turn around and an initial view will be placed exactly behind the camera directed straight ahead towards the studio.

Sky box type: Cylinder - space around an observer is created by wrapping a flat image on a cylinder. After loading Cylinder type Sky Box, you can set the following image parameters:

Offset - controls the SkyMap's cylinder shifting up / down in relation to your studio's floor. Negative values shift it down, positive values up. Values are assumed by default in % and the maximum value is 100%. At 100% your cylinder is shifted up to the top and its bottom edge is at your studio's floor level. At (minus) -100% the SkyMap's cylinder is shifted totally downward and its top edge is at the floor level of your studio.

Scale - adjust the 'wrapping' of the loaded cylinder's image. Values are assumed by default in %. At 100% the cylinder is wrapped without gaps in the image, the image is 100% filled up. Values above 100% will cause the image wrapped on the cylinder to overlay, while values below 100% will result in creating a gap in the image.

Rotation - its default values are set in degrees from 180 degrees to (minus) -179.99 degrees. If the parameter is 0, the camera standing in the studio and pointing straight ahead 'sees' the center of the image. By entering the next Rotation value, you will rotate the image on its axis to the right or to the left.

Note: Sides if images to be displayed as panoramas on cylinders should have multiples of 1024 as their lengths in pixels: 1024, 2048, 4096, 8192, 16384

For example: files with resolutions: 8192x2048, 8192x4096, 16384x2048

Files with other resolutions may be displayed in inferior quality or may slow down the system.

In the case of a Cylinder type SkyMap, you have to be careful about reflections in the studio. It may happen that a glossy floor reflects the 'top' part of the cylinder, which is, in fact, an empty hole, resulting in the unnatural look of the studio's floor. It is not a case with Cube, Sphere or Sphere reflect types of Sky Boxes that fill the whole sphere.

Sky box type: Sphere - this type of SkyMap requires .jpg files, but specially prepared. Some cameras can take this kind of panoramic pictures. After loading this file, a full sphere is created around the studio.

When you load a Sphere Sky Box, you can set the same image parameters as with the Cube.

Sky box type: Sphere reflect - just like with the Sphere files, this type of SkyMap requires .jpg files, but specially prepared. You can get such panorama files by using certain cameras or by preparing them by a graphic designer. After loading such file, a full sphere is created around the studio.

After loading the Sphere reflect type Sky Box, you can set the same image parameters as with the Cube.

SHADOWS

To enable shadows in the studio, first you have to select the first item, [Scene], which covers the main set design's settings.
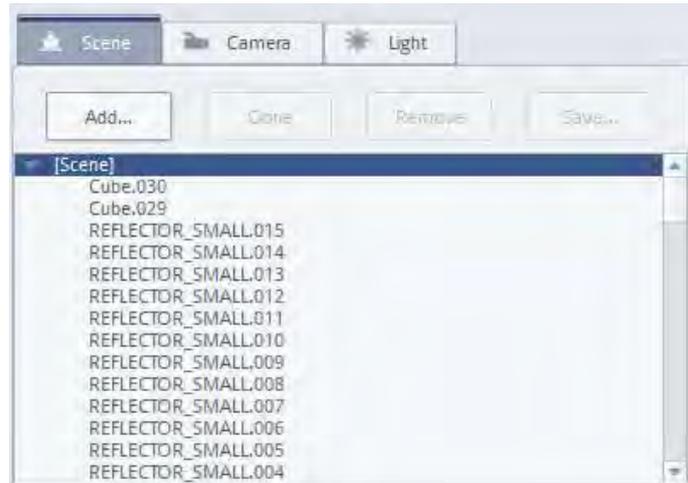
You can find "Shadows" position below the objects tree. After checking the function: Enable shadows, additional options for adjusting shadows' density are displayed.

To adjust shadow's density, use a slider with values ranging from NONE to STRONG.

The first parameter applies to the shadows cast by all the objects in the studio for which Enable shadows option has been checked. The second parameter applies to all the Talent type objects. With a slider, you can set a shadow that is more transparent (NONE) or has higher distinctness (STRONG). The example is shown in the image below.

Shadow parameters for objects will depend on the lights' settings in the studio, while talent type shadows do not depend on the light settings and are always generated after the Enable Shadows function on a specific Talent type object is checked.

If you are using a ready-made set design, first you select an appropriate Talent type object. If you are creating a new set design, it can be added with ADD button. An appropriate talent thumbnail appears.

The most important thing is to ensure that a contour edge of a field where the talent figure is located was situated just above the floor, under no circumstances penetrating it.

Select the object with a mouse so that it was highlighted in red. The parameters of this object will be displayed on the right side of the screen. Find "Shadows" field.

When you check Enable Shadow option, you enable a shadow for this object.

To set the shadows' parameters more precisely, it is suggested to set them on a live source.

For example, if you select this object, you will notice that this source is set with A mixer, as indicated by the Source index parameter.
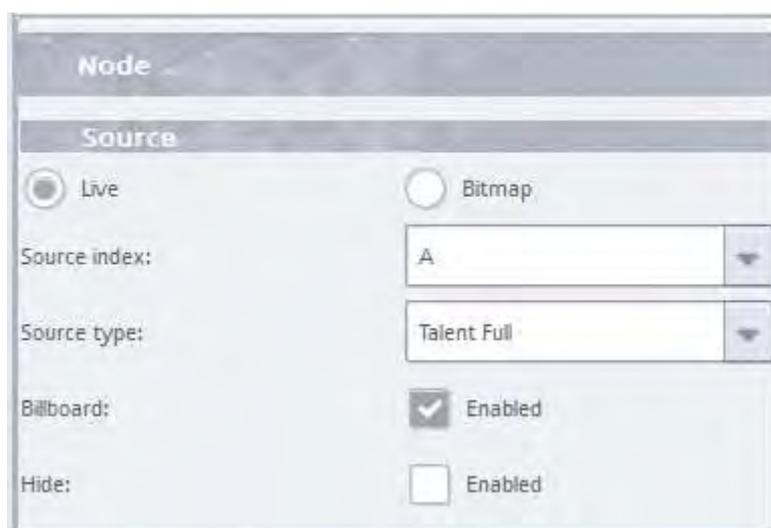
Therefore, just set any input from a camera, CAM 1 for example, on the Production module's mixer.

You will get on the screen a live image from the camera.

Now the live image from the camera should be subjected to a chromatic keying procedure described in the "Keying" section.

The figure's size should be properly adjusted to the chosen set design in the part of the mixer A, where the live source from the camera 1 had been previously selected. It is done with the use of gears settings button located on the right side of the buttons. The image below.

After pressing the button, the size of the talent can be adjusted by using a scale knob

in a window that appears. The image below.
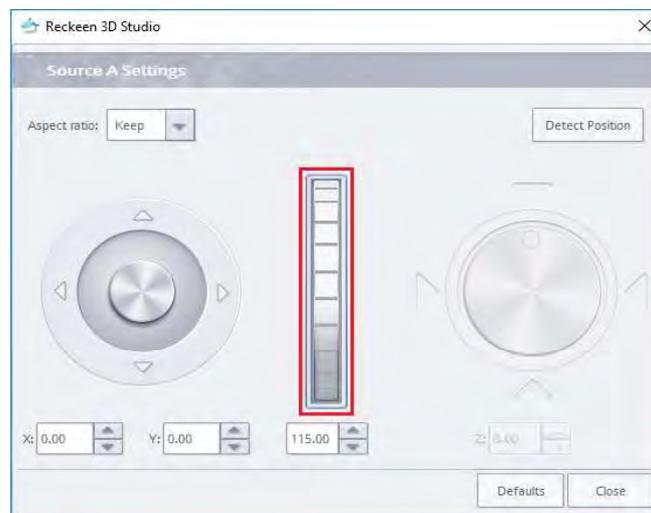
The achieved effect will be as demonstrated in the image below.

The next important step is to use DETECT POSITION button, with which you will automatically pin the talent's form to the floor and adjust its shadow. The image below.

The effect of using this function will be just like in the image below.

After selecting the object so that it was highlighted in red, it is possible to adjust a shadow to better fit the figure with the help of sliders.

The first parameter - Size - relates to the radius of the shadow. With the help of the second slider -Shape- you can define the shape of the shadow that is cast.

Now it is possible to set an appropriate shadow density (None, Strong) with the main shadow parameter ([Scene]).
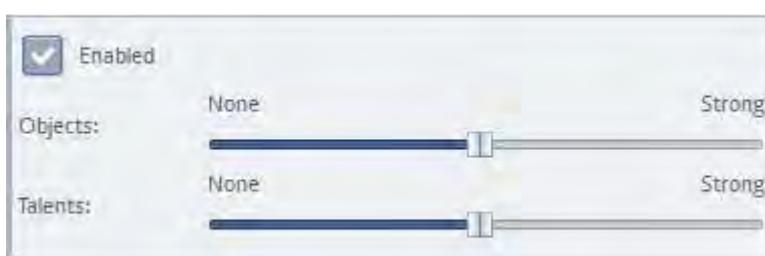
The image below depicts the final result of using size, shape and shadow density functions.

In the case of non-Talent objects, you select an object so that it becomes highlighted in red.
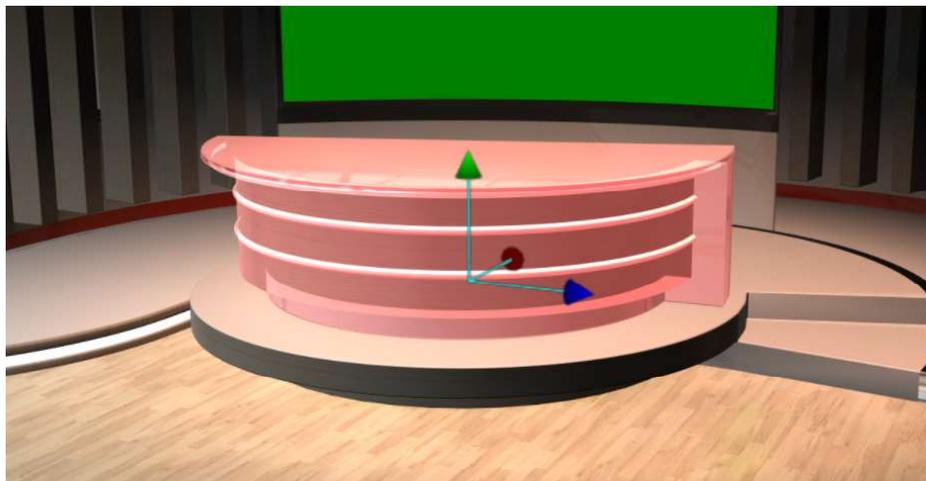
On the right side, you can now see a Shadow parameter along with Enable Shadow option. With this

option you can turn on the shadow for a given object, if the lighting conditions are met, i.e. an appropriate type of light is used, Spot for example.
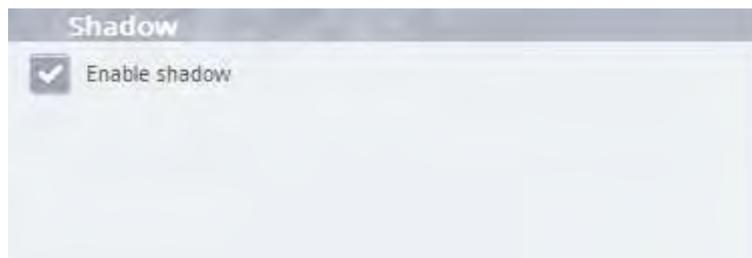
You can set an appropriate density of the object's shadow by using the main ([Scene]) parameters.
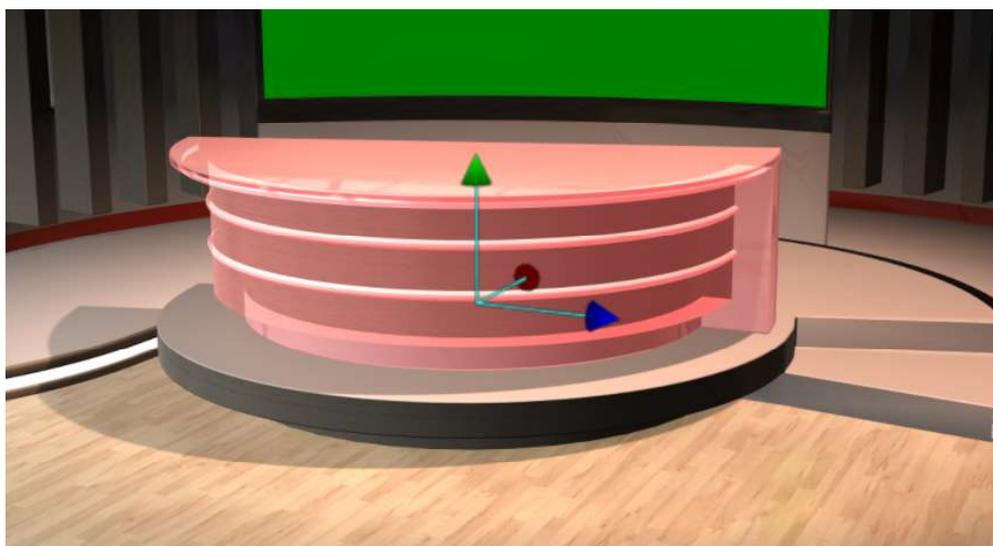
General rules for enabling shadows:

If you want to use shadows, you have to take into account the fact that they require additional calculations done in the system and, what goes with it, an increased use of graphics memory.

You should enable shadows only for those objects that are clearly visible on the stage and are of particular importance to the final viewer. If there are objects in the set's background that are barely visible or that do not participate in the main thread of the camera, they do not require shadows. It is not recommended to enable shadows for large objects, i.e. entire large external studio wall, ceiling or floor (such objects do not create shadows in the natural studio environment). For the objects that are not illuminated by any lights, i.e. Direct or Spot ones (as only these types of lights create shadows), there is no need to enable this function. In addition, fully transparent objects also do not create shadows.

It is suggested to pay attention to whether you enable a shadow for an entire group of objects, e.g. for a desk, and not just for one of its legs.

PERFORMANCE function is used for overall evaluation of the scene performance, its description can be found in one of the following parts of the manual.

SHADOWS - FOR PNG BITMAPS

The talent object can also be used to insert permanent PNG graphics also containing transparency with an alpha channel, for example in the PNG file format. for such a bitmap it is also possible to turn on shadows.

The above photo shows a bitmap which is selected from the Source / Bitmap tab and below there is an option to turn on shadows for such a bitmap. Shadows for these types of objects act as shadows for decoration objects.

SHADOWS - FOR ANIMATIONS

Each object placed in the scene can be animated. If, before activating the animation function, the shadows on such an object have been turned on, they will also be active in the anaimation process. Look at the picture below:
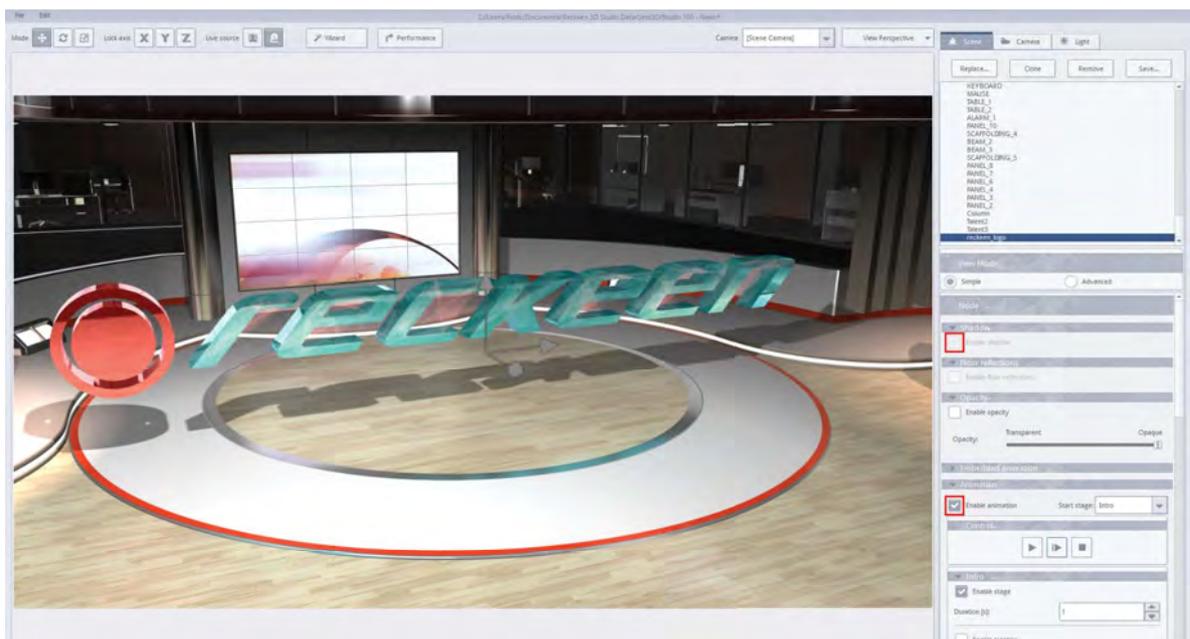
OPACITY

To enable opacity in the studio, first you have to select the first item, [Scene], which covers the main set design's settings. You can find "Opacity" position below the objects tree. After checking the function: Enable opacity, options for adjusting opacity.

Select the object with a mouse so that it was highlighted in red. The parameters of this object will be displayed on the right side of the screen. Find "Opacity" field.

When you check Enable Opacity option, you enable a opacity for selected object:

To adjust opacity use a slider with values ranging from TRANSPARENT to OPAQUE.

FLOOR REFLECTIONS

In our studio, we define the floor as an object placed at the level: Y = from 0cm to 30cm.
For such an object it is possible to turn on precise reflections, the photo below shows the same scene with the option turned on and off:

Note - a floor object located outside the range (0 to 30 cm) will have preset reflections disabled automatically.

3D PERFORMANCE

When you are creating a set design, you can use a measuring instrument that will show current overall performance of the Reckeen system. You can turn this function on with a button in the Studio Editor (see the image below).

For better accuracy of measurement and evaluation, it is suggested to choose an output format in which you intend to work and to connect the appropriate number of inputs.

The evaluation of system performance depends on many factors, i.e. video input, format of files in video and graphic trays, sequences used, enabled DSK layers, etc. Therefore, the indicator provides some approximation of performance evaluation. During the measurement it is suggested to include the largest area of the studio possible in the stage camera's view, but still as if it was done working on the air.

When this function is activated, the main mixer's PROGRAM and PREVIEW will be switched for a while, so it shouldn't be used during live operation. You will be informed about that with a message. If you don't want to see this message again while launching the function, check an option: Do not show this window again. If you want to see the messages again, in the General / Options settings press a button: Reset pop-up warnings to default state. Picture below.
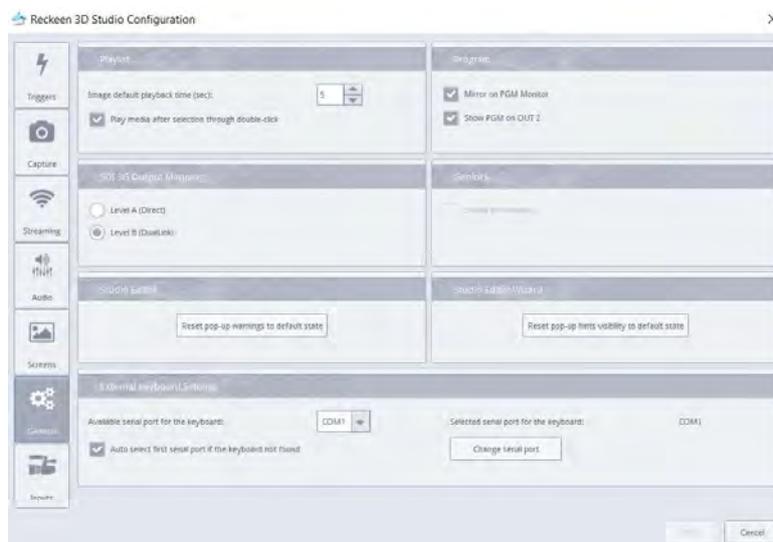
After you accept the button, a progress bar will appear with its respective colors and percentage of system usage under given conditions. See the description below.

Performance is depend on many factors (not only number of triangles) in objects:

- Set complexity
- number of triangles,
- number of objects,

- materials,
- texture resolution.

Performance colors:
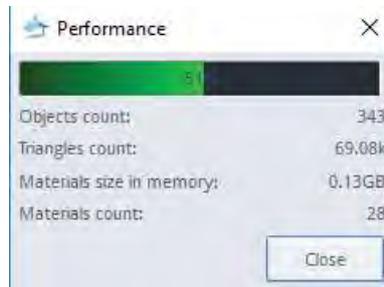
- Green performance (to 70%) counter means that set is properly prepared and optimized. Can be used without any problems.
- Yellow color (from 70% to 90%) means that set is quite heavy and very rare with very heavy system overloading can produce jerks,
- Red color (above 90%) means that set is too heavy and should be better optimized or complexity should be reduced.

LIGHT TAB

In this section, properties of studio lights are being defined. You can change the parameters of these lights, turn them on and off, change their color, direction and positioning in the studio. You cannot, however, add or clone new lights. For that reason, these buttons are dimmed. Picture below.

There are the following types of lights in the studio:

Ambient - a type of light that fills an entire studio and illuminates all the objects evenly. Ambient light does not come from any particular direction and it falls on all the elements of 3D scene, helping you lighten or darken them. Picture below.

You can only set the power of this light. If you enter a 0 value in the Power field, the light will be turned off. The maximum brightness Ambient light reaches at 2.00

To make it easier for the user to set the lights, when the Light tab is turned on, different types of lights will be represented by different objects that appear in the studio. This allows you to rotate and move these objects and thus control the direction of light and its location.

Ambient light is the only one that will not be represented by any object in studio because it fills the entire studio and you only set its strength.

OTHER TYPE OF LIGHTS

Generally , only 3D Rotate Gizmo or 3D Move Gizmo is available for light objects. The 3D Scale Gizmo is off because it is not possible to increase or decrease a light object. However, you can adjust the color, intensity, or direction of light by using the appropriate light-type controls.

You can choose the following types of lights from the drop-down list: Directional, Point, Spot.

The Directional light has only a color and a direction parameter. This source emits a parallel light, which means it travels across a stage in the same direction. Sunlight is the best example of such light.

Directional type of light creates shadows for the indicated objects. When directional light is directed upwards, it does not create shadows. Imagine a situation in which a talent figure is illuminated from underneath the floor (light penetrating the floor). The talent object would then cast a shadow on a ceiling, which wouldn't look naturally in the set design. It is possible to lighten up each direction of the studio with Directional light, but it simulates the real world's sunlight type of light, so it casts shadows on the objects below. Because of the system performance, it is best to use only one Directional light. The rest should be of a different type.

Below we see the cone object representing the Directional light source editor in the studio. The base of the cone is the place where the light emits. Where we point the base of the cone in this direction will be the direction of light illumination.

Note that for this cone a 3D Rotate Gizmo appears immediately. Even if you have previously set the 3D Move Gizmo mode, after selecting Directional light from the drop-down list, the Gizmo will be changed to

3D Rotate. This is due to the properties of this light, as it has only a color and a direction, and does not have a specific position.

A cone representing this light in the studio is always suspended in the middle of a 'ceiling'.

Directional light has always an object's representation with coordinates x = 0m, y = 3m, z = 0m, i.e. usually at the center of the studio. This position has no effect on the light's final effect, and is intended only to make it easier to be found in the studio for changing its direction with Rotate Gizmo. This means, if you have a different type of light, such as Point, placed anywhere in your studio, then after changing the type of light from Point (which has a position in the studio) to Directional, the position of this light object will remain unchanged only until you save the studio file to the editor. Afterwards, the object representing the Directional light will appear again in x = 0m, 3m y = z = 0m position in the studio.

With the 3D Rotate Gizmo we can easily set the direction of the light. Remember that our studio also produces light reflections from glossy materials: walls, ceilings, furniture, etc. Therefore, often light reflections can give us additional effects that must be checked by the user. Simply by editing the camera, you can check the random positions of the studio, light as the source (stream glow) does not unnatural reflect in the material .

Color of the light and its intensity can be set with a color wheel operating on RGB (Red, Green, Blue) system. Changing the dash marker's position on the wheel allows you to set the color by changing the color tone parameter. If you hook the cursor on a small circle, you will be able to move it inside the square. Current color will be visible in the middle of the small circle. If you want to turn the light off completely, you need to move the circle to a black area inside the square. . The picture below.
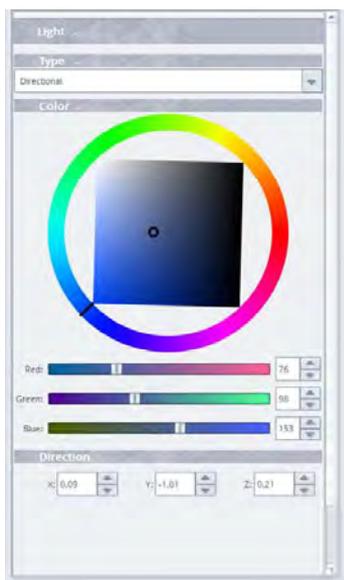
You can set the color of the light more precisely by clicking on white arrows next to numerical values.

By changing the color of the light, you also change the color of the object representing light, in this case the cone.

Generally , the 3D Rotate Gizmo is used to set the direction of the light. However, you can precisely adjust the direction of the light with help of the values in X, Y and Z fields in the Direction section.

Light of the POINT type is a spherical kind of light, which illuminates all the objects around it in the studio. In contrast to the type light Direction, this type has attenuation value depending on the distance from the source. The objects are less illuminated the further away they are from the source of light. This light does not have a single specific direction, it shines in every direction. It doesn't make shadows.

The light in the studio will be represented not by the cone but by the ball glowing in all directions.

This sphere (ball) has a specific position in the studio, so it will be important to position it with 3D Move Gizmo.

3D Rotate Gizmo you can also use, if you want to move the ball in some specific direction in the studio and the 3D Rotate Gizmo (arrows) axis are oriented in different directions. You can then rotate the object: the ball, to move the 3D Move Gizmo in the right direction and then move it with the 3D Move Gizmo.

Color of this light can be set in the same way as in the previous case, with the help of the color wheel. If you want to turn it off completely - choose black. The intensity, however, is controlled by the distance of the object Point light from the illuminated object.

Generally , the 3D Rotate Gizmo is used to set the direction of the light. However, you can precisely adjust the direction of the light with help of the values in X, Y and Z fields in the Direction section.

Position section.

In the Attenuation section you can set the type of attenuation of this light:

- Constant - constant light attenuation coefficient,
- Linear - linear light attenuation coefficient,
- Quadratic - square light attenuation coefficient.

Maximum attenuation of light is reached when entering a value of 2.00 .

If you enter a value of 0 in all the fields, the light will travel in the studio without any attenuation, it will neither be diffused nor weakened with the distance from the source. This will, by removing attenuation, maximize the illumination of this light.

In order to test the performance of these coefficients, you have to make a number of attempts typing different Constant, Linear and Quadratic values, and checking what lighting effects you get in the studio. It is best to start testing at initial values of Constant = 1.0, Linear = 0.5, and Quadratic = 0. Let's observe how the light affects objects in the studio. The further they are away from the light source, the more light dampening is visible.

Basically the three define an equation describing how the light appears at a distance. An attenuation factor is used for describing how a light's intensity diminishes over distance.
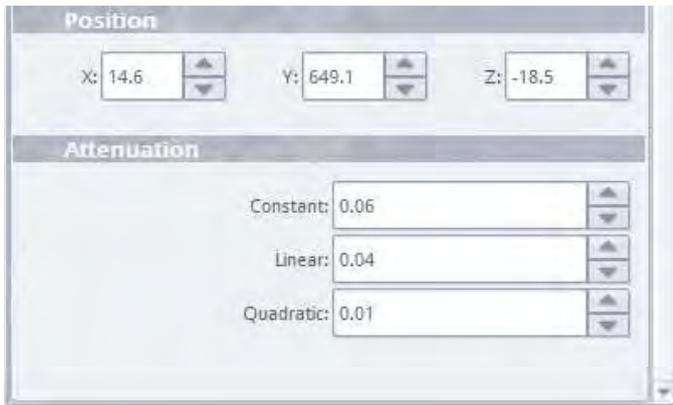
The reason the two parameters other than the constant one is called linear and quadratic is evident from the formula: the linear attenuation value is multiplied by the distance (thus we have a linear relationship) while the quadratic attentuation value is multplied by the square of the distance (giving a quadratic relationship).

Spot type of light - a spotlight type. Spot has parameters of color, position in the studio and light direction.

SPOT type of light creates objects' shadows. The most common use of this light is to illuminate a talent form from above. However, you should remember not to set this light's position and direction directly above the figure as the talent area is flat. Most often the light is placed a little ahead of the figure and in a proper direction towards the talent's outline. Then you will get a shadow effect behind the inserted talent. This light should illuminate a group of objects located close to each other, e.g. a desk, a platform and a talent. This type of light should be treated as a single light source illuminating the most important part of the studio, where the main production thread is located.

Light emitted from a spotlight is made up of an inner circle (representing the light source without dampening and adjustable with the INNER value) and an outer circle (the intensity of which is getting increasingly dampened and being regulated with the OUTER value). The light intensity decreases moving from a bright center to a darker outer contour. The light's color is set as before - with a color wheel. Choose black if you want to turn the light completely off.

Spot light is also represented by a cone object. The cone can be placed anywhere in the studio and pointed in any direction. Therefore, use the 3D Rotate Gizmo to set the direction of the Spot light and the 3D Move Gizmo to adjust its position in the studio.

In addition to setting the spotlight with the 3D Move Gizmo, you can make accurate and precise changes in the light's position in the studio using the X, Y and Z fields' values in the Position section. What's more, you can introduce accurate and precise changes to the direction of light, previously set using the 3D Rotate Gizmo, with the X, Y and Z fields' values in the Direction section.

In the Cone section, set Outer and Inner values. A value of 150 (expressed in degrees) is the maximum angle of this cone. The picture below.
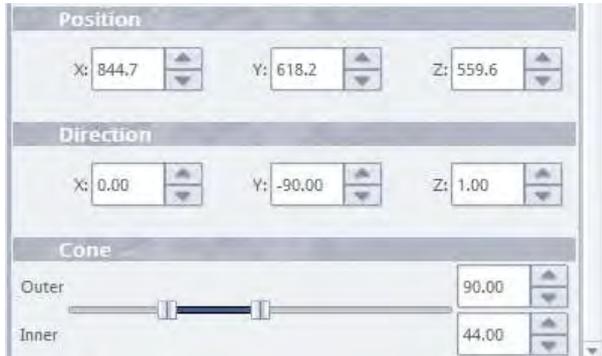
If you set the same values in Outer and Inner fields, you get a spotlight cone with circle of a very sharp boundaries. The further the Inner value is away from the Outer value, the fuzzier boundaries the spotlight will have.

Most often, in the studios' projects you will find already pre-set different types of lights. But it may happen that in the studio's project prepared in the Wizard, you will have to select and set your own lights as the Default lights have been be selected.

LIGHTS ON SCENOGRAPHY (EXAMPLE USAGE)

To best understand the whole idea of building a set design, illuminating it and creating shadows, it is best to use an example of a default "News" studio, which is loaded first during default launch of Production 3D. In this studio, AMBIENT type of light has been used to slightly illuminate the scenography. In addition, there is one POINT light to illuminate the elements in the background (elements of the studio's backup facilities) as the intensity of light depends on a distance from its source. Therefore, the elements that are really far back don't need such strong light. Since there are 3 talent figures in the studio that may take part in the camera's production thread, each of them has a separate SPOT light assigned with its appropriate INNER and OUTER cone settings. This stage design is not only properly lit, but also its performance requirements are not high. Picture below.
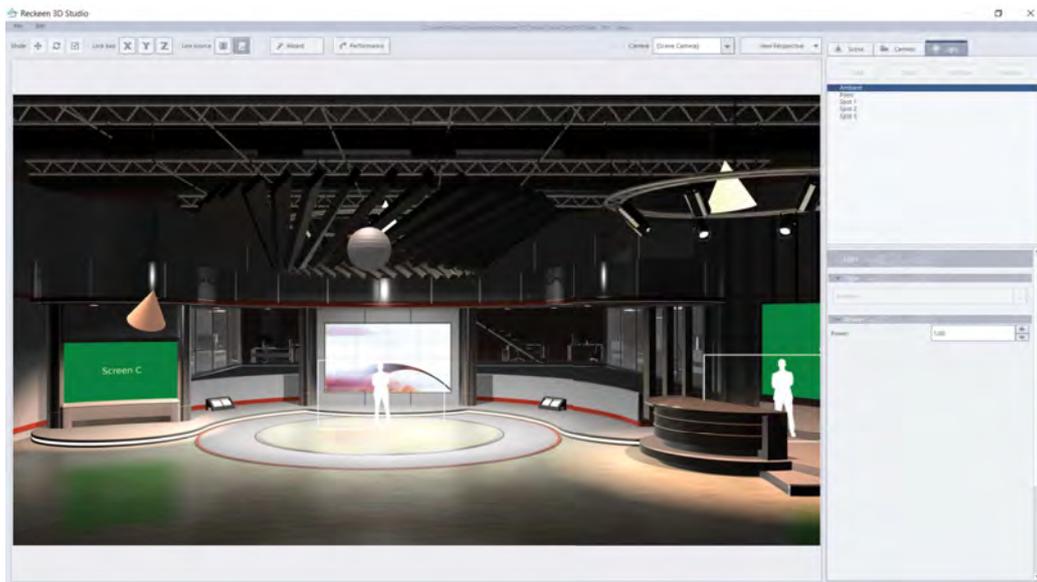
TOOLBAR - FILE OPTION

There is an File option on the toolbar available at the top left side of the screen. You can choose functions from the drop-down menu.

File-> New – You start the editor work from scratch. If you have any studio loaded, selecting this function will cause all of the settings to be lost.

- File->Open Wizard
- File >Load Studio . . . - opens a studio file with a previously saved project.
- File >Save Studio - saves a current project file.
- File >Save Studio As . . . - saves a current project in a file under a different name.
- File >Go to Startup - takes you to the start screen

If we choose the option File- Open Wizard , we go to Wizard.

IMPORT OF 3D OBJECTS

You can add 3D objects to your scene, the Reckeen 3D Studio allows importing OBJ and FBX files.

We'll go back to 3D Editor now to show them. Picture below.

You can add FBX or OBJ file containing a 3Dobjest. To do that We need to click LOAD FROM FILE. Picture below.

Use AutoDesk FBX Importer.

An option called "Use AutoDesk FBX Importer" has been added to a window from which a user chooses files with 3D objects and animations.

Uploading a file can be be conducted using one of two methods:

- Default method uses Open Asset Import Library algorithm (short name: Assimp). It's a portable Open Source library to import various well-known 3D model formats in a uniform manner. This method is chosen if we DO NOT tick "Use AutoDesk FBX Importer" box
- If "Use AutoDesk FBX Importer" box is ticked, then Autodesk importer will be used. This method only works for *.FBX files.

It's best to test both methods and observe which one will import a particular object and its textures in a better way.

WIZARD

It should be noted at the beginning that you shouldn't work in the 3D Editor, or the Wizard, during the live broadcast.

Click File > Open Wizard in the opened 3D Studio Editor window or press the Wizard icon on the bar.

Then, a warning appears, stating that in the case the new camera takes were defined during the ongoing session, the results of the work might be lost (message window below).

If you want to keep your previous work in the Production, it's best to click NO to go to the Production module, save the session there and run the Wizard again. Click YES only after completing those steps.

The first one of the pop-up window series will appear. It will guide you through the Wizard. (Picture below).
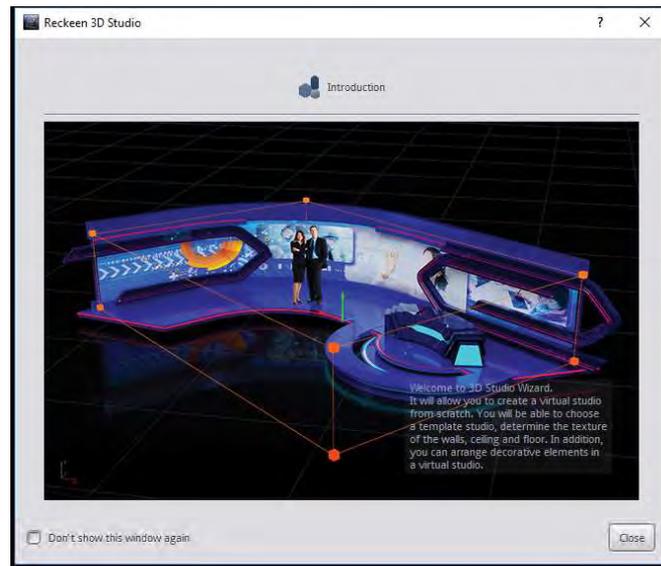
If you tick the option: Do not show this window again, the window will not appear the next time you open the Wizard. The same can be done to all the windows that appear in the Wizard. Once you leave the Wizard, you can save changes to your session on the production screen (File> Save session) or create a new session (File> Save Session As...). Afterwards, when you re-enter the session, the pop-ups will not appear in the Wizard again.

However, if the pop-up hints still facilitate your work, you can enable them once again by clicking on the production screen:

Options> Configuration> General> Wizard Studio Editor> Reset pop-up hints visibility to default state (picture below).
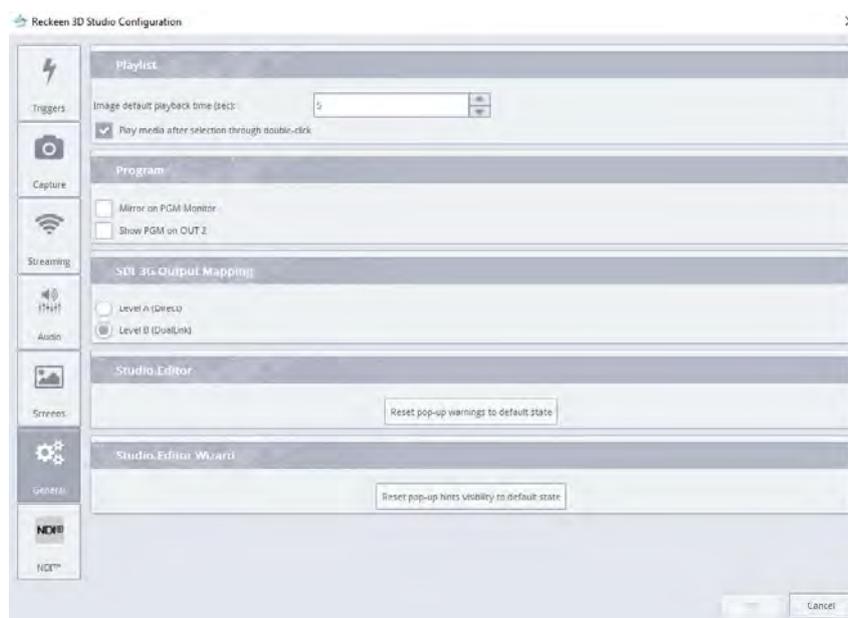
The button with inscription: Reset pop-up hints visibility to default state will become highlighted and the

hints start appearing again. The first step after opening a Wizard is to choose a studio.

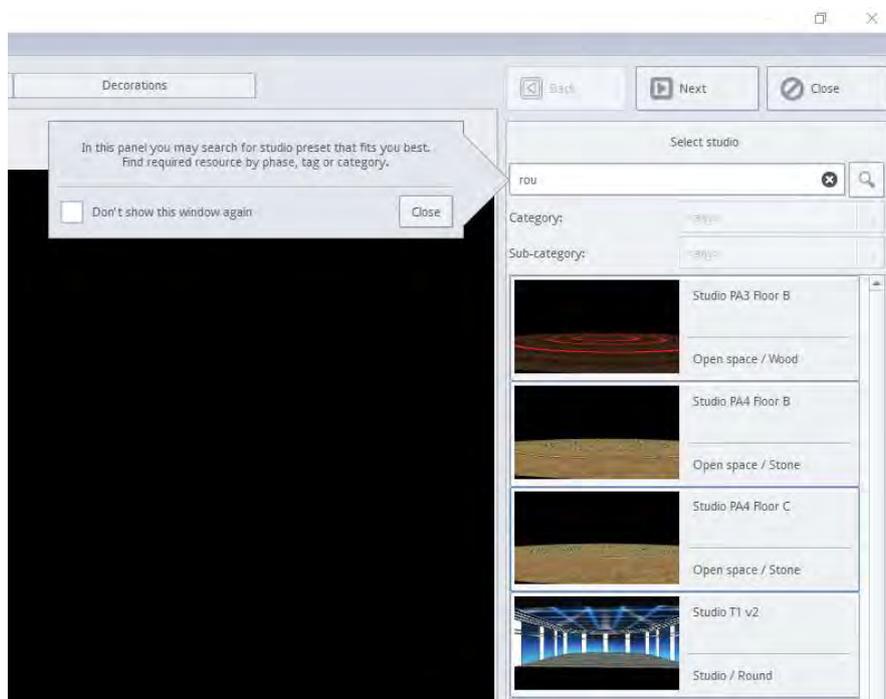You will be guided through the consecutive steps by the appearing pop-ups.

Picture below - a Window with a mouse - workspace.

A pop-up with instructions on how to select a studio by entering keywords Picture below.

A window with search results Picture below.

You search the studios by typing the name in the box, news for example. Then, all the studios that have news phrase in their name or in their category, will be listed. You don't have to type the entire word, the search engine will show you suggestions after entering at least 3 letters of the phrase. (See the previous Picture.

The first step is to choose a studio. The Wizard launches with the Studio tab already open. Other tabs are as follows: Walls material, Floor material, Ceiling material and Decorations. Some of them may be disabled (inactive) by the studio designer's intent.

First, choose a studio template. When you move the cursor over the template, it becomes highlighted and an additional enlarged window appears.

Move the cursor over the window and right-click it to display the template's name, category, sub-category and keywords. Picture below.

If you have a lot of items to search for, just enter the keyword, or its first three letters, for example, search for the studios that have "news" in their name. After entering "new", the studios that have this phrase in their description will appear. It may be any part of the name or the word in the studio's description.

For the word "transparency", you can enter either the first three letters of the word ("tra") or any string of letters in the middle of the word (like "spa"). Some elements, like "tv", have only two characters, therefore you can type a two letter string, "tv" for example, and press the space-bar to create "tv ".

Some of the preview pictures have a small icon in the corner. When you click it, another window appears with the stage design preview, showing how it might look like in the final perspective and what elements it contains. This facilitates selection of appropriate elements.

You can narrow down your search by selecting Category and Subcategory from the drop-down list. Picture below.
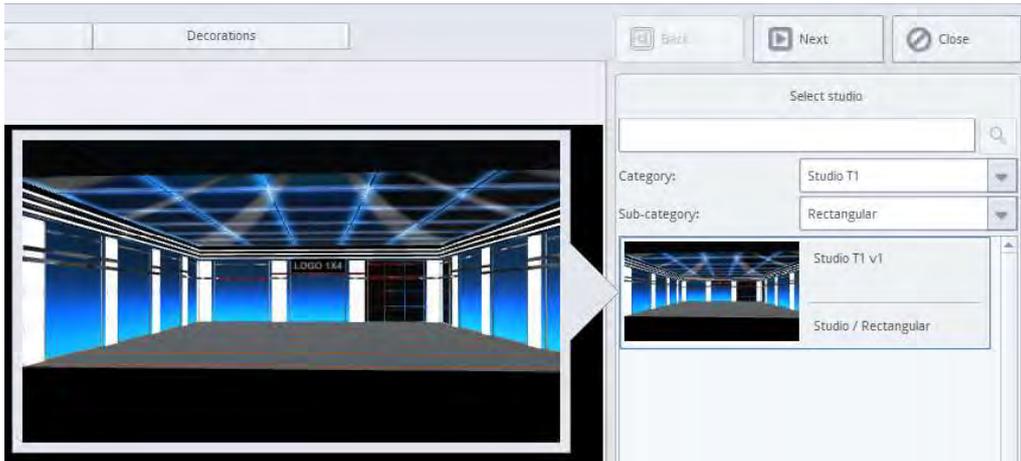

A red question mark ("?") appears on some of the STUDIO TEMPLATE thumbnails. With its help, you can open another window in which you will see a view of the set design along with the use of individual objects, as an example, in the same category.

After selecting the studio template, click it to load it.

Depending on the selected template, all or some of the tabs will be available at the top of the screen. If the graphic designer assumed, for example, that the floor material in the studio cannot be changed, this tab will not be active. You can change the tabs by clicking on them or by using the Back and Next buttons at the top right corner of the screen. Picture below.
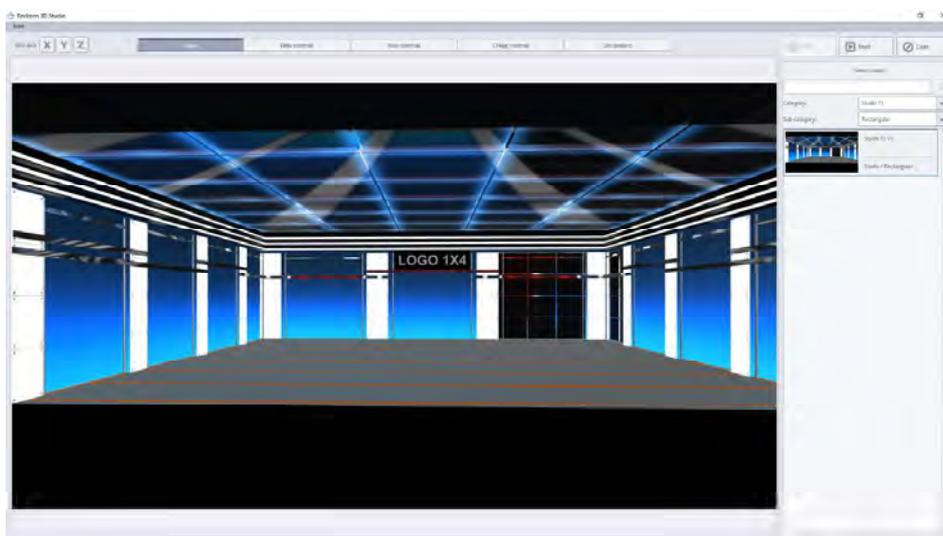
You can navigate through the loaded studio with your mouse. The same rules apply as for the mouse movements in the studio editor. See the chapter: Virtual 3D studio editor, paragraph: Operating modes: Camera and Object.

All the operations available in the studio, such as mouse movements or locking XYZ axes, are transferred from the Virtual 3D studio editor. Only the rotation around the selected object is disabled, as it was

deemed useless in the Wizard.

Now, you can go to the next tab: Walls material.

You don't have to mark specific elements of the walls in the Wizard. The material is changed in all the studio areas specified by the designer. All you need is to select the desired wall material from the materials list on the right side of the screen. Just as in the Studio tab, when you move the mouse over a specific material and right-click it, its properties are shown, namely Name, Categories, Subcategories and Keywords. Picture below.
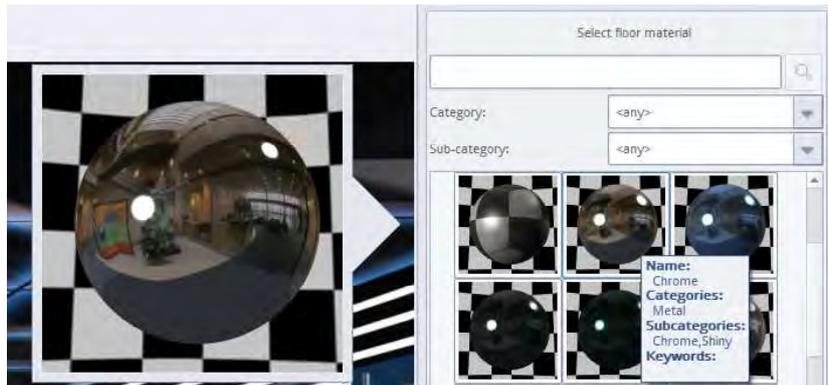
Like before, you can use the smart search typing only 3 letters of the name.

You can, of course, choose entire group of interesting materials from the drop-down list by selecting Category and Subcategory.

For example: Choose Category: Natural and Subcategory: Shiny. A list of materials with these properties will appear. Next, type the word "red" in the search-bar. Now, only the red ones will be included in the material group.

The process of choosing materials in the Floor material and Ceiling material tabs is exactly the same.

Now, let's move on to the Decorations tab.

In the Decorations tab, so called "placeholders" appear in the view of the studio. Picture below

Placeholder's positions are pre-defined in the studio's design. Select any one of the placeholders in the preview window and click it with the left mouse button. Then, the placeholder lights up red and starts blinking. A placeholder can be selected with a mouse or indicated by selecting it from the list of all placeholders. Picture below

When you click on the placeholder, the "pin" lights up and starts blinking. Then, select from the list of the elements an object to be "affixed" in that place. Let's choose a platform. Picture below.
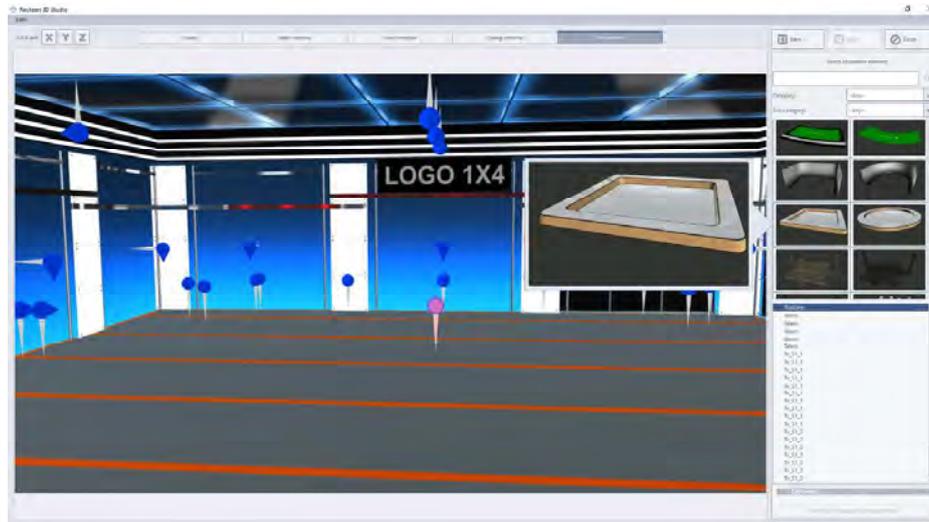
When you click on the selected object, the placeholder's pin will disappear replaced by the selected object. The object will be inserted exactly where the placeholder has been. The object will be facing direction indicated by the arrow on the placeholder's pin.

A red question mark (?") appears on some of the objects' thumbnails. With it, you can open another window in which you will see an example this object's use in the set design prepared by the graphic designer. Picture below.
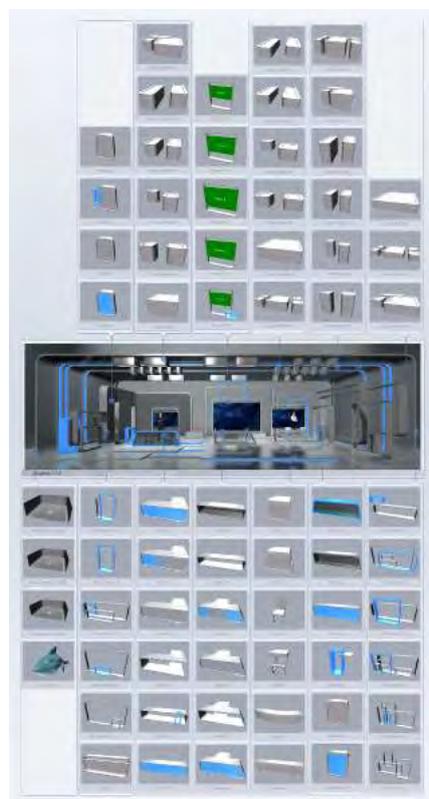
Simultaneously, a new position will appear on the list of placeholders: a Platform, along with a drawing of a small cube next to it. It means the placeholder has been replaced with an object.

Note that this object, the Platform, also has its own placeholder on its surface. You can now place, for example, a desk on this platform. Click the placeholder visible on the platform and then select the object: Desk. Picture below

What's more, the desk object has two placeholders. You can place a Talent behind the desk using one of them. Picture below

If you want to remove the object from the placeholder, you have to select it on the screen by clicking the left mouse button on it. The whole object will light up and start blinking. Now, remove the object by pressing the button: Remove decoration from placeholder, located at the bottom right corner of the screen.

You have to remember that, if you select the Platform object, as in the example above, you it will be removed along with all the objects attached to it.

The available objects are listed and displayed in the windows. In the windows, the objects are visible in positions as if they were replacing their placeholders located on the floor, that is the placeholder's pin

was pinned to the floor. The arrow on the top of the placeholder determines the direction the object will be facing.

If the placeholder is pinned to the ceiling, and its pin is "upside down", then an object loaded to such a placeholder will also be turned "upside down".

Let's look at the platform placed on the ceiling in our example.

It may happen that, when you want to place an object in your studio on a particular placeholder, it may not be a perfect fit. The object may, for example, "impale" the wall. Picture below
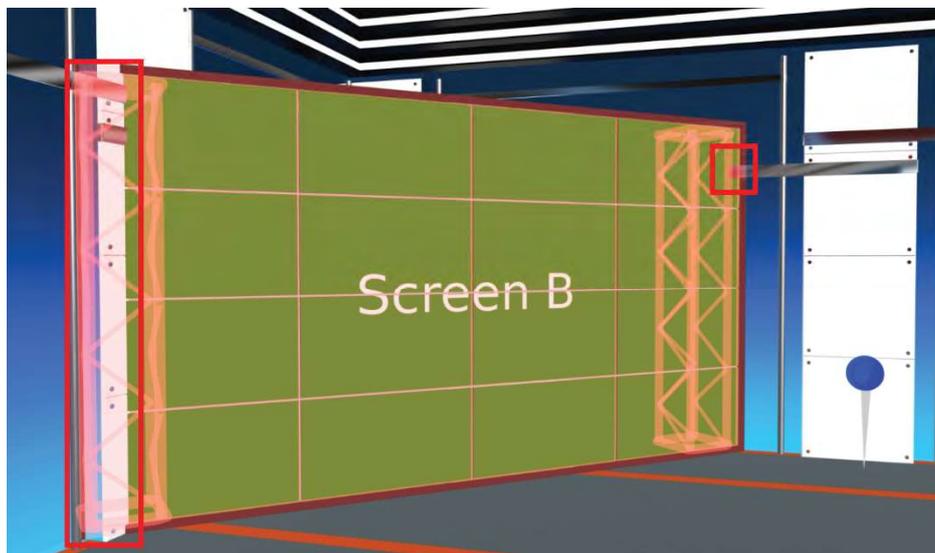
Do not worry about that, let's now leave the object in that place, as accurate corrections and shifts will be done later on in the Editor. Picture below.

Edit: Undo and Redo functions

There is an Edit option available at the top left side of the screen. You can trigger Undo and Redo functions from the drop-down menu or through the keyboard shortcuts.
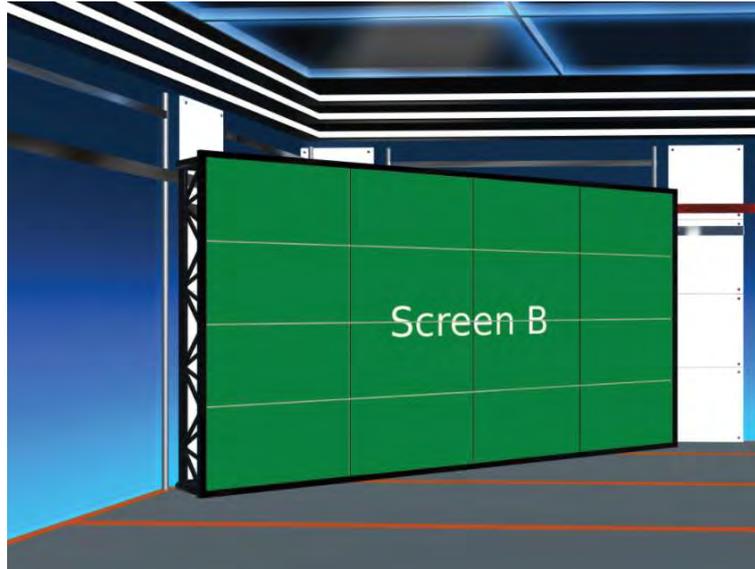
- Undo function - erases the last introduced change.
- Redo function - reverses the Undo command.

Principles of the functions' operation are the same as previously described in the Studio 3D Editor. The only difference is that, in the Wizard you cannot undo the camera movements, which was possible in the Editor. There is no Camera tab in the Wizard, therefore these movements are not recorded when designing the studio.

After adding all the objects, you can go back to the Ceiling tab to see the studio without placeholders. You can neither select, add nor remove the objects in the Ceiling tab and in the Walls tab. Instead, you can once again change the materials covering the ceiling, the walls or the floor if they don't match the added objects.

You can press the Close button if there are no more changes for you to make . The Wizard will be closed and you will be automatically redirected to the Editor.

Now, you can continue with the editing.

The Wizard allows you to design a studio quickly and easily. But let's remember that you go through the Wizard only once, putting all the necessary elements in the studio. The studio once created in the Wizard cannot be loaded to the Wizard again. If you have forgotten about some object and you want to add it, you can do it in the Editor.

In order to be able to the design each of the elements in the Editor, you have to change the mode from Simple to Advanced.

In the Advanced mode, you can display an entire tree structure of all the elements by clicking on the triangular markers that appear in front of the names of the objects and their elements. The whole process of building the studio, that is placing a platform, a desk, or a chair on the floor and so on, will be reflected in this structure. You will only see one element in the Simple mode - the Floor. In the Advanced mode, you will be able to display all the items placed on the consecutive placeholders. Picture below.

When you click on the name of the primary element in the tree, a window will appear below the tree, containing materials that can be used.

You can change the item's material by clicking on the selected material's thumbnail.
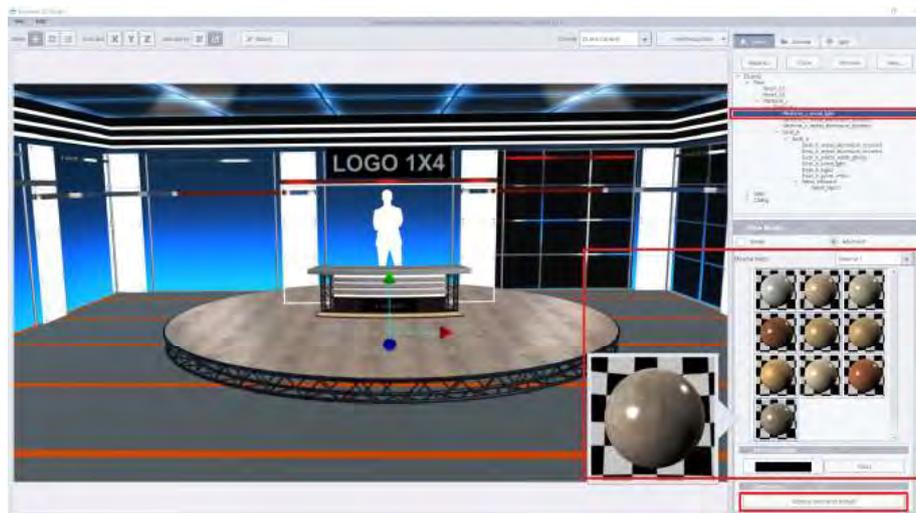
In the case of such objects as talent or screen, a tab with materials database will not be visible. There is no possibility to change their material, even when you switch the Live option to Bitmap and use graphic images. Some Logo type objects (that could be found in the database) also don't have an option to change their material. In some set designs, you can find certain logo type objects, under which you can both change a material and apply an appropriate graphics with transparency. In the case of an object's Clone, both the material and its color are transferred.

If you are not satisfied with the change, you can restore the item's basic material by pressing the Restore material to default button located at the bottom right of the screen.

It is possible to change the color of some of the materials. It is done with the color wheel.

You should bear in mind that you change a color of a specific material, so if the same material has been used in any other object, that object will also be subjected to a color change. You cannot change the color of some of the objects. In the case of objects loaded with Microsoft Paint 3D such option may be locked and you will be informed about it with a message. If you want to restore a default color, you have to use the Reset function. In the case of an object's Clone, both the material and its color are transferred.

In the Editor, all the objects added in the Wizard can be moved, cloned, their color changed, their elements removed etc. In the picture below, you can see two desks, original one on the right, and the cloned one with the materials changed on the left.
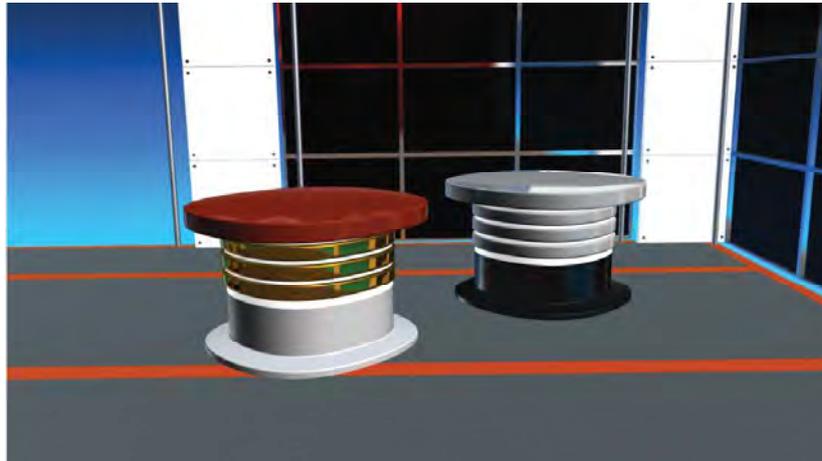
In the Wizard's Ceiling and Walls tabs you could only change the materials to the extent determined in the project. If you wanted to change the color of the floor strips (as in the picture above), it would not be possible in the Wizard. You can do it in the Editor. All you have to do is to find the floor stripes element on the tree in the Advanced mode and change the material. Picture below
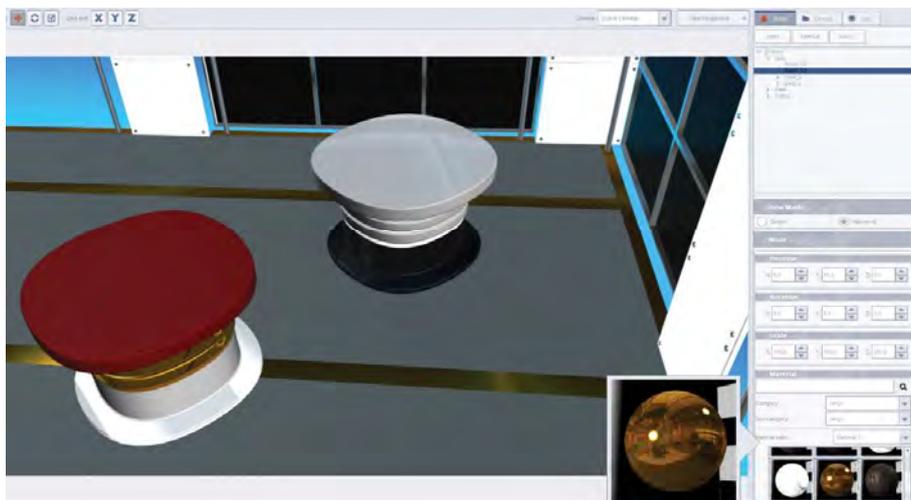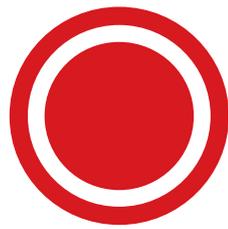
Animations, how to set up inside Reckeen 3D Studio

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You can animate any object within your virtual 3D studio, or use imported rigged animations. Simple animations can be added to any 3D object in a virtual studio – application objects as well as imported ones. For more complex animations, you can import rigged animations from any external applications using FBX format.

SIMPLE ANIMATION

To create the animation, go to the 3D Editor. Picture below.

It is possible to animate objects existing in the studio or to add a new object. Adding is done using the ADD button. Let's choose the object for animation, e.g. penguin. We add it. Picture below.
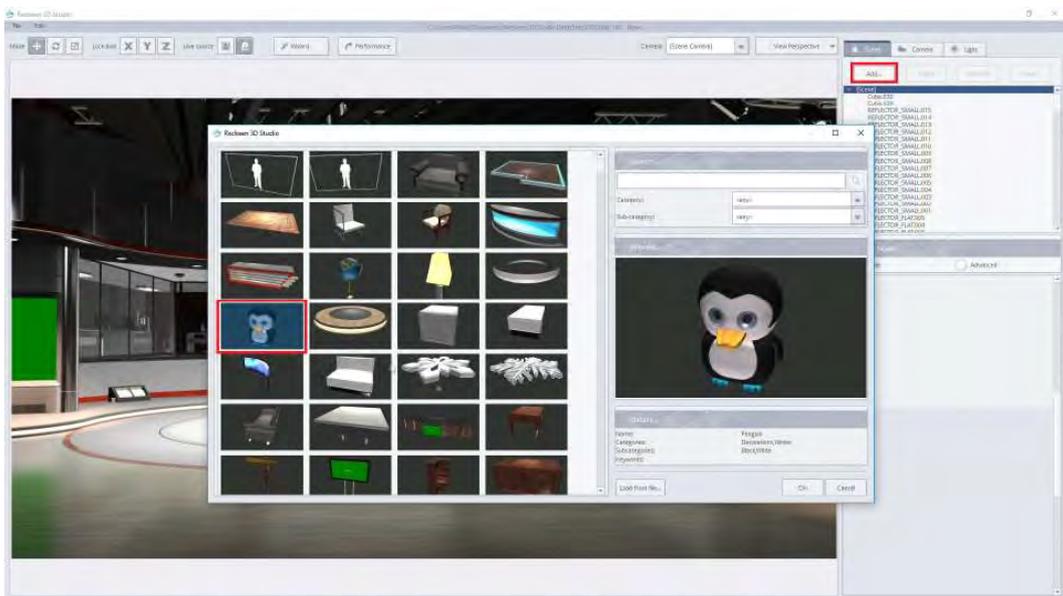
The object is highlighted in red. So we can turn on the animation options of the object. Picture below.

In this case, the default options have already been set. Thus, we can show what the example animation looks like with the PLAY button. In the INTRO section we have enabled the "Enable Stage" opti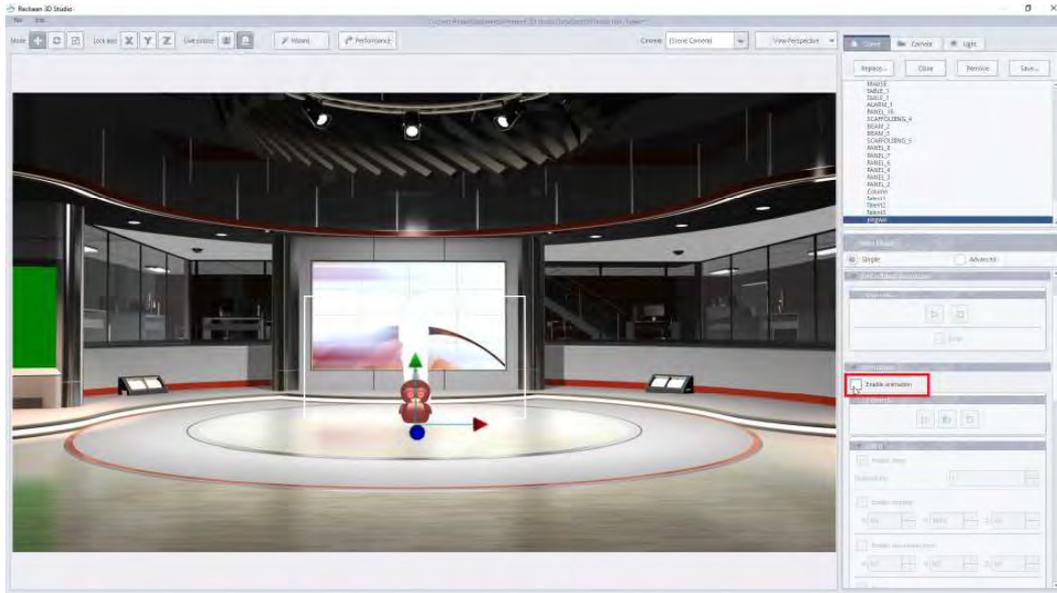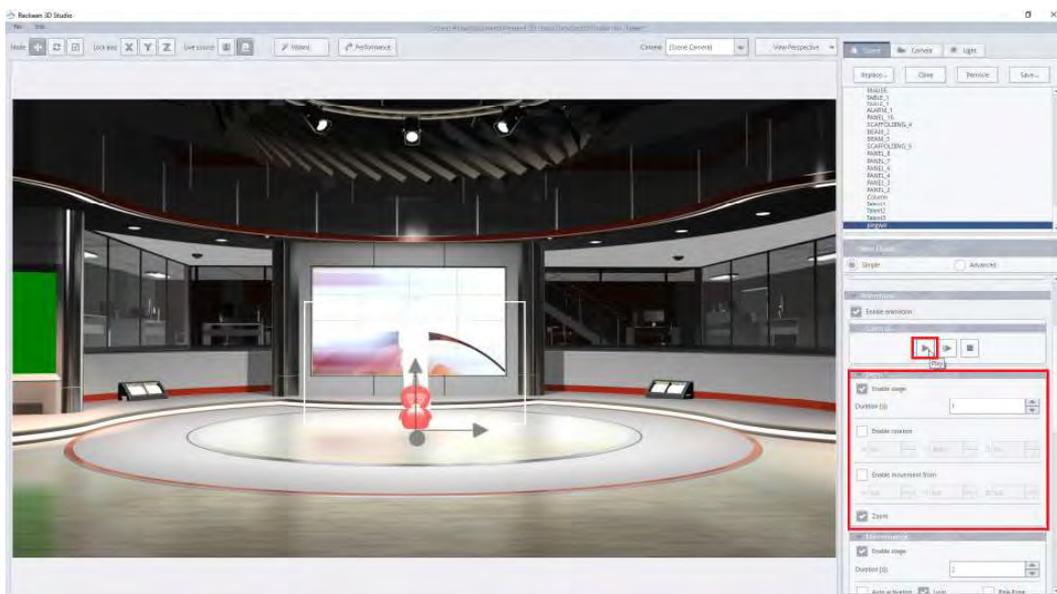on with a value of 1 second and "Zoom" options. This means that the object will appear on the stage floor from scratch, expanding to normal size. And all this in 1 second. Now the INTRO phase has been completed. Picture below.

Now the MAINTENANCE phase. In the MAINTENANCE section we have the "Enable Stage" option enabled with a value of 2 seconds and the "Enable rotation" option enabled with the values X = 0, Y = 360, Z = 0. This means that the object will start rotating on the stage floor in the Y axis, with full 360 degrees rotation. Since the value 360 has no minus sign, the rotation will be counter-clockwise. If we would like the rotation to be clockwise then we must enter the value -360. The entire phase will last 2 seconds. We also have the "Loop" option checked, which means that the object will not stop its rotation but will perform it in a loop. Picture below.
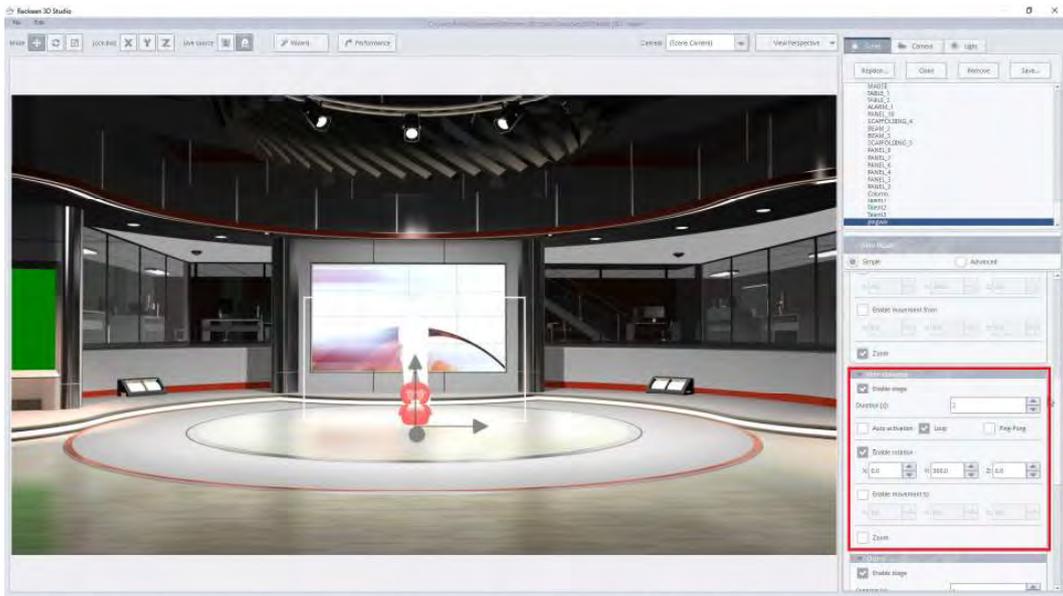
We make using the NEXT button. Picture below.

Then, the OUTRO phase is performed. In the OUTRO section we have enabled the "Enable Stage" option with a value of 1 second and "Zoom" options. This means that the object will disappear from the stage, decreasing from normal size to zero, standing on the floor all the time. And all this in 1 second. Now the OUTRO phase has been completed. Picture below.
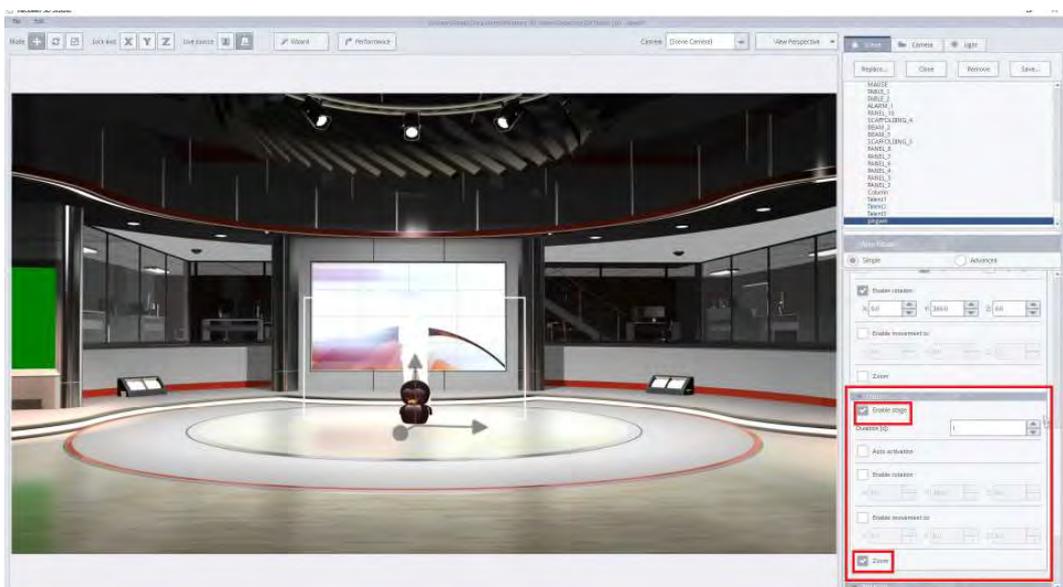
press the NEXT button.

We can modify each of these three phases. For example, the INTRO phase is on. We will turn off ZOOM. The ZOOM function is used to show the object size animation from a value of 0 to a maximum value of 100%.

Therefore, as at the beginning, we turned on the animation options for our object, it disappeared from the stage because the ZOOM function was turned on.

That's why we will turn this function off now to show the object. Picture below.

We select the ENABLE MOVEMENT FROM option. We will want to move the object in the INTRO phase, from position 300 to the current position of the object. That's why we will turn this function off now to show the object. We select the ENABLE MOVEMENT FROM option. We will want to move the object in the INTRO phase, from position 300 to the current position of the object. The ROTATION function, when enabled, will allow us to rotate the object around one of the axes. The prepared phase will look like this . The object moved from position 300 to the current position, on the floor of the stage, rotating around the Y-axis. Picture below.
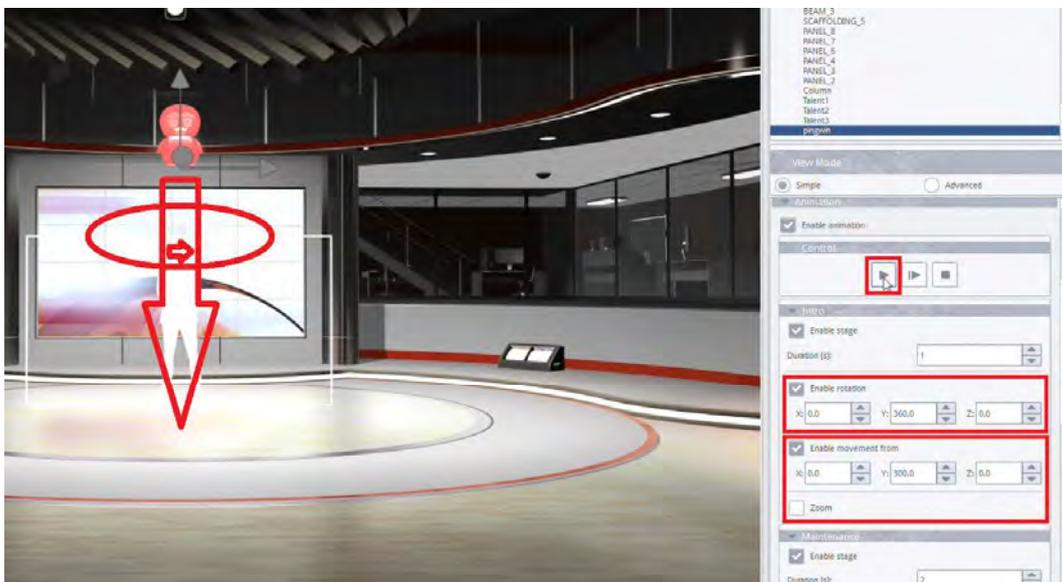
Now we will prepare the MAINTENANCE phase. It is turned on.

In this case, the AUTO ACTIVATION function will cause the object animation to transition from the INTRO phase to the MAINTENANCE phase automatically.
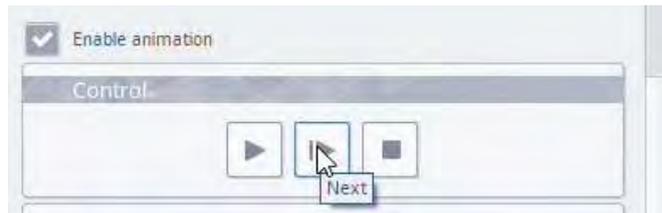
The LOOP function will cause the animation to continue until you press the NEXT button.

The ROTATION function will rotate this object along the Y axis, 360 degrees.

Moving an object can follow the X-axis at a distance of 300. It will look like this. Picture below.
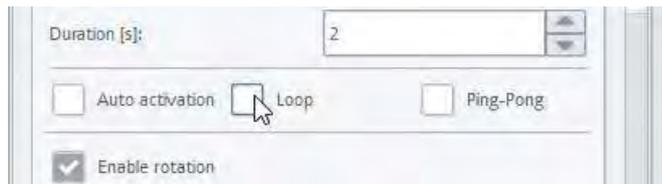

After pressing PLAY, we release INTRO. Because the AUTO ACTIVATION function is not enabled, the animation waits for the NEXT button to be pressed. Picture below.

The MAITENANCE function is now performed: Animation is performed in the LOOP function. The object rotates 360 degrees after the Y axis ad it is also moved along the X axis.

Now we set the OUTRO function. We can use the AUTO ACTIVATION function. This means that the object will go automatic after completing the MAINTENANCE function to the OUTRO function. For this to happen, we would have to disable the LOOP function in MAINTENANCE Phase. Picture below.

Then the MAINTENANCE function will last as long as we enter in the DURATION field. we enter the value of 4 seconds. Picture below.

Turn on the AUTO ACTIVATION function in OUTRO Phase. Picture below.
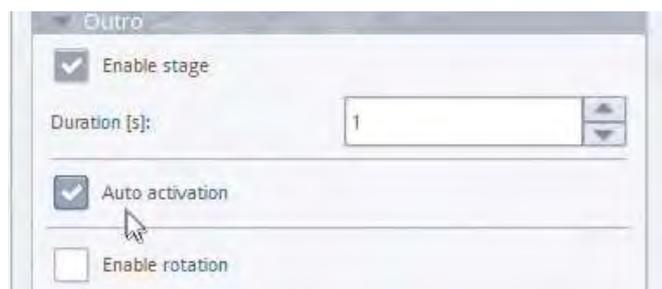
We will leave the ZOOM function enabled. This means that the object will change from 100% to 0. So it will disappear from the stage. Our OUTRO Phase. Picture below.
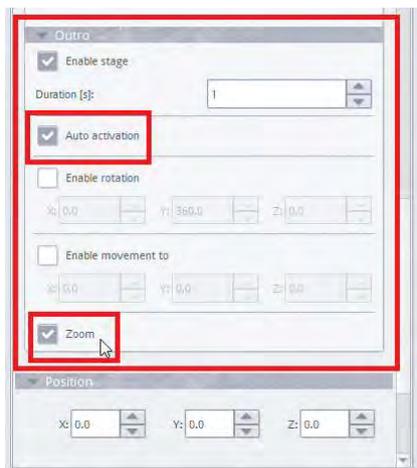
Our whole animation will look like this. After pressing PLAY, INTRO will be performed. The object waits for the NEXT button because the AUTO ACTIVATION function is not turned on. Now the 4-second MAINTENANCE phase is performed, the animation goes to the OUTRO and the object disappears from the scene.

In this way, we can enable or modify the object animation phases.

Now we have only made the transition from the INTRO phase to the OUTRO phase.

INTRO AND OUTRO ANIMATION EFFECTS

Since software version V1.9, the list of entry and exit effects of an aninated object has been extended.
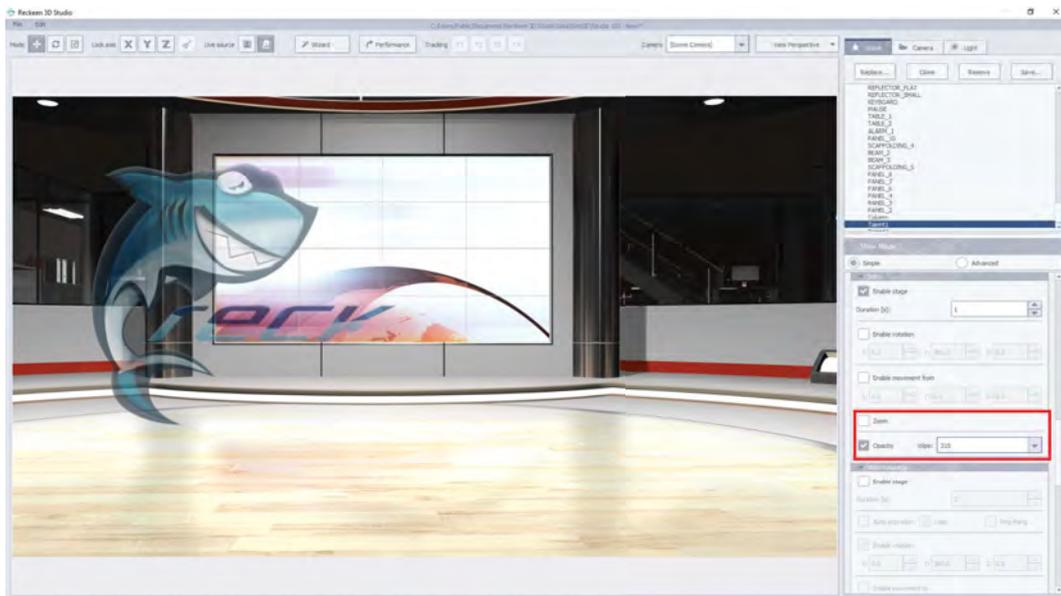
ZOOM - function is used to show the object size animation from a value of 0 to a maximu value of 100%, from the center of the object.

OPACITY - the function is used to show the object in transparency from 0 to 100%. This function is influenced by the start value of Opacity for the selected object.

WIPE - this function is used to show an object with a wipe effect. here can set a different angle for this effect in 45 'steps.

All the above settings can be combined with each other in any configuration. These functions are available for the radio phase - Intro and Outro
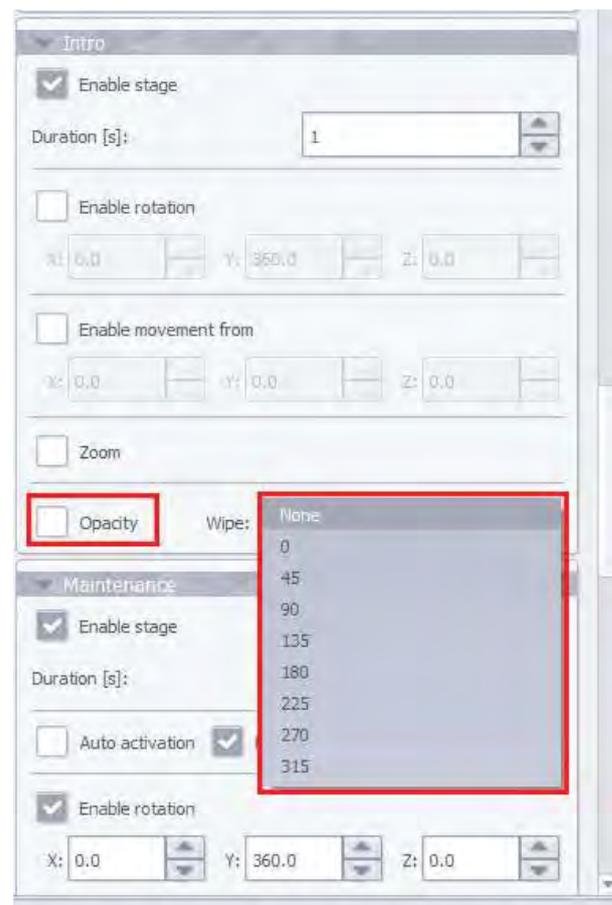
ANIMATION CONTROL IN THE PRODUCTION

SIMPLE ANIMATION

We close the 3D EDITOR module and go to the ANIMATIONS tab and we trigger the animation with the PLAY button. Picture below.
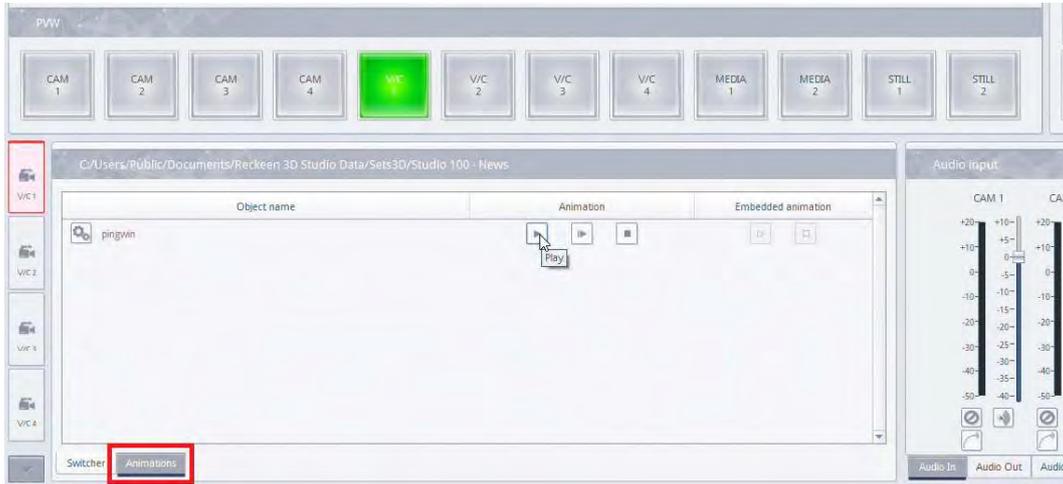
 To execute the next phase, press NEXT. After the animation is finished, the PLAY button will be active again. Picture below.

EMBEDDED ANIMATION

The second type of animation these are EMBEDDED animations. We open the 3D Editor and press the ADD button. And we load the object from the file. Picture below.
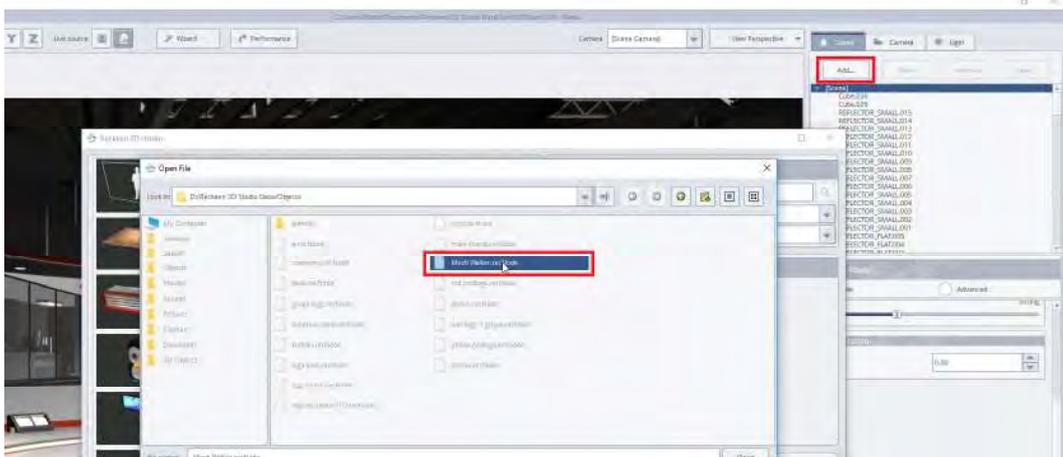
This is the type of animation where the motion was designed by the graphic artist.

In this case, we can turn on the animation with the LOOP function. This means that our animation will be played in a loop. To start it just press the PLAY button. The object will be animated automatically. Picture below.

After closing the 3D Editor module, in the ANIMATIONS tab, a PLAY button will appear for this object to run this animation. Picture below.

If you press the PAUSE button, the animation will stop. Picture below.

The STOP button also stops the animation but returns to the beginning to 1 frame. Picture below.

If you would like to find an object in the editor, just press the gear button. Picture below.
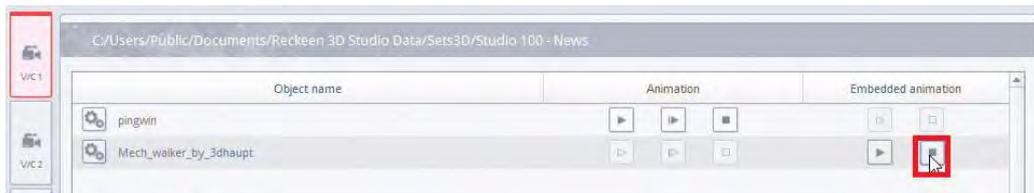
Then the 3D Editor will open automatically. The object will be highlighted in red

SIMPLE ANIMATION - CONTROLLER FOR PHASE INDEX

First, We open 3D Editor . Picture below.

We'll add a new object in 3D Editor. Button ADD in the Scene tab opens up a window with all objects. We'll choose a penguin from Reckeen's library as our 3D object. Picture below
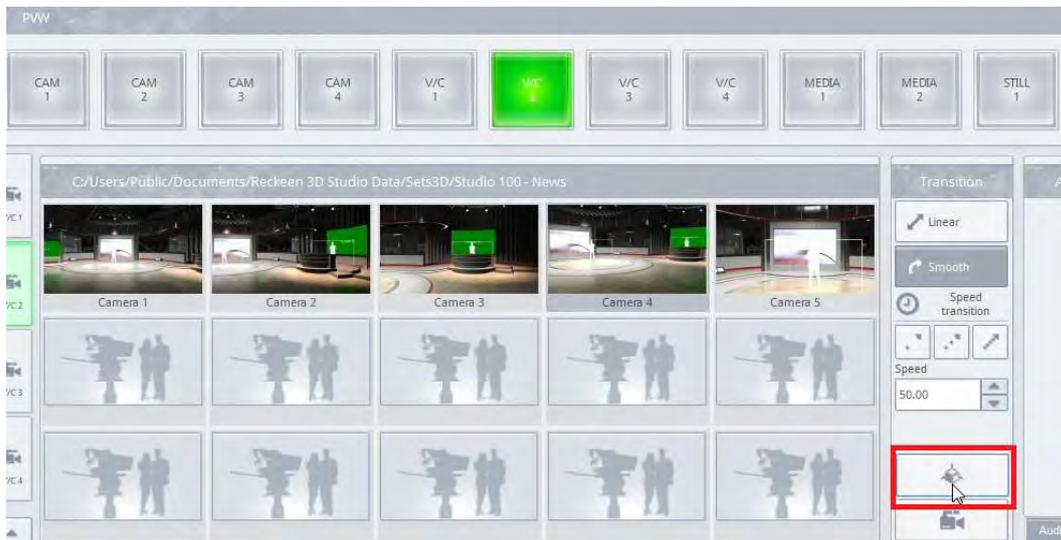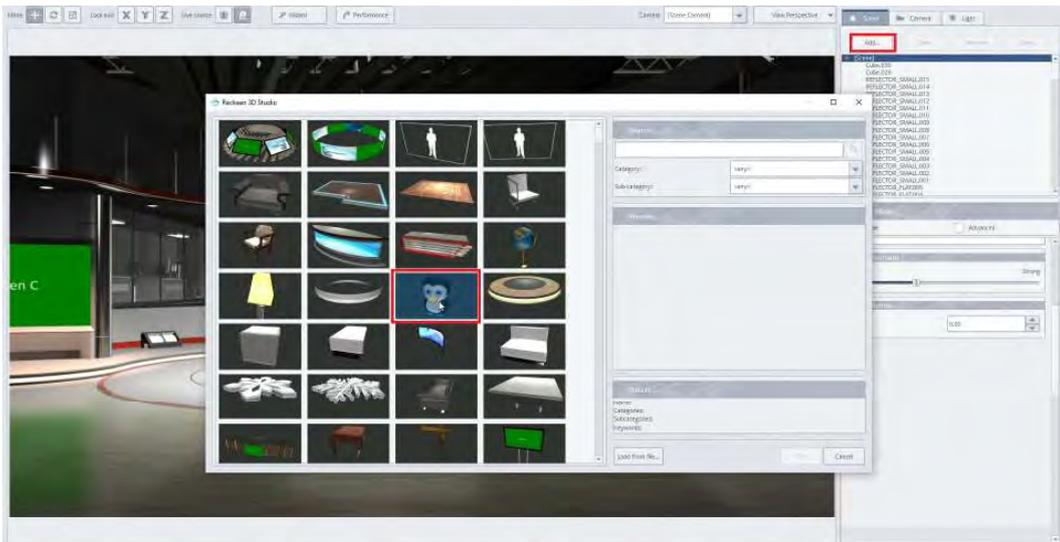
In the SIMPLE ANIMATION section we're describing the first part of setting up animations. We're going to repeat those steps, and then we're show a new controller for animation's phase index. Picture below.
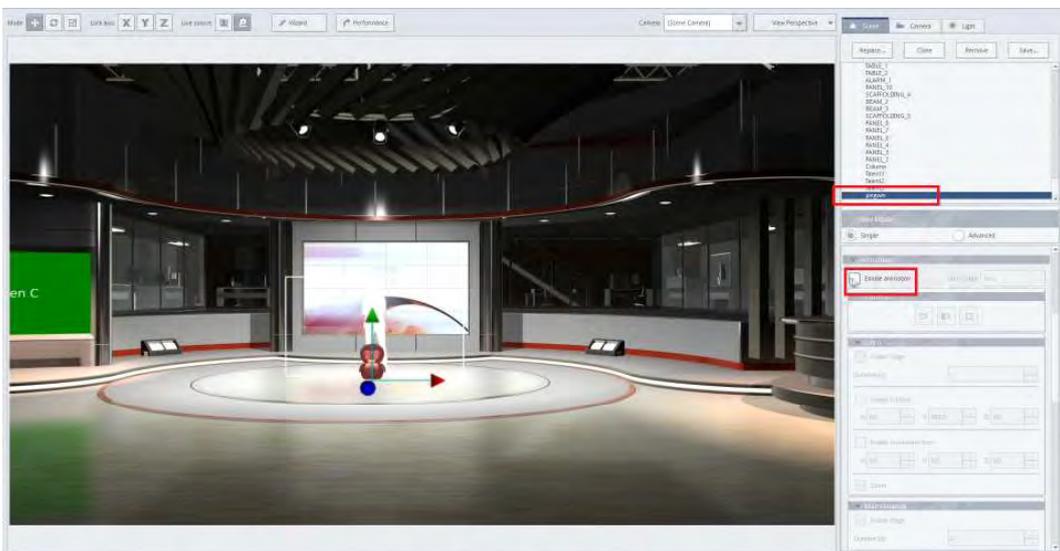
 We're turning on object's animation. The object is not visible at the moment, because as the first phase INTRO a zoom-in: 0-100% animation was chosen. Let's turn on a rotation of the object in that phase.
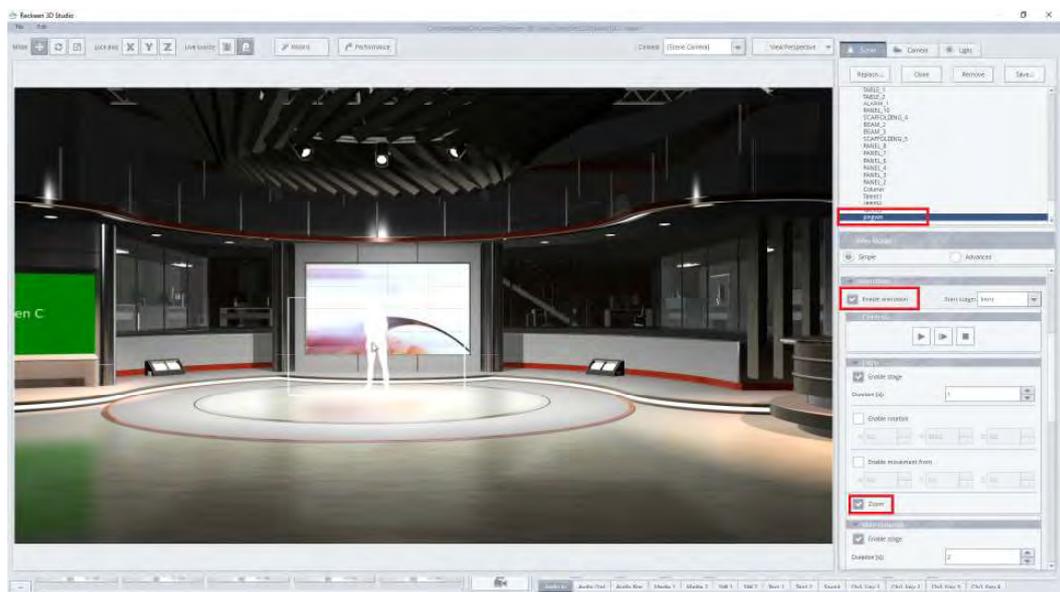
If we turn this function off, then we'll see the object in the first phase. Picture below.

Let's turn on a rotation of the object in that phase. We,re choosing 360 degrees, around Y axis.

We're also enabling movement, and setting up value 300 on Y axis. The object will be animated going downwards and rotating starting from a displayed position. Picture below.
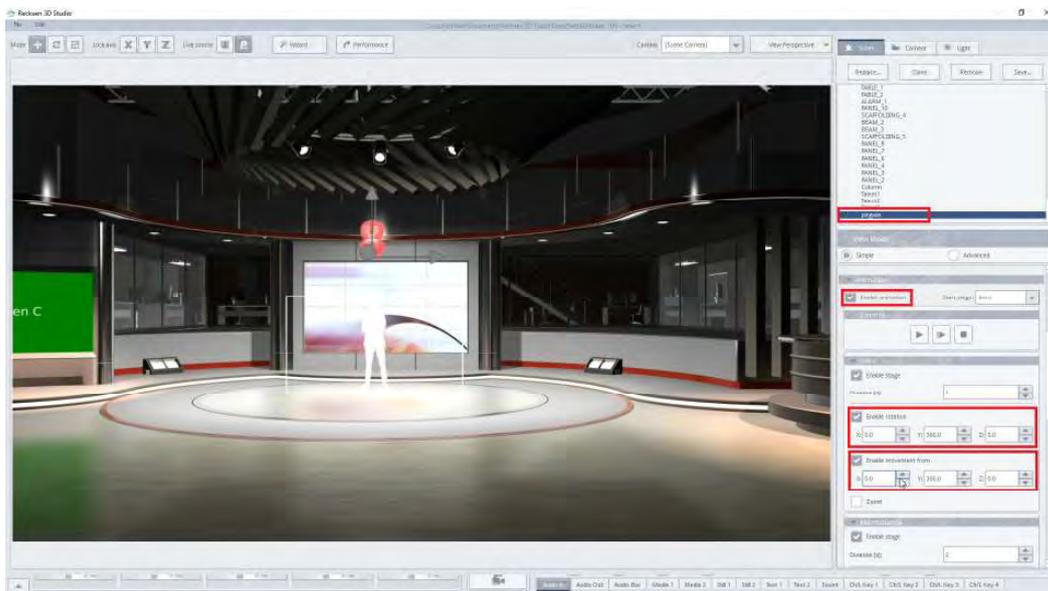
Now, let's move on to the second phase - MAINTENANCE. We're turning off the LOOP option and setting up 360 degrees rotation. We're also enabling movement of the object on X axis, setting value 300, so to the right side. Picture below.
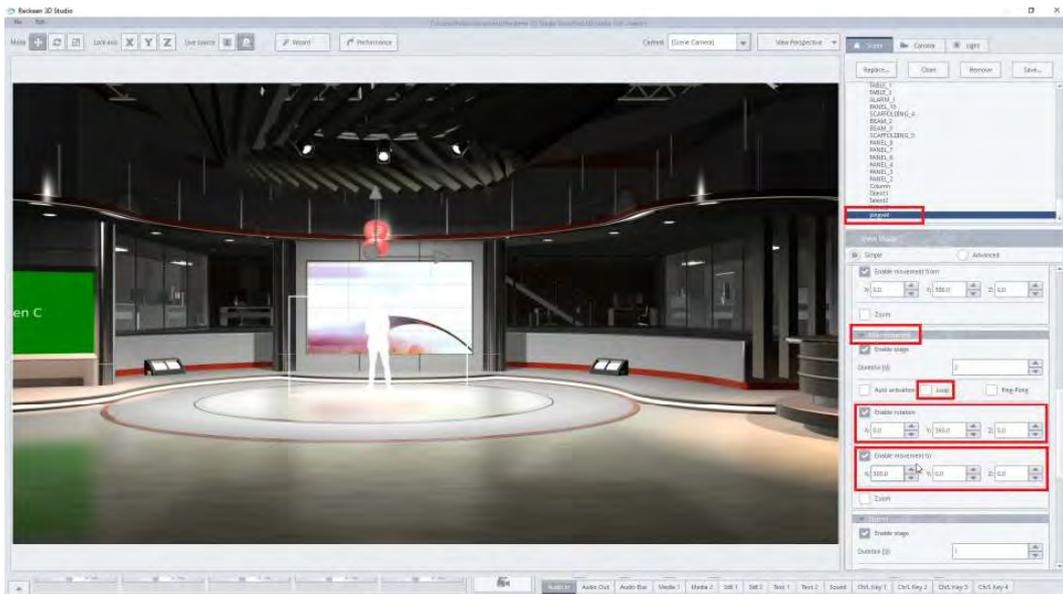
And now the third phase – OUTRO. We're enabling ZOOM, which will cause the object to change its scale from 100% to 0%, and that way disappear. Picture below.
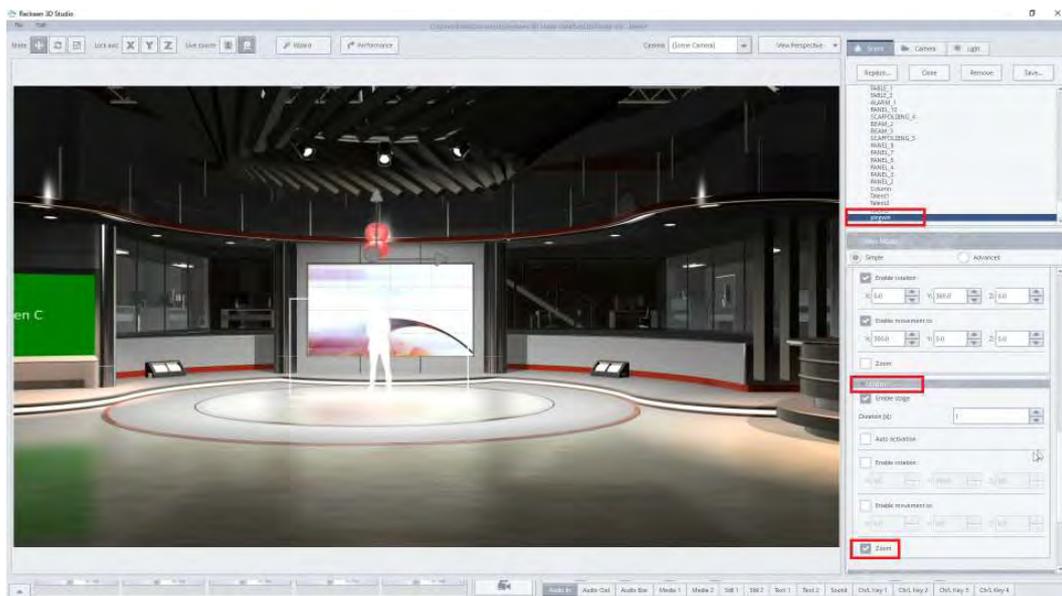
To start the animation we need to press PLAY (the first button from the left side) or NEXT (second button). Picture below.
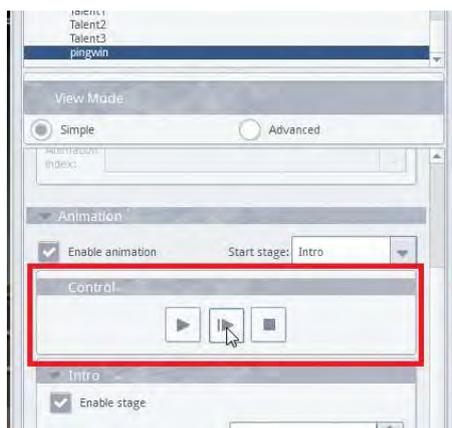
We'll now see an INTRO phase. AUTO option is not turned on, so to execute the MAINTENANCE phase we need to press NEXT again. And after that, we want to execute the third phase – OUTRO. The phase will cause the object to disappear by zooming out.

So, to start the OUTRO phase We have to press NEXT one more time. At any time, we can repeat the whole animation sequence.

START STAGE OPTION-SELECTING THE START PHASE OF SIMPLE ANIMATION

Let's talk about a next function: we can now choose which phase we want an animation to start from. This option is called START STAGE, and it's placed right next to ENABLE ANIMATION ON/OFF button. Picture below.
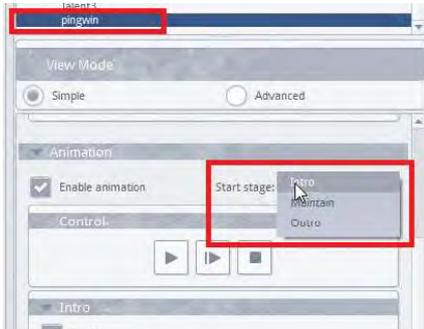
By default, START STAGE is set to INTRO, that's why before the animation started off from the INTRO phase.

If we decide to choose MAINTENANCE as a phase to start from, then after pressing PLAY or NEXT, animation will complete MAINTENANCE phase. After that it will go to the OUTRO phase. And as the last phase – INTRO will be executed. This way, we can change the order of phases.

So let's now have a look at the last possibility – I'll set up START STAGE to OUTRO. First the object size will change to 0%, as that's what OUTRO phase has been set up. Then the INTRO phase is being executed, and lastly MAINTENANCE. Picture below.
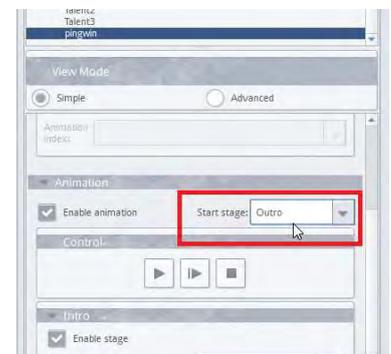
After closing 3D EDITOR, the object will be automatically set up accordingly to our saved settings and our choice of START STAGE option.

We can control and trigger each phase of an animation by pressing PLAY. Picture below.
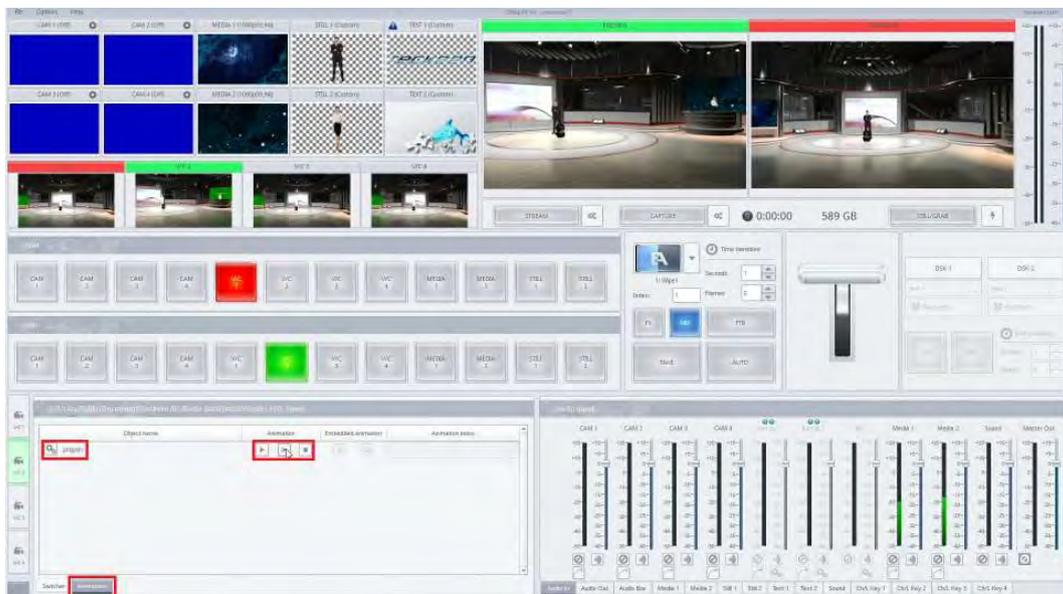
FUNCTIONS OF EMBEDDED ANIMATIONS

Next functions were also added for 3D object with built-in animations. The animations can be easily triggered from within the production screen.

We'll go back to 3D Editor now to show them. Picture below.

I'll add an FBX file containing a 3D, already animated object. To do that We need to click LOAD FROM FILE. Picture below.
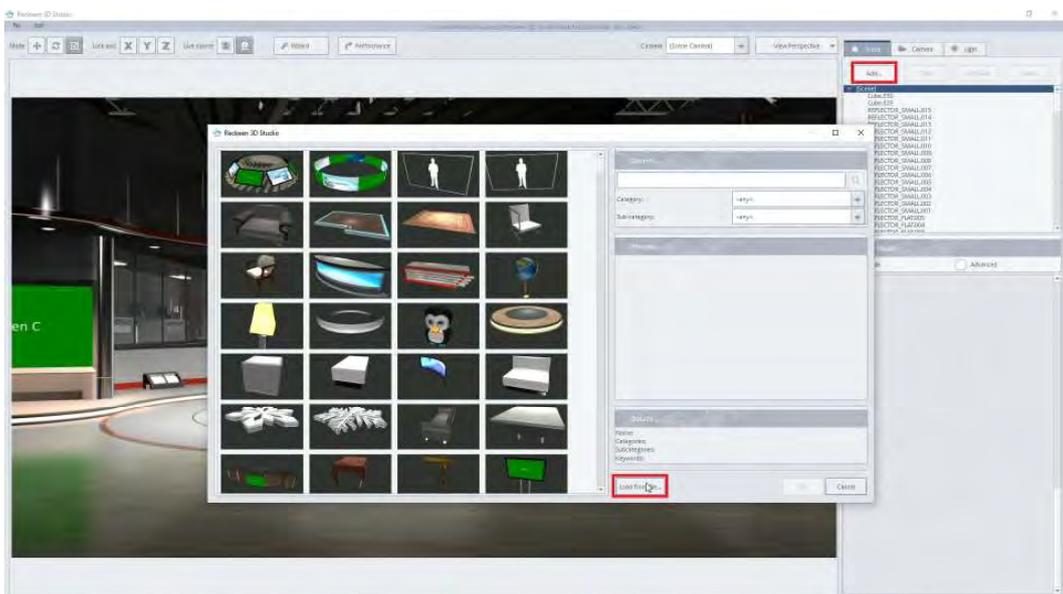
Import can happen in two ways. First is a standard way of uploading files, just by clicking on the 3D object file.

Second one is with a use of AUTO DESK library. We'll tick USE AUTODESK FBX IMPORTER checkbox. FBX format is not standardized, therefore the files can be loaded using both methods. Picture below.
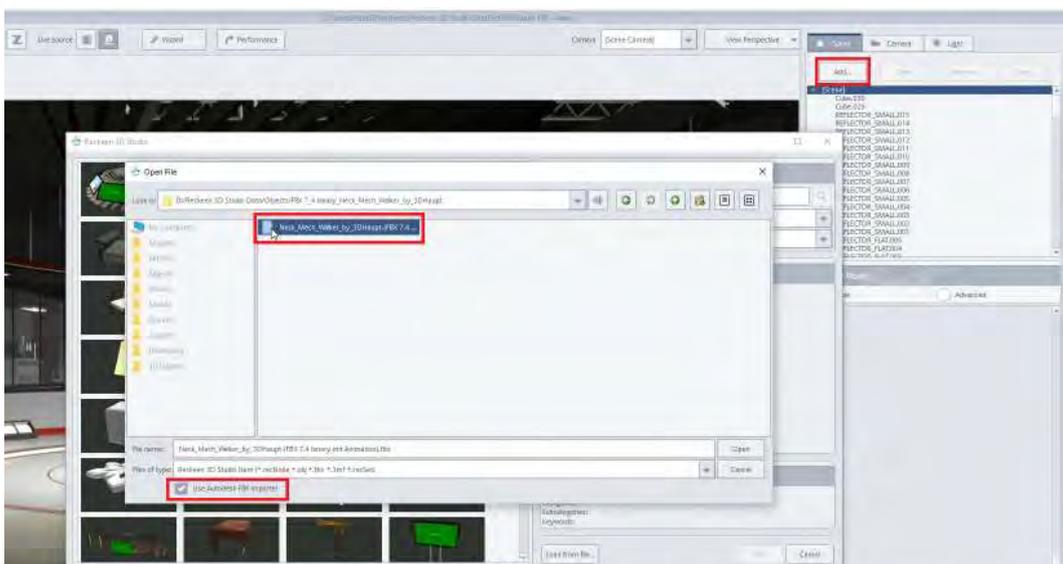
Animations in the chosen object are in-built, and they have been divided into phases.

After we highlight the object, we can see available settings and options. Here, we can set up a speed in which the object executes its movements. Picture below.
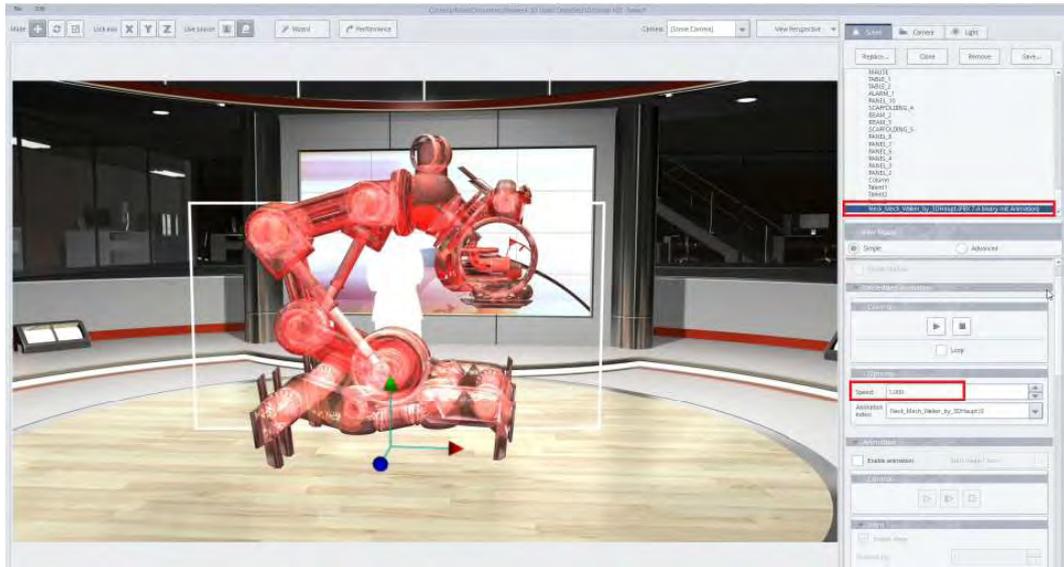
Under ANIMATION INDEX, we can choose which animation, prepared by the graphic designer, we want to be executed. Picture below.
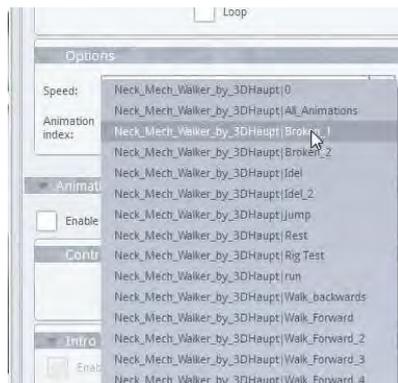
After the animation has been executed or if we press STOP, object goes back to the initial position. Now we're going to change the speed of the animation. The range we can choose from is 0.001 to 10. Value 1 is a default value – a speed defined by a graphic designer. Picture below.

The phases of animations can be changed, from the production screen, live, during broadcast. After closing 3D Editor, the object is in its initial position. Pressing PLAY launches the animation. Under ANIMATION INDEX we can choose which movement we want to be executed. Picture below.
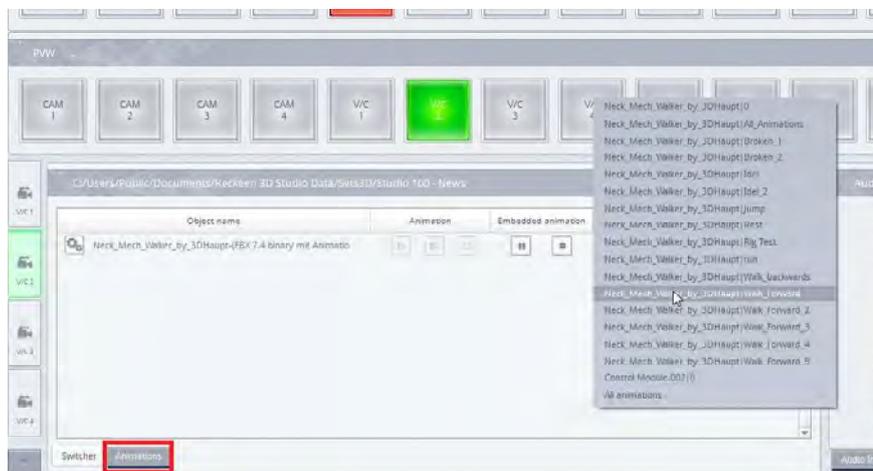
If we haven't chosen LOOP option in 3D Editor, we need to manually press PLAY every time we want begin the animation again.

TRIGGERS OF ANIMATION - ANIMATION

We can also use triggers to control animations. Picture below.

For a SIMPLE MODE we choose ANIMATION CONTROL. Picture below
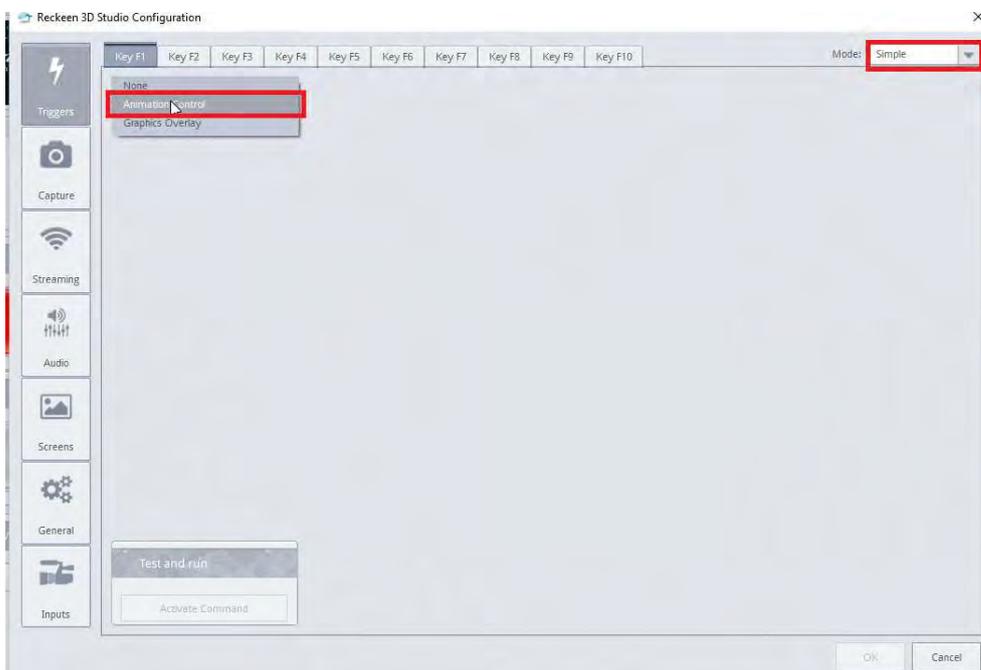
Then click on the name of the object, and then "ADD".

This mode will trigger an animation phase that is currently chosen for this object. Picture below.
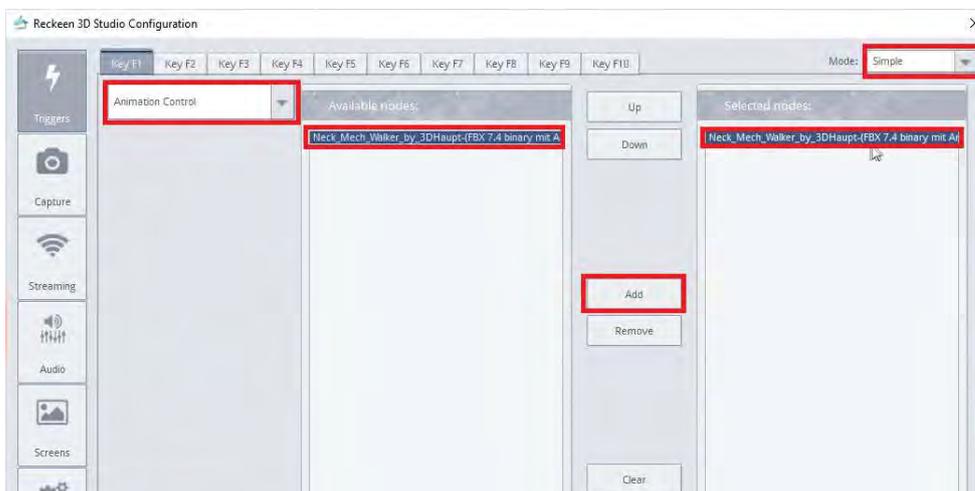
To change the mode, go to top right corner. In the ADVANCE MODE , we also need to start off by choosing ANIMATION CONTROL. Picture below.
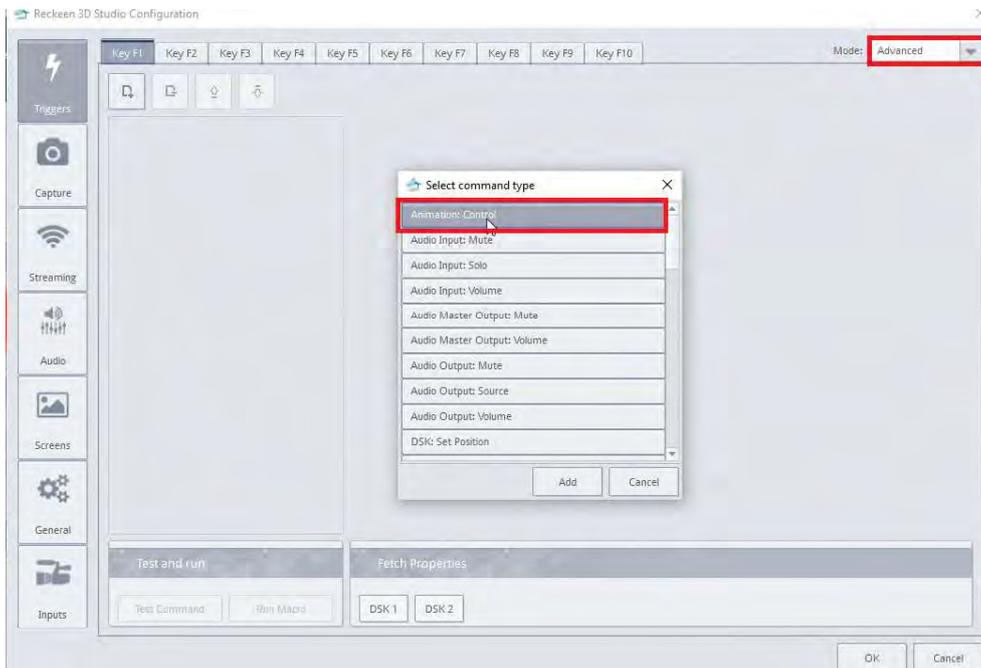
Then we're choosing an object from a list. On the right-hand side we can choose "Enable control" Reckeen's animations consisting of 3 phases. Picture below.
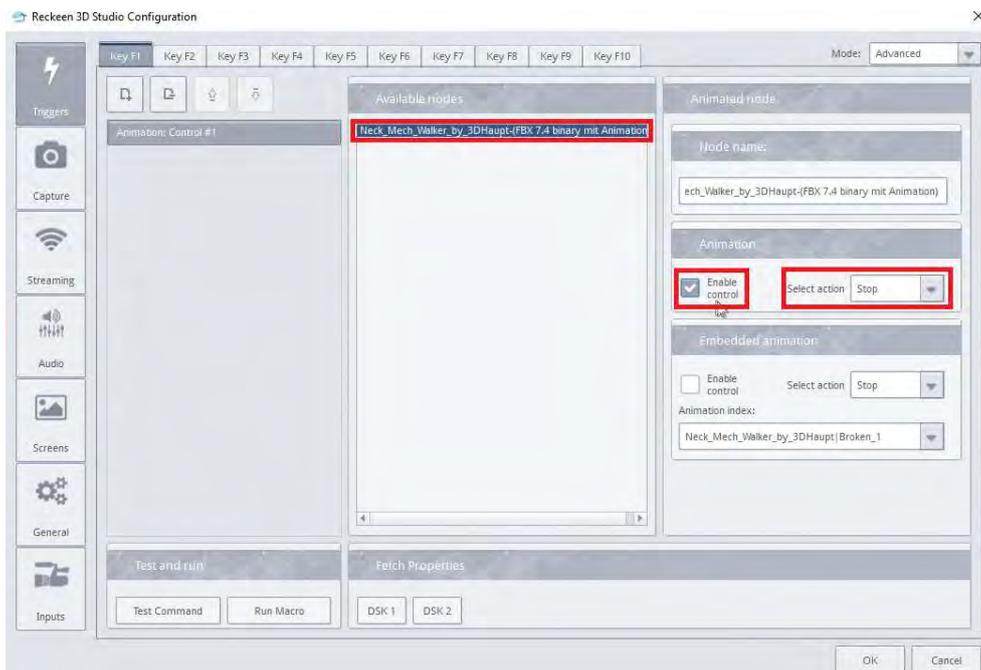
We can also choose embedded animation. Picture below.
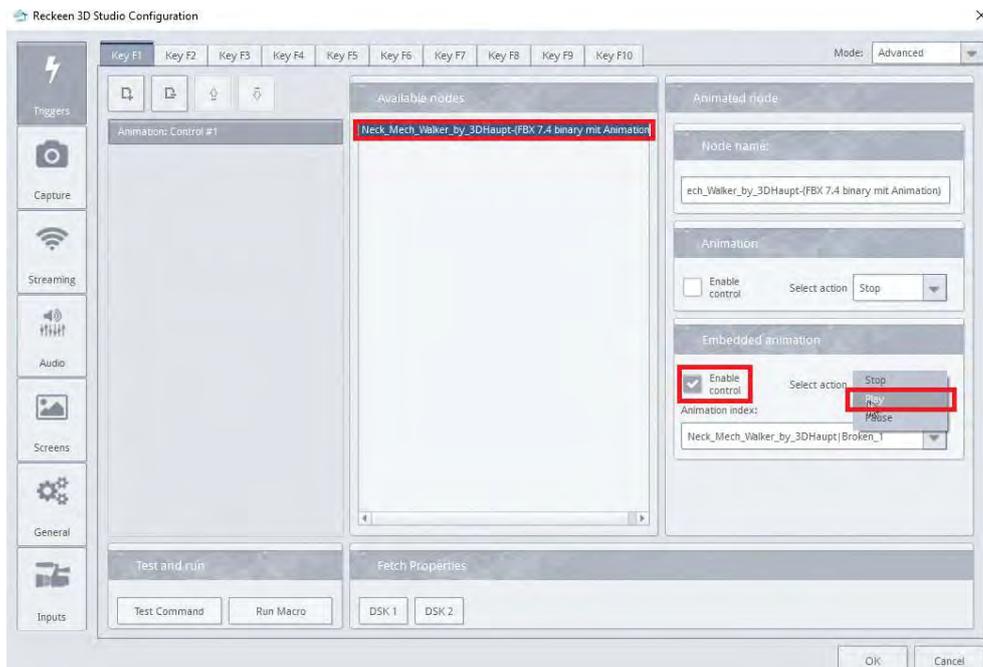
From ANIMATION INDEX we can choose a desired animation phase.
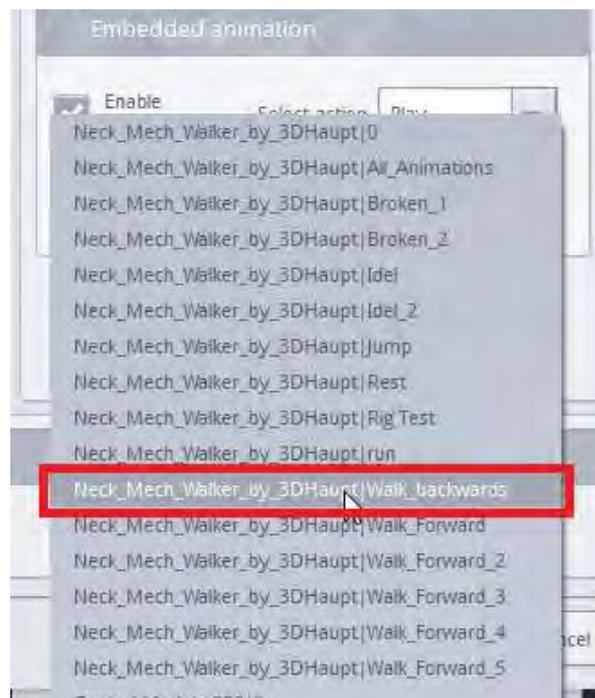
IMPORTANT NOTICE: This way we can trigger that specific phase, even if on the production screen a different phase is chosen.

TRIGGERS OF ANIMATION - GENERAL RESET

One of the very useful triggers is General Reset, it has options related to animations, picture below:

because animation processes are multi-threaded, it is worth setting all animation phases to zero during animation design and at the very beginning of production.
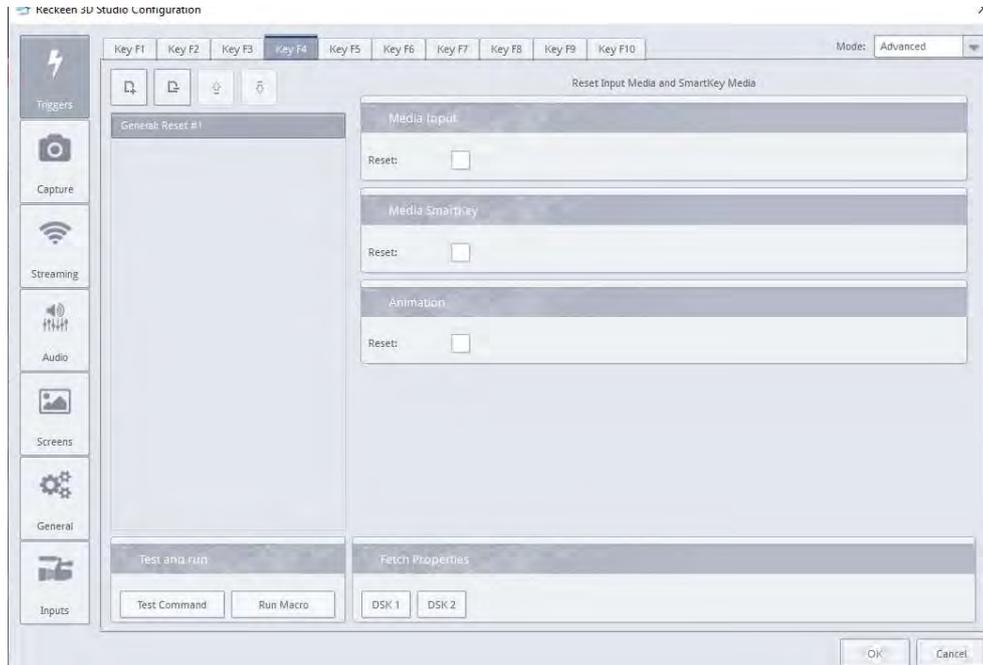
To get it you need to call GENERAL RESET with the option below shown:
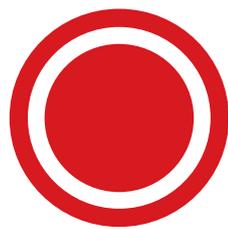
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3D Multicamera feature and a Depth of Field function

Let's look at an example below. There are four cameras plugged in to the system's inputs. Picture below.

First camera shows a wide shot. Second camera shows a medium shot with two people sitting on the left-hand side. Third and fourth cameras show medium shots: one of a guest, and the other one of a presenter. Picture below.

3D MULTICAMERA MODE AND THE TALENT OBJECT CONFIGURATION

To configure 3D Multicamera, we start at 3D Studio Editor. Let's open the editor by pressing "Open Studio 3D Editor" button. Picture below.

Chosen set has a talent object placed in the middle of the studio, reserved for a presenter. By clicking on it, it starts flashing in red. Picture below.

In the window on the right-hand side, we can find this object on the object's list. By default, source index, of ABCD mixer, assigned to this object is A. Picture below.

Click on the object in the window, and start cloning. For four cameras, we need to make 3 copies of this object. Picture below.
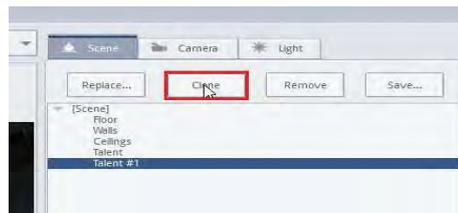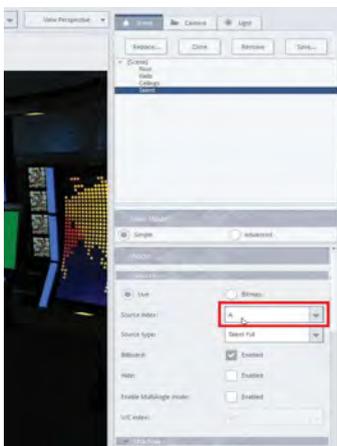
First object will be showing a wide shot. Instead of source index: A, we're ticking the "Enable" box next to "ENABLE MULTIANGLE MODE". As you can see, an image from Camera 1 appeared, in place of the default talent image. V/C index shows V/C 1, meaning that the view, by default, has been assigned to camera 1. Picture below.

Options for ABCD mixer's source index maintain off. The field of Source index is greyed out. Picture below.
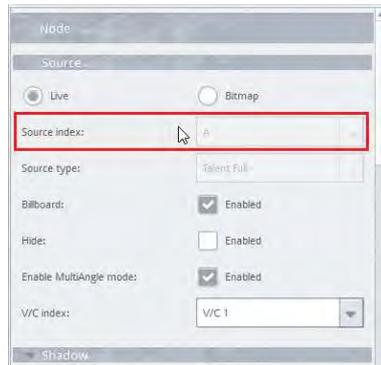
In this place, we can find 3 more copies of this object. Let's click on the second one. Now, turn on "ENABLE MULTIANGLE MODE", and change V/C index to CAM 2 to V/C2.That means that in this place an image from camera 2 will appear. Picture below.

The image appeared in place of the default talent image, and now its position has to be modified. The image is a medium shot, so the object has to be lifted up above the virtual floor level. Picture below.

We need to repeat the steps for remaining objects. Let's also chose MULTIANGLE MODE for the object: Talent 3 with a single man. We want to show the view from camera 3, so we need to choose CAM 3 to V/C 3 in the V/C index. This image is also a medium shot, so the object has to be lifted up above the virtual floor level.

Picture below.

And similarly, we need to configure the object: Talent 4, with a single woman who hosts the meeting. We choose CAM 4 to V/C 4, and since it's a medium shot too, we're lifting the object up. Picture below.

That's all we have to do in Studio 3D Editor. Picture below.
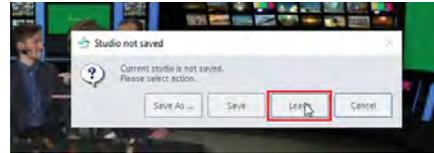
In the case of a wide shot, any movement of V/C is possible, as per operator's taste and liking. Talent is a billboard type of an object, therefore it always faces the camera. When V/C 1 is chosen on the main mixer, only a 3D Multicamera view from Camera 1 is visible. Picture below.

When switching to V/C 2 on the mixer and the view from Camera 2 appears in the studio. This outcome is a result of the set-up in the Studio 3D Editor we did earlier. Picture below.
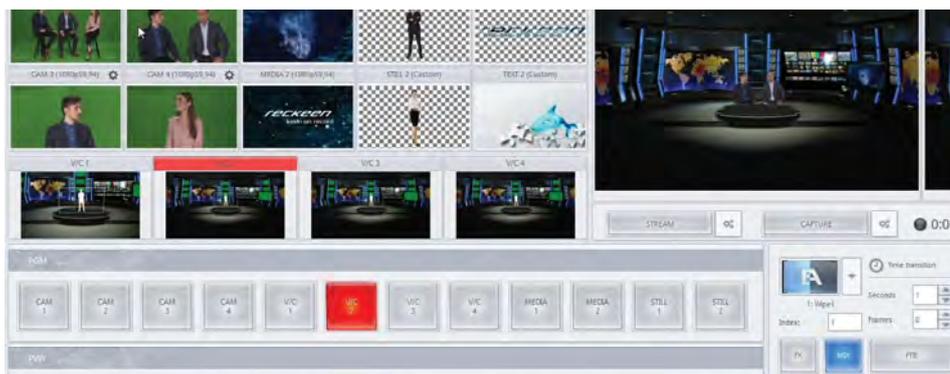
When switching to V/C 3 we will see the view from Camera 3, because Talent 3 has been assigned to CAM3 to V/C 3. Picture below.

And when choosing V/C 4 on the mixer, we will see the view from Camera 4. Picture below.

That way we can make production of an interview or a talk show. What's left is to set up virtual cameras' positions.

TALENT OBJECT CONFIGURATION - CAM1 TO V/C ALL

Settings in the window - the VC index allows you to set one more configuration, that is CAM1 to V/C ALL After switching to CAM 1 to V/C ALL we will see the view from Talent 1 on all VCs. However, there are conditions from the remaining VCs are not selected for the remaining camers. Picture below.
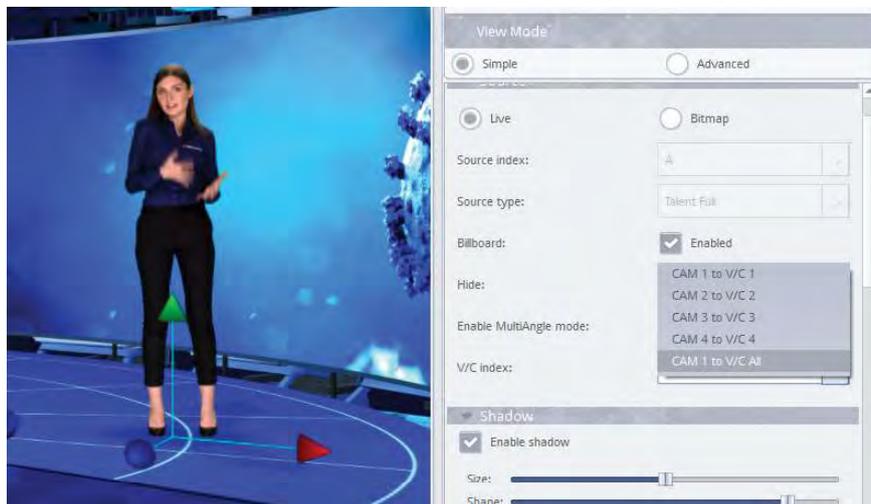
NOTE: if you set the camera selection options in any VC. e.g. CAM2 to V/C2, although for CAM1 to V/C ALL is active in VC2, only the Talent 2 from CAMERY 2 will be displayed.

VIRTUAL CAMERA'S POSTIONS IN CAMERA SETUP

We use medium shots to achieve higher camera signal quality, than a zoomed-in image made from a wide shot. we need to open CAMERA SETUP WINDOW. Picture below

We're changing a camera shot with a use of a mouse. If you press and hold the scroll wheel of the mouse, then you can move the ZOOM smoothly and not at intervals by leaps and bounds. It's important to set up the position, so that its direction and perspective correctly depict a real camera's placement. In this case, the camera was pointing to the left side, perpendicularly to the persons. Picture below.
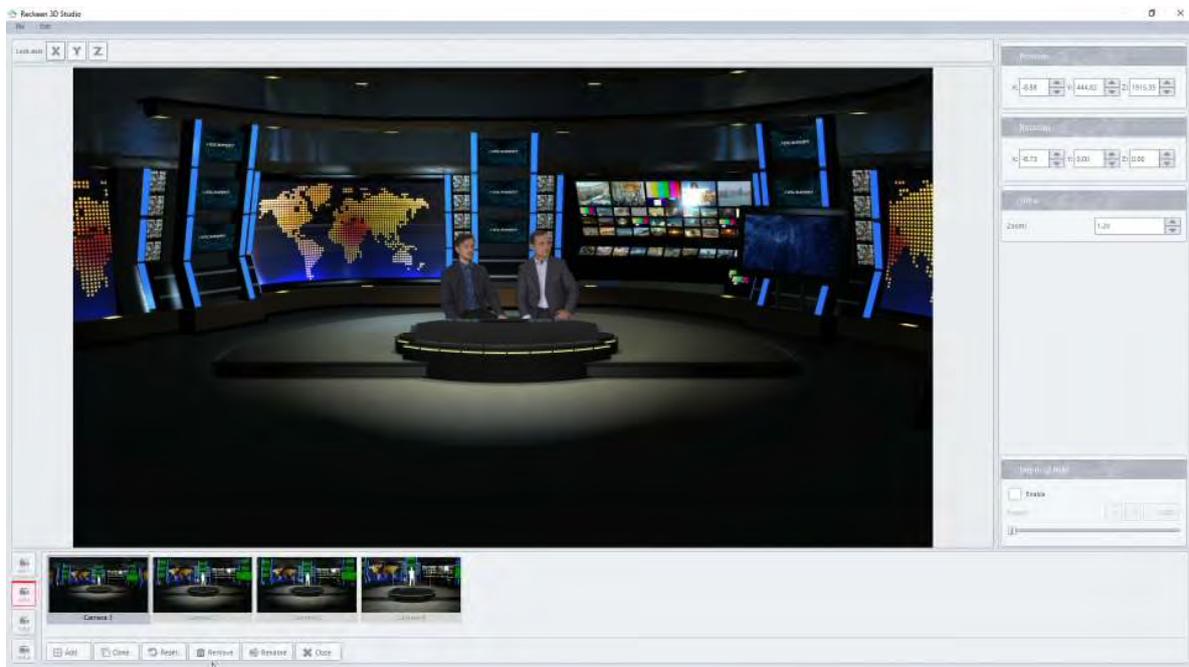
First of all, we can remove unnecessary 3 default shots and leave only one. It's best if the frame from the real camera will match the frame in the virtual studio. It's also good to keep the distance of the virtual camera similar to the one of a real camera to a talent. Picture below

We can also create additional camera shots, for example with a use of micro moves or zoom in/out. Picture below.

Similarly, we need to set up shots for V/C 3. The view from Camera 3 is a middle shot, perpendicular to

the talent. Picture below.

Virtual camera should be placed in a way, so that it resembles the position of the physical camera, in this case pointed towards left side of the room. It's important to avoid moves downwards. Picture below.
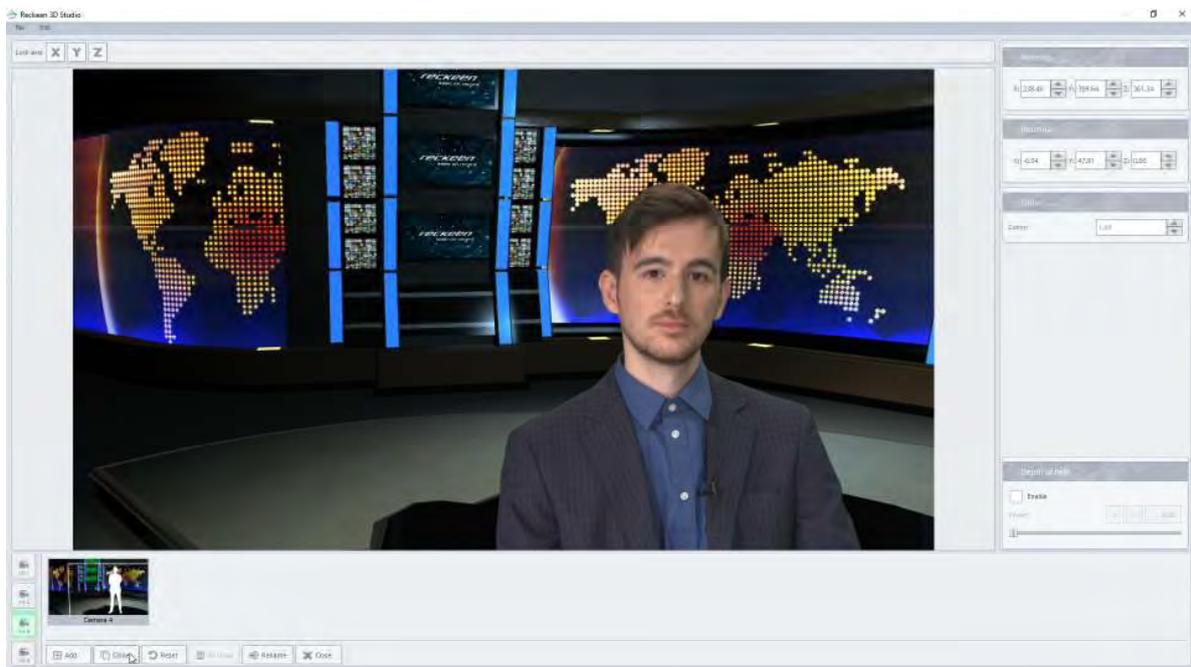
We can add additional camera shots and present micro moves and zoom in/out. Picture below.

An interview host was assigned to V/C 4. Virtual camera should be pointing towards right-hand side in this case. Picture below.

Let's create the shot in a way that fills up the space of the frame.

Talent object has a billboard function on, so it will always face the camera from the front, even when we move a virtual camera around. For this medium shot, we can also prepare extra shots with micro moves. Picture below.
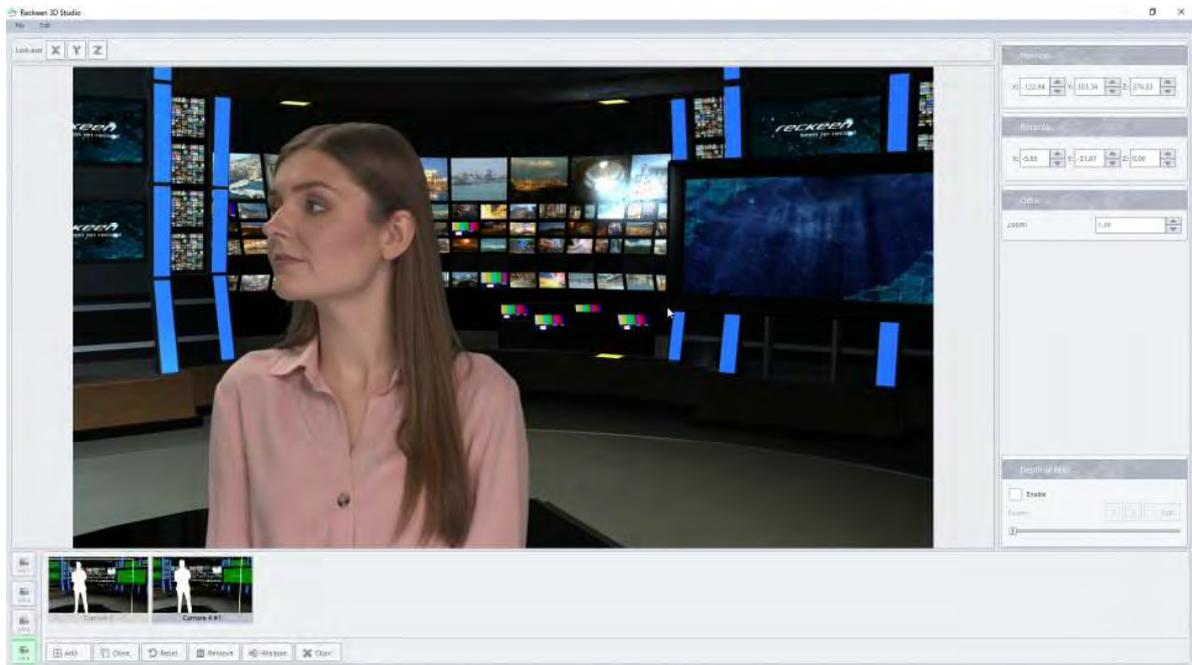
That would be the end for setting up the camera shots for 3D Multicamera.

In V/C windows we can see the virtual camera views we've chosen for each camera. By switching between V/C on the mixer, we can see that the cameras visible on Program and Preview windows change. That way we can make an interview or a talk show type of production. On the mixer we can make immediate transitions using CUT button, or smooth ones using AUTO button. Picture below.
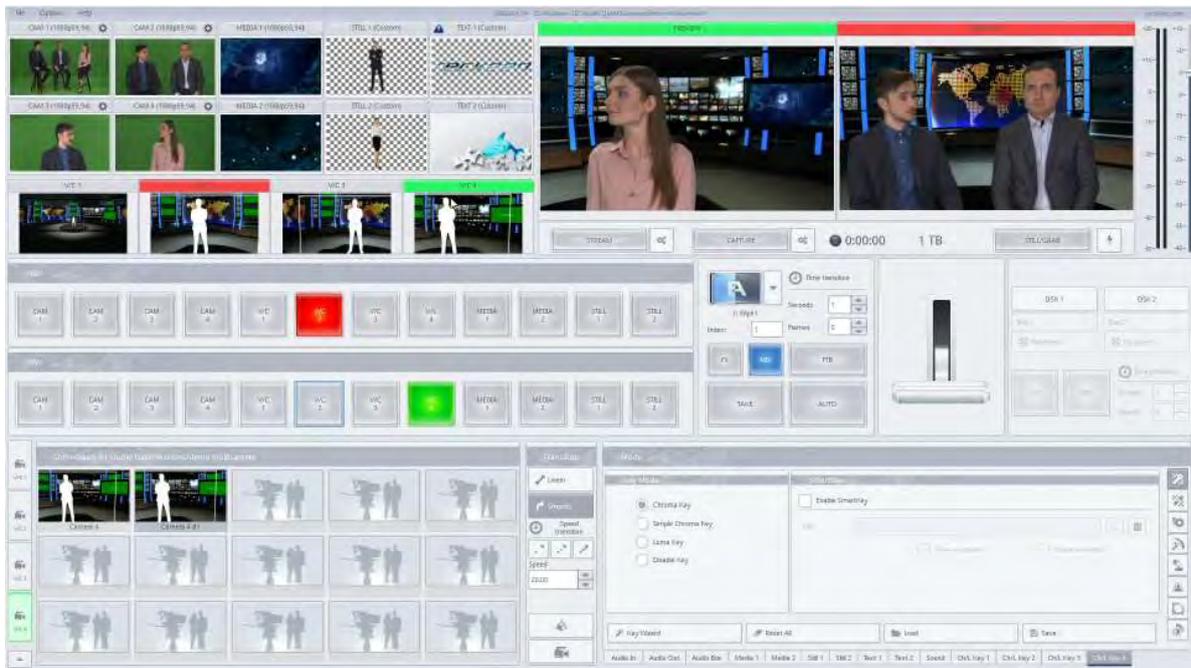
DEPTH OF FIELD (DOF) FUNCTION

Now, we're going to look into a new function imitating opening and closing camera iris, that allows to blur the background, while the talents stay in a focal point. This feature is called Depth of Field (DOF). Depending on a camera position and its distance from talents, blur intensity will change. Let's start the setup with a master shot. In Camera Setup window, enable Depth of Field option but with 0 value. Picture below.

By moving the slider called "Power" we can change the intensity of the blur. The blur will appear behind talents, and depending on the camera position and chosen intensity – also in front. DOF value equal 48. Picture below.

We will set up a value of 5 for a wide, distant shot. Picture below.

If we zoom in the camera, the background becomes more blurred than it was at a far-away view, but the Depth of Field value remains unchanged. Picture below.

As V/C 2 is a medium shot, we can set up greater Depth of Field intensity. We'll set up a value of 10. Picture below.

Similarly, for V/C 3 we can also set up a value of 10. Picture below.
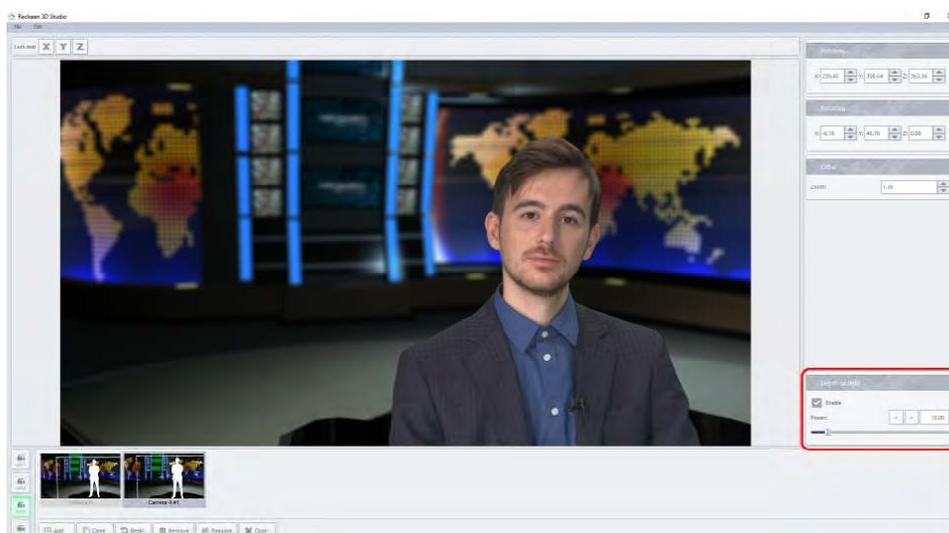
And for V/C4. Picture below.
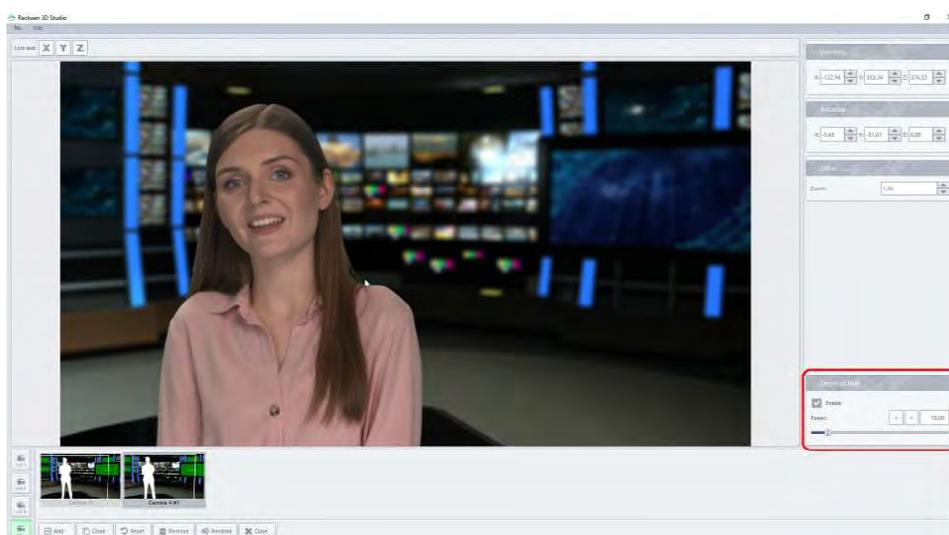
Of course, these values can be adjusted to one's preferences.

We can go back to the production screen now. We are going to move the virtual cameras around, showing you how depth of field works during production. For the medium shots, we've set up higher blur value, with auto-focus on talent. On Preview, the DOF value is 5. On the Program, the DOF value is 10. Picture below.

It's important to remember to adjust a virtual environment to the set-up of physical cameras.

Note - The Depth Filter can also be set by one of the triggers for each V / C, for more details see chapter "Programing triggers".

TALENT POSTION CORRECTION

It might happen, that a person will appear too small or too big compared to a set and virtual surrounding. We can correct the size in the Studio 3D Editor, by choosing the object and changing its scale using Mode: Scale (top left corner). Picture below.
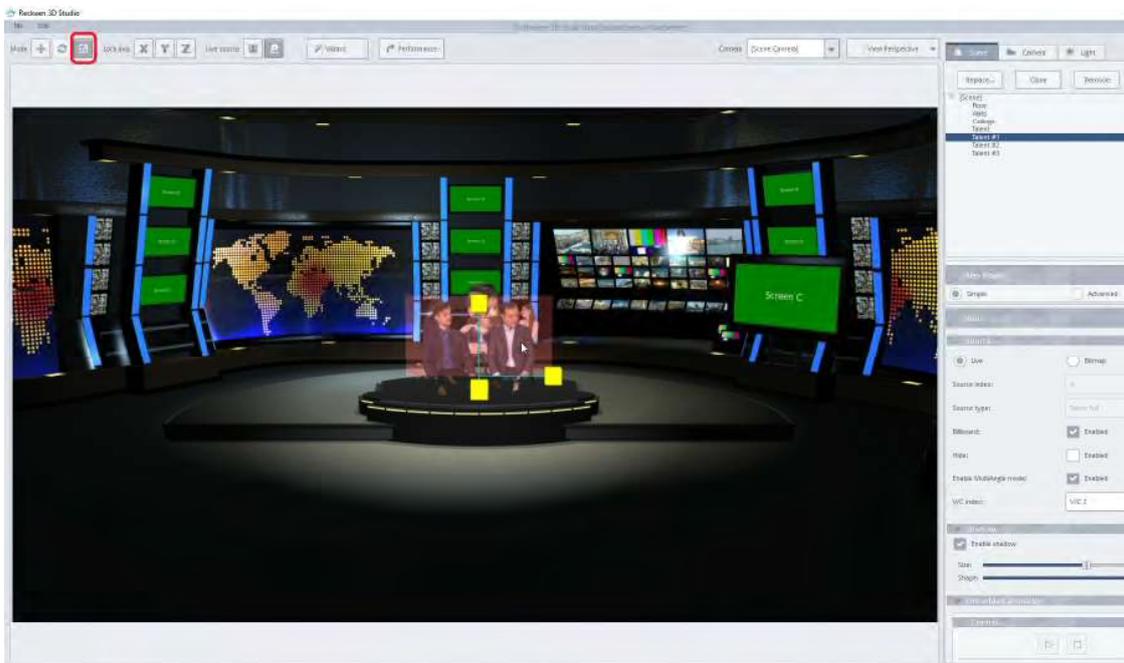
After such correction, we need leave the editor and go to Camera Setup window to adjust the shot for this V/C. We need to place the virtual camera so that it covers up the fact that the talents have been filmed from the waist up.
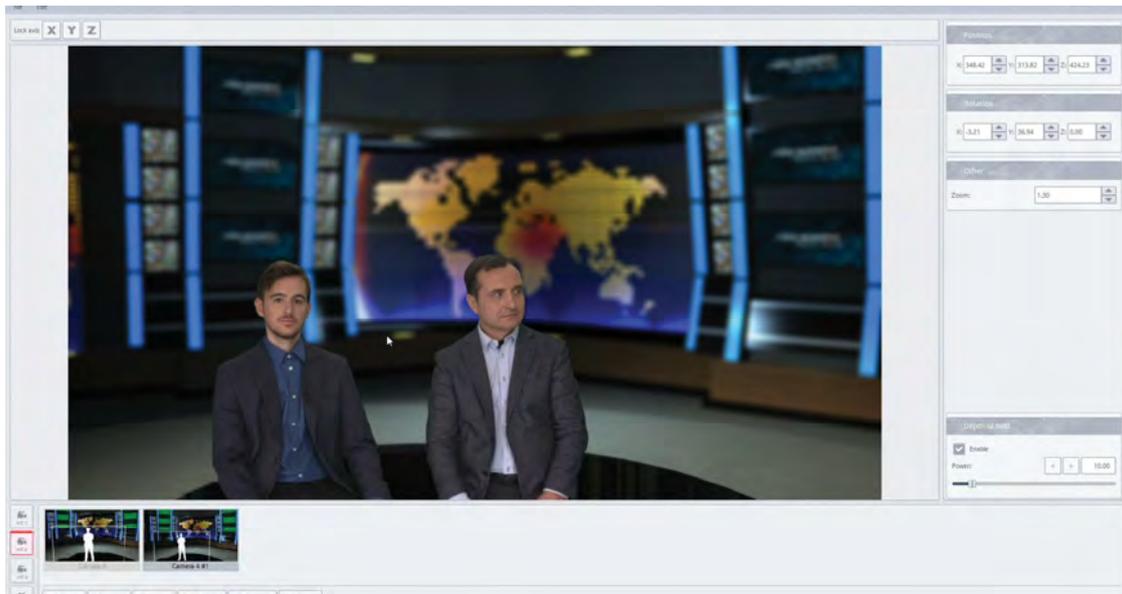
Let's remember, that for the medium shots, where talents have been filmed from waist up, we need to place the Talent object above the virtual floor level in Studio 3D Editor. Each time after correction in Studio 3D Editor, go to Camera Setup Window to adjust the shots as well.

All parameters depend on many factors, such as size of a frame, zoom of a real camera, size of a TV studio in virtual set, and distance between a talent and walls. Take all factors into consideration when making adjustments.

3D MULTICAMERA SHADOW

The shadow settings for the talent in the 3D multicamer operation mode are standard as for the normal operation mode and are described in the chapter "Virtual 3D studio editor" subsection Shadows.

In the 3D Multicamery mode, there may be a need to display all shadows simultaneously (shadows overlap creating one collective shadow). This is the case if in different VCs we have an image of the same talent but seen from different cameras, positioned at different angles.

To ensure the uniformity of the shadows in this case for different angles is the option Scene / Show shadows for MultiAngle cameras. Enabling this option causes that all Talent shadows will be displayed in each VC for active 3D Multicamery mode.
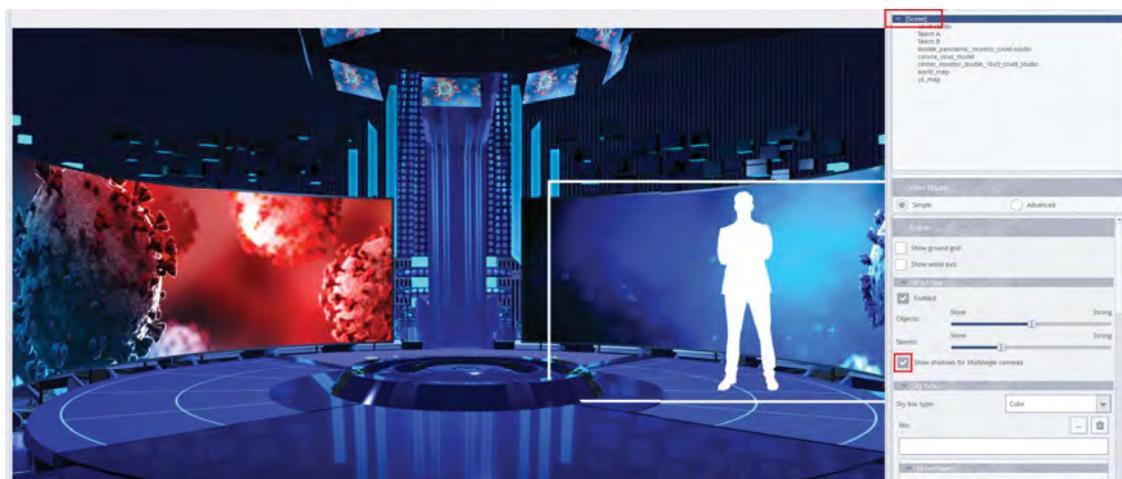
Note: this option will not always solve all variants and possible cases. Therefore, it should be used in a thoughtful way and where it is helpful.

16
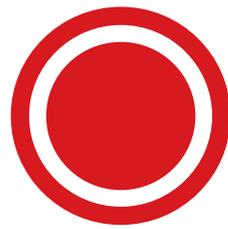
PTZ

The Reckeen 3D Studio system allows you to direct control PTZ cameras.

A pan–tilt–zoom camera (PTZ camera) is a camera that is capable of remote directional and zoom control. PTZ cameras are commonly referred to as robos, an abbreviation of robotic camera. These systems can be remotely controlled by automation systems. The PTZ controls are generally sold separately without the cameras, but can also be included into software which cooperate with the camera.

SUPPORTED PTZ MODELS

3.1 software version of Reckeen 3D Studio supports control of 4 x PTZ cameras simultaneously, which allow for PTZ virtual studio tracking and Augmented Reality productions - these functions are called XR in the Reckeen systems.

Two types of Reckeen virtual studio models support PTZ functions (XR):

RECKEEN 3D Studio - 4K, 12G SDI-HDMI Virtual Studio, and

RECKEEN 3DSPro - 4K, 12G SDI Virtual Studio

Reckeen 3D Studio supports VISCA over IP protocol based PTZ cameras. All tests were done with SONY, CANON and PANASONIC PTZ models:

SONY BRC X400 (HDMI 4KP30, SDI only Full HD)

SONY BRC-H800 (HDMI , SDI only Full HD)

SONY BRC-X1000 (HDMI 4KP30 , SDI Full HD)

CANON -CR-N300 (HDMI 4KP30 , SDI Full HD)

CANON -CR-N500 (HDMI 4KP30 , SDI Full HD)

CANON -CR-N700 (HDMI 4KP60 , SDI 12G 4KP60)

Panasonic AW-UE 100 (HDMI 4KP30 ,SDI 12G 4KP30)

Panasonic AW-UE 150 (HDMI 4KP60 ,SDI 12G 4KP60)

PREPARING PTZ CONNECTING TO RECKEEN SYSTEM

The diagram below shows the connection between PTZ cameras and the Reckeen 3D Studio system and 3DSPRO X8 versions.

First configure the PTZ camera, set the desired video formats and connect to the Reckeen system.
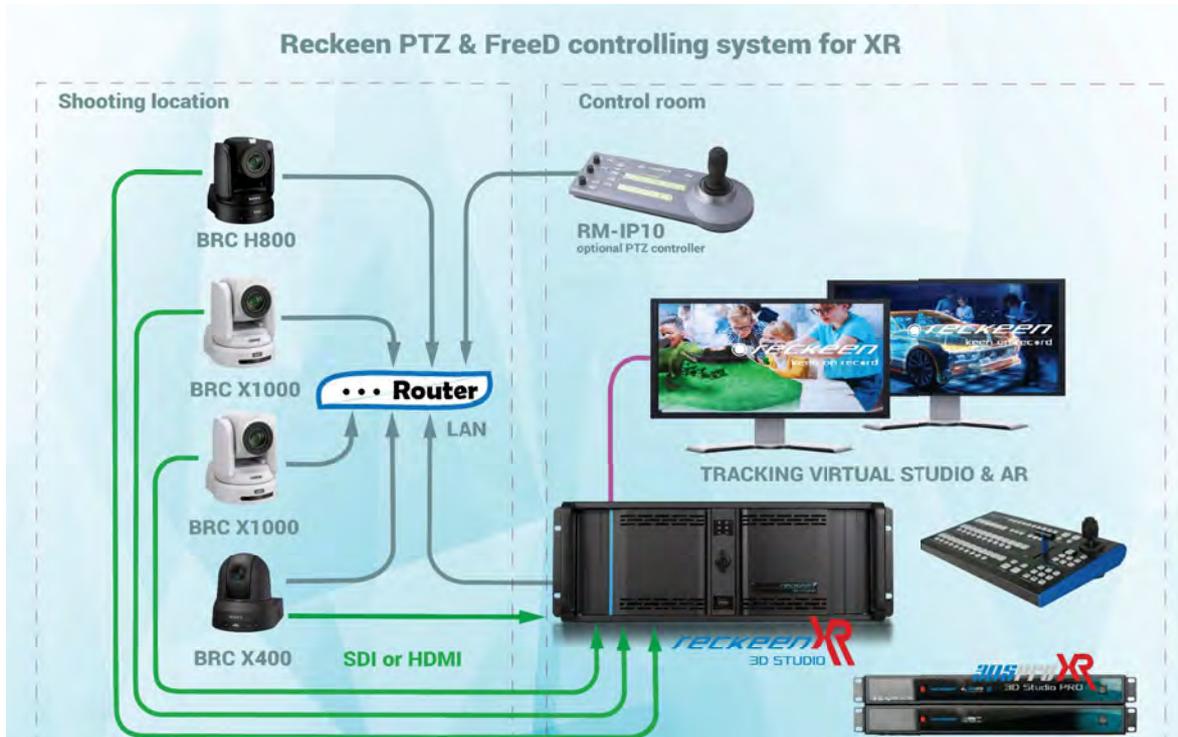
Note: All connections should be made with both cameras' and Reckeen system's power off.

SONY PTZ CAMERAS PREPARATION

BRC-X400 connection and preparation for work with Reckeen 3D Studio system

https://pro.sony/en_AR/products/ptz-network-cameras/brc-x400

for manuanl:

https://pro.sony/en_AR/support-resources/brc-x400/manual

BRC-X1000 connection and preparation for work with Reckeen 3D Studio system

https://pro.sony/ue_US/products/ptz-network-cameras/brc-x1000

for manuanl:

https://pro.sony/ue_US/support-resources/brc-x1000/manual
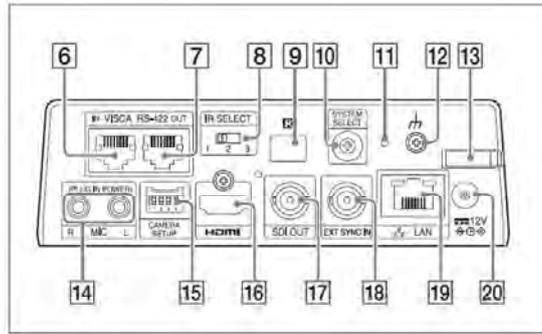
Connect camera with Reckeen 3D Studio system by required video interface. HDMI (16) or SDI (17).
- Connect "Earth" terminal (12)
- Connect camera with your LAN network (19)
- Set HDMI/SDI video output format into required value (10). For best accuracy in tracking system it have to be set with the same value as Reckeen 3D Studio output.

Select your desired video output format.

Note: All settings should be made with cameras' power off.

No.	Video output format/Frame rate	
	BRC-X400/X401 and SRG-X400/X402/201M2/X120/HD1M2 (with 4K Option)[2]	SRG-X400/X402/201M2/X120/HD1M2 (without 4K Option)[2]
0	3840x2160/29.97p	1920x1080/59.94p
1	1920x1080/59.94p	1920x1080/59.94p
2	1920x1080/59.94i	1920x1080/59.94i
3	1920x1080/29.97p	1920x1080/29.97p
4	1280x720/59.94p	1280x720/59.94p
5	1920x1080/59.94p	1920x1080/59.94p
6	REMOTE[1]	REMOTE[1]
7	HDMI : 640x480/59.94p SDI : 1280x720/59.94p	HDMI : 640x480/59.94p SDI : 1280x720/59.94p
8	3840x2160/25p	1920x1080/59.94p
9	1920x1080/50p	1920x1080/50p
A	1920x1080/50i	1920x1080/50i
B	1920x720/50p	1920x720/50p
C	1280x720/50p	1280x720/50p
D	1920x1080/59.94p	1920x1080/59.94p
E	3840x2160/23.98p	1920x1080/59.94p
F	1920x1080/23.98p	1920x1080/23.98p

- Connect power supply (20)

BRC-X1000 connection and preparation for work with Reckeen 3D Studio system
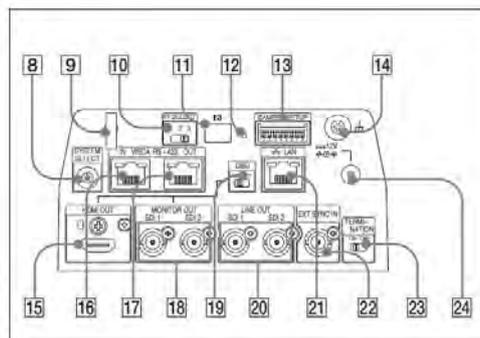
- Connect camera with Reckeen 3D Studio system by required video interface. HDMI (15) or SDI (20).

- Connect "Earth" terminal (14)

- Connect camera with your LAN network (21)

- Set HDMI/SDI video output format into required value (8). For best accuracy in tracking system it have to be set with the same value as Reckeen 3D Studio output.

Select your desired video output format

SYSTEM SELECT
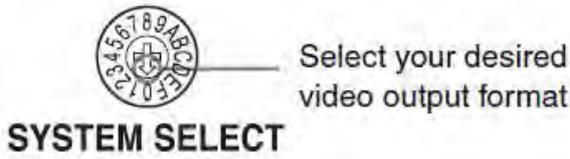
No.	Image size/Frame rate	
	BRC-X1000	BRC-H800
0	3840×2160/29.97p	No output
1	1920×1080/59.94p	1920×1080/59.94p
2	1920×1080/59.94i	1920×1080/59.94i
3	No output	No output
4	1280×720/59.94p	1280×720/59.94p
5	No output	No output
6	No output	No output
7	HDMI: 640×480/59.94p SDI: 1280×720/59.94p	HDMI: 640×480/59.94p SDI: 1280×720/59.94p
8	3840×2160/25p	No output
9	1920×1080/50p	1920×1080/50p
A	1920×1080/50i	1920×1080/50i
B	No output	No output
C	1280×720/50p	1280×720/50p
D	No output	No output
E	3840×2160/23.98p	No output
F	1920×1080/23.98p	1920×1080/23.98p

Note: All settings should be made with cameras' power off.

• Connect power supply (24)

Camera settings change in web browser

In the next step, we need to obtain information about the IP settings of our PTZ cameras, we will need this data to pair PTZ cameras with the Reckeen 3D Studio system.

a. Set correct IP address in your LAN segment. Both systems (camera and Reckeen 3D Studio) must be in the same LAN segment

Start RM-IP10 Setup Tool and click the "Camera" tab. The "Camera List" screen appears and cameras that are detected on the IP network are listed on the screen.
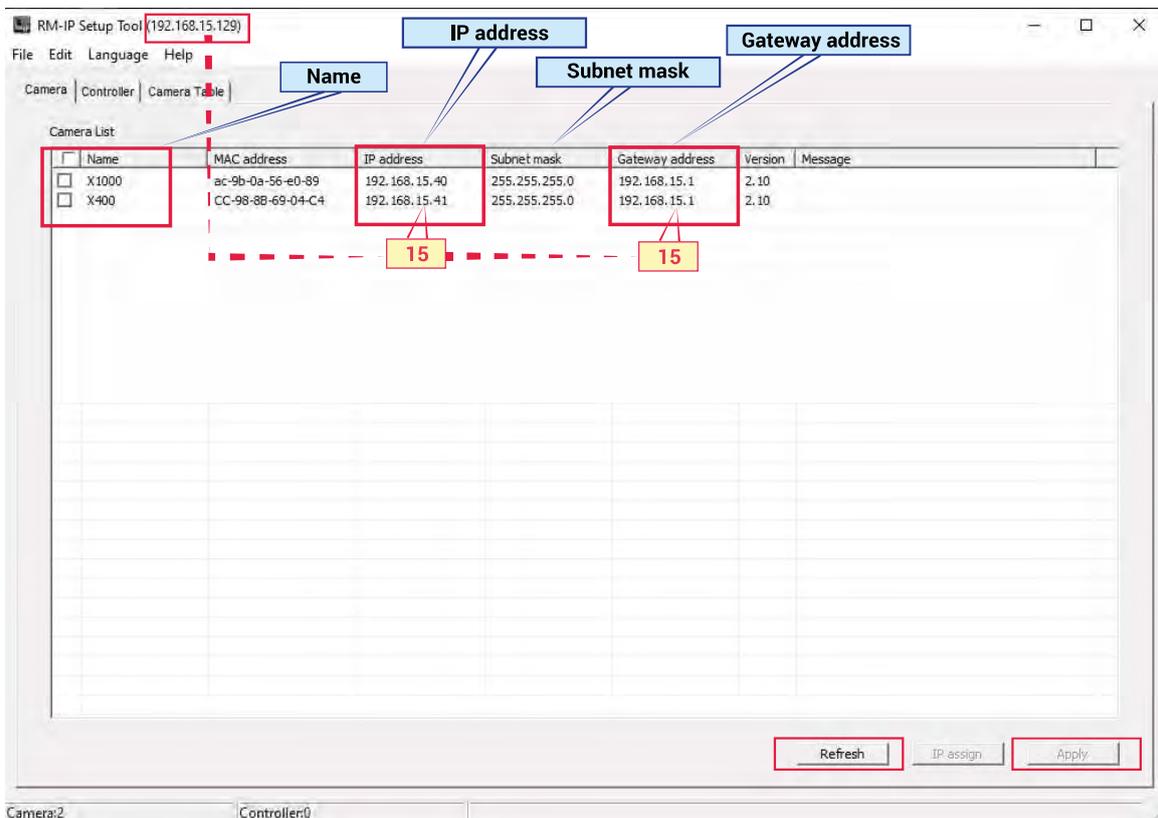
"Mac address" is a unique address for the camera and cannot be changed.

Set the camera's name. Input the camera's name to the "Name" column.

Set the IP address.• Input the IP address to the "IP Address" column.• Input the subnet mask to the "Subnet mask" column.• Input the default gateway address to the "Gateway address" column.

Click "Apply" to save the settings for each camera that has its checkbox marked.   Click "Refresh." An updated list of the current settings registered is displayed.

b.   You can access the camera from a web browser on a computer to change the settings.

RECKEEN CONFIGURATION SET-UP FOR SONY CAMERAS

After setting the desired resolution on the PTZ camera you will start your project. Connect the PTZ camera to the Reckeen system according to the diagram below:
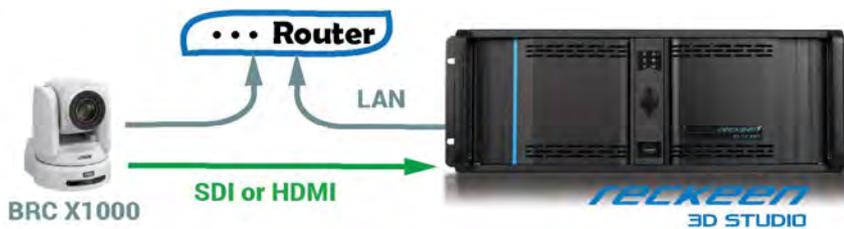
Now open the Configuration / Tracking /PTZ tab in the Reckeen application,

see figure below:

In the next step, we need to set the Camera Type of the PTZ camera being used, and enter the correct IP address (from RM-IP10 Setup Tool) of your PTZ into the PTZ configuration tab, this will allow you to control your PTZ directly from the Reckeen 3D Studio application, picture below:

If all cable connections are correct and the camera's IP address is correct, we can press the connet button to connect the camera with the application. Press the Connect button:

This button will **turn blue** when the connection with the camera is established. **Red color** of the Connect button means that the connection between the camera has been broken, e.g. by removing the LAN connection cable on the camera or the Reckeen system. If the connection is restored, the system will automatically connect the camera, signaling it with the blue Connect.

Note, we can connect up to 4 PTZ cameras to the Reckeen system, please make sure your camera's IP connections are paired with the correct CAM 1-4 video inputs. Then make sure you enter the IP address for the correct CAM input.

In the lower part of the configuration window, there are LOAD and SAVE buttons, which allow you to save and restore all PTZ configuration settings. See the picture below:

The option indicated above in the red frame does not affect the PTZ, but only the tracking options that will be described in the next chapter.

CANON PTZ CAMERAS PREPARATION

Canon CR-N300 connection and preparation

for work with Reckeen 3D Studio system

https://www.canon-europe.com/ptz-cameras/cr-n300/

https://www.canon-europe.com/support/consumer_products/products/remote-camera-system/cr-n300.html?type=manuals&language=en

CR-N300 - Canon

The Canon CR-N500 connection and preparation

for work with Reckeen 3D Studio system:

https://www.canon-europe.com/ptz-cameras/cr-n500/

Manuale for 500:

https://www.canon-europe.com/support/consumer_products/products/remote-camera-system/cr-n500.html?type=manuals&language=en

Camera Search tool (application needed to "find" cameras in the local network):

https://www.canon-europe.com/support/consumer_products/products/remote-camera-system/cr-n500.html?type=download&language=en&os=windows%2010%20(64-bit)

STEPS TO SETUP PTZ FOR CANON 300 and CANON 500 /700 are identical:

1. Connect camera with Reckeen 3D Studio system by required video interface (HDMI or SDI)

2. Connect "Earth" terminal

3. Connect camera with your LAN network

4. Connect power supply

5. Open a web browser and enter the IP address of the camera into the address bar. The IP address can be found in the camera's manual or by using a network scanner (Camera Search tool).

6. Open browser, type the IP address in search bar. Then, fill up fields with Administrator name and password.
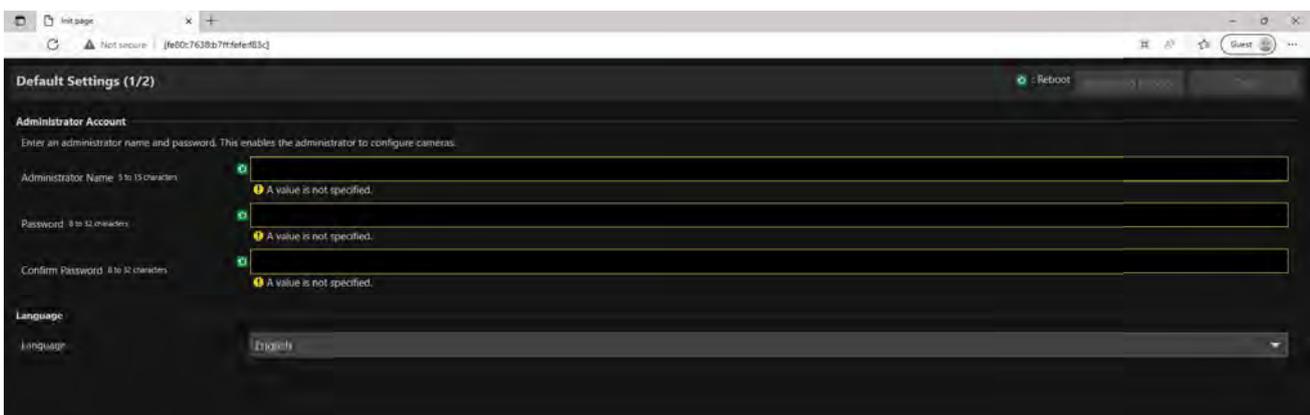
7. Click "Apply and Reboot". After reboot log in to the camera's web interface using the username and password configured in step 6.

8.Once logged in, setup camera IP (DHCP or Static) and Frame Frequency. After all click "Apply" button
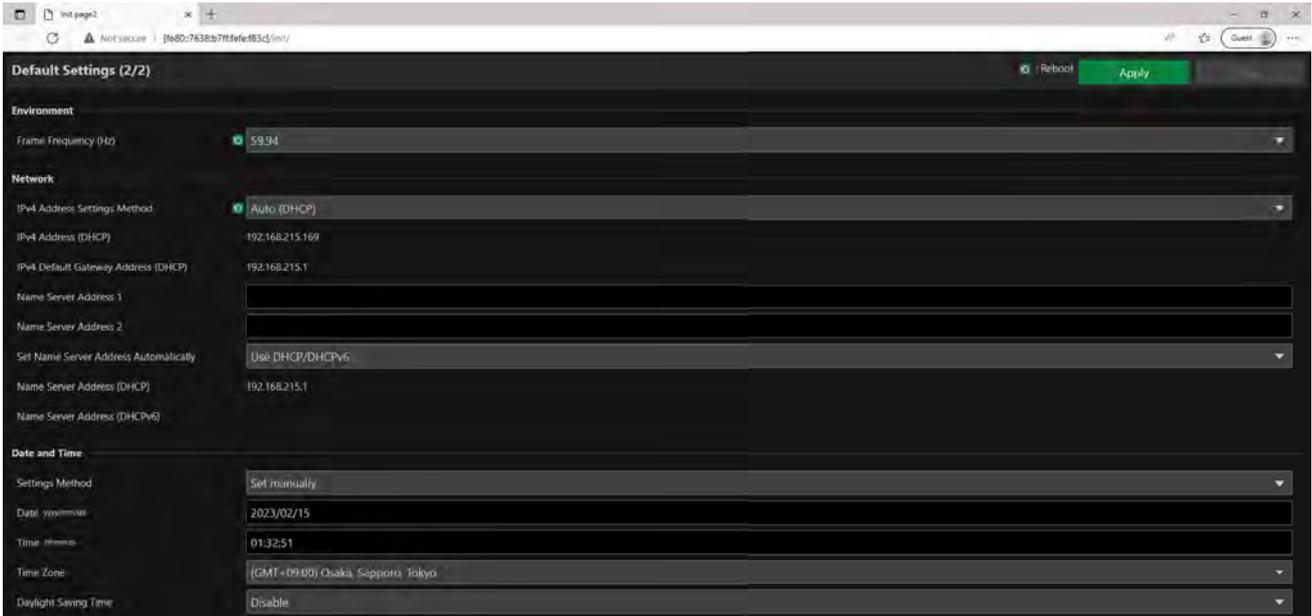
9. Set up the output signal format of the HDMI and SDI terminals. For best accuracy in tracking system the resolution and framerate needs to be the same as Reckeen 3D Studio output.
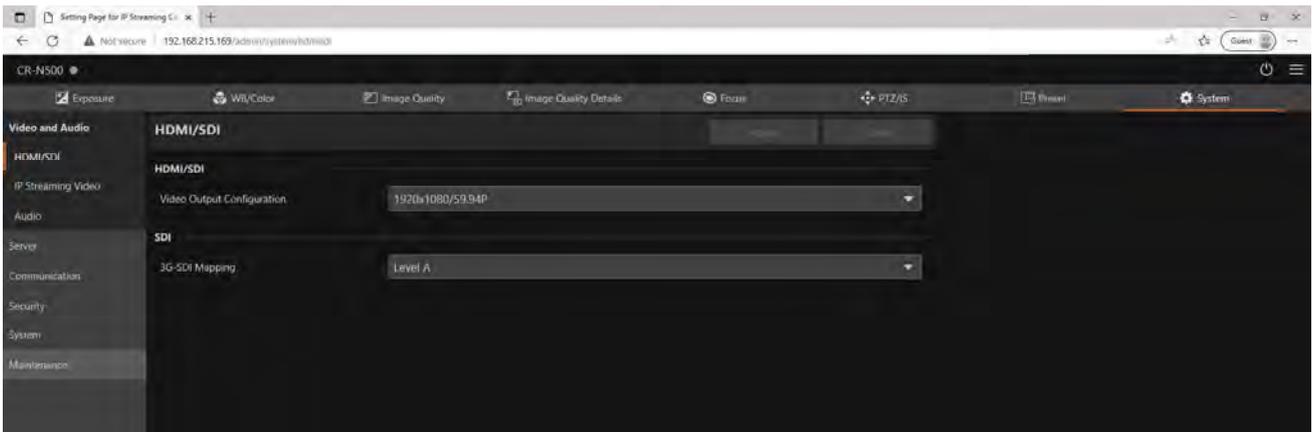
Possible output signal configurations:

[Frame Frequency (Hz)]	HDMI/SDI video output format (video size/frame rate)
23.98	1920x1080/23.98P, 3840x2160/23.98P
29.97	1920x1080/29.97P, 3840x2160/29.97P
59.94	1280x720/59.94P, 1920x1080/59.94P, 1920x1080/59.94i
25.00	1920x1080/25.00P, 3840x2160/25.00P
50.00	1920x720/50.00P, 1920x1080/50.00P, 1920x1080/50.00i

10. It's recommended to set up static IP of the camera inside "Communication" section and "Network" sub-section

RECKEEN CONFIGURATION SET-UP FOR CANON CAMERAS

After setting the desired resolution on the PTZ camera you will start your project. Connect the PTZ Canon camera to the Reckeen system according to the diagram below:

Now open the [   ]   [below:

In the next step, we need to set the Canon Camera Type of the PTZ camera being used, and enter the correct IP address (from Camera Search tool) of your PTZ into the PTZ configuration tab, this will allow

you to control your Canon PTZ directly from the Reckeen 3D Studio application.

PANASONIC PTZ CAMERAS PREPARATIO

Panasonic AW-UE 100 connection and preparation

for work with Reckeen 3D Studio system

Panasonic AW-UE 100 (HDMI 4KP30 , SDI 12G)

https://pro-av.panasonic.net/en/products/aw-ue100/

for manual:

https://pro-av.panasonic.net/manual/en/03_doui.html?code=AW-UE100   )W,%E
3%80%80%E3%80%80%E3%80%80AW-UE100K%E3%80%80%E3%80%80   d%20
Camera&pagetype=C&lang=en

Panasonic AW-UE 150 connection and preparation

for work with Reckeen 3D Studio system

Panasonic AW-UE 150 (HDMI 4KP60 , SDI 12G)

https://pro-av.panasonic.net/en/products/aw-ue150/index.html

for manual:

https://pro-av.panasonic.net/manual/en/03_doui.html?code=AW-UE150P&name=AW-UE150W,%E
3%80%80%E3%80%80%E3%80%80AW-UE150K%E3%80%80%E3%80%80%204K%20Integrated%20
Camera&pagetype=C&lang=en

Manual for advanced camera settings (ptz, calibration, additional settings - both AW-UE 100 and 150)

PTZControlCenter OperationsManual (panasonic.co.jp)

PtzControlCEnter (an application needed to "find" cameras in the local network):

https://pro-av.panasonic.net/en/software/ptz_cc/

Installation procedure for the above tools

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://eww.pass.panasonic.co.jp/pro-av/
support/content/download/DEF/soft/man/PTZControlCenter_Install_eng.pdf

STEPS TO SETUP TRACKING FOR Panasonic AW-UE100 and 150 are identical:

1. Connect camera with Reckeedn 3D Studio system by required video interface (HDMI or SDI)
2. Connect "Earth" terminal
3. Connect camera with your LAN network
4. Connect power supply
5. After starting the camera, install the PtzControlCenter application (the instruction available at:)

https://eww.pass.panasonic.co.jp/pro-av/support/content/download/DEF/soft/man/
PTZControlCenter_Install_110eng.pdf

6.Launch the PtzControlCenter application and enter "Name: Admin" and "Password: Admin" in the respective fields.

7. If the login is successful, the VIEW screen of this software will be displayed. In the upper left corner of
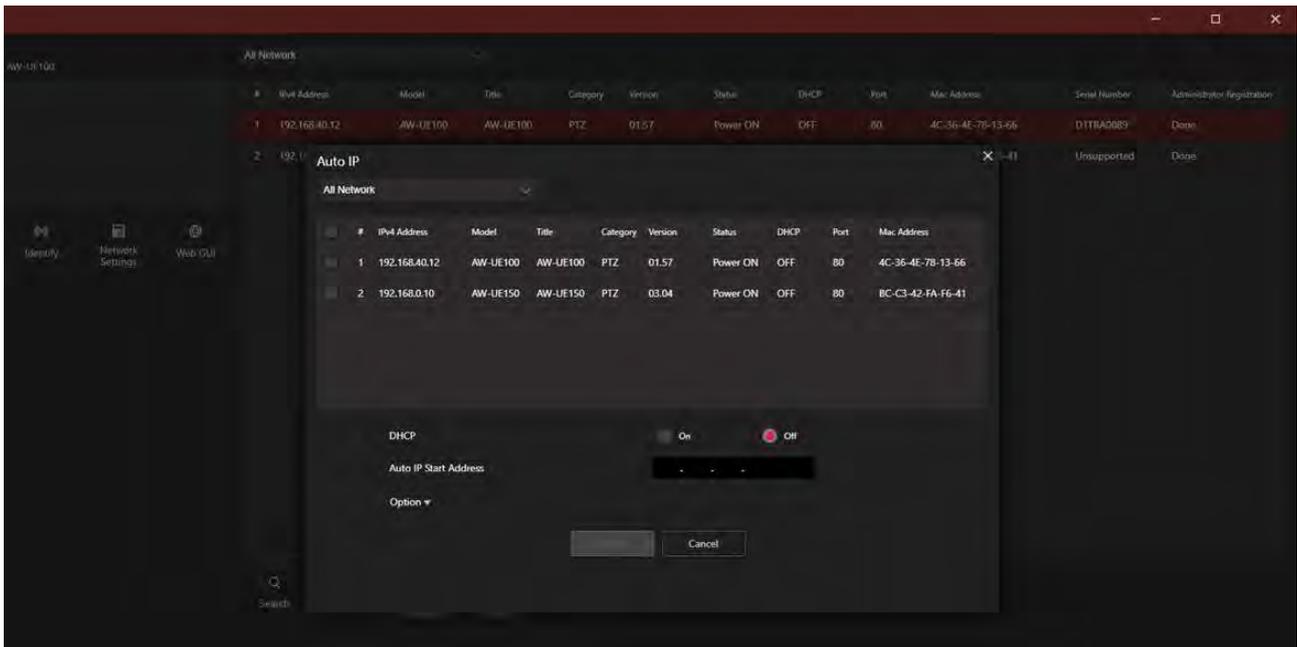
the menu bar, click on the third icon from the left.
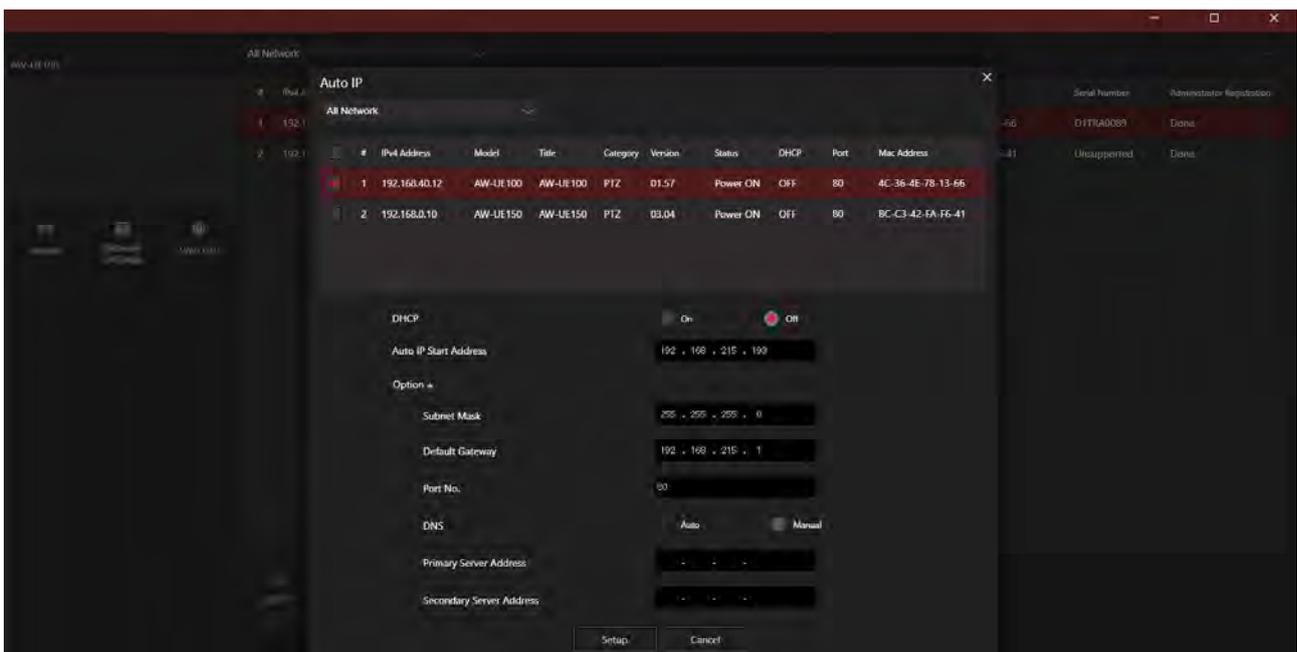
8. Then you need to confirm the licensing agreement.

9. The main screen of the application for searching cameras will be displayed.

10. Select the camera to set up the IP and click on the AutoIP icon at the bottom of the screen. A window with camera settings will be displayed.

11. ... te fie...

12. ... be dis...
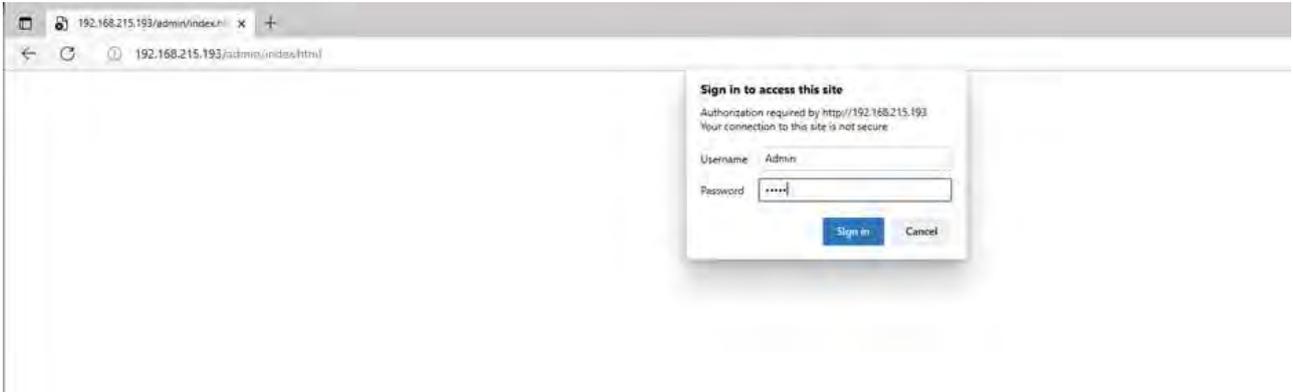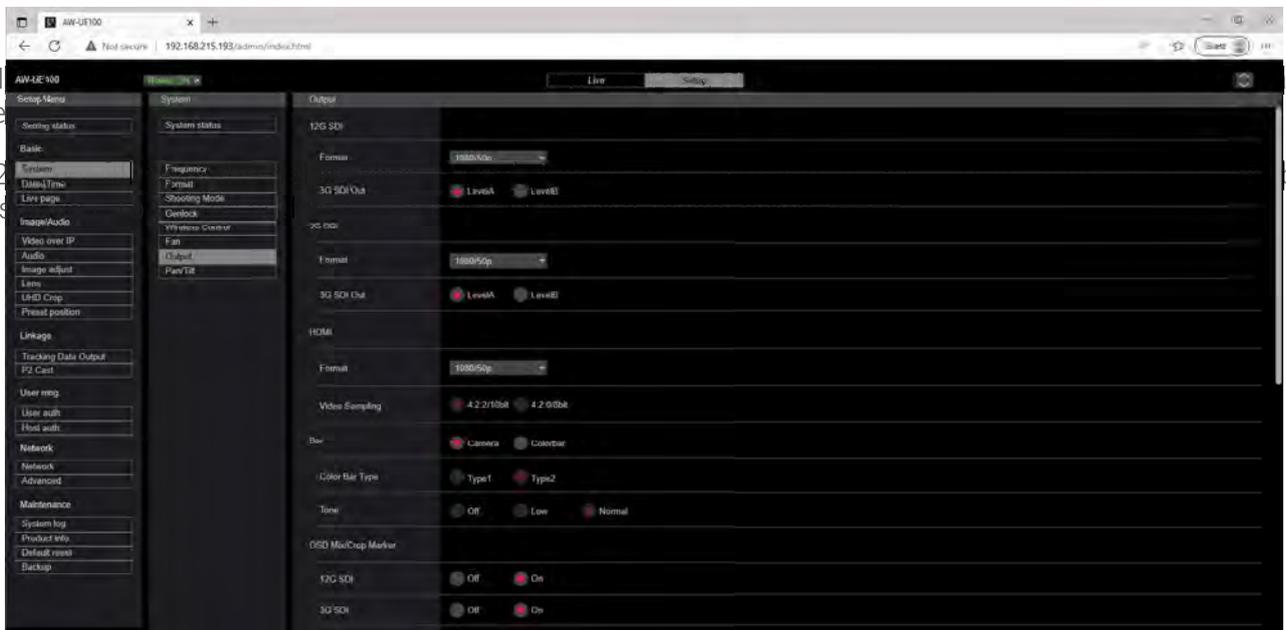
13. After logging in, go to the 'System' tab -> 'Frequency' and set the appropriate frequency.

Frequency: 59.94 Hz, 29.97 Hz

Format	External sync signal input format		
	Tri-level sync		BBS
2160/59.94p	1080/59.94p	1080/59.94i	480/59.94i
2160/29.97p	1080/29.97p 1080/29.97PsF		
1080/59.94p	1080/59.94p		
1080/59.94i	—		
1080/29.97p	1080/29.97p 1080/29.97PsF		
1080/29.97PsF	1080/29.97p 1080/29.97PsF		
1080/23.98p over 59.94i	—		
720/59.94p	720/59.94p		

Frequency: 50 Hz, 25 Hz

Format	External sync signal input format		
	Tri-level sync		BBS
2160/50p	1080/50p	1080/50i	576/50i
2160/25p	1080/25p 1080/25PsF		
1080/50p	1080/50p		
1080/50i	—		
1080/25p	1080/25p 1080/25PsF		
1080/25PsF	1080/25p 1080/25PsF		
720/50p	720/50p		

RECKEEN CONFIGURATION SET-UP FOR PANASONIC CAMERAS

After setting the desired resolution on the PTZ camera you will start your project. Connect the PTZ Panasonic camera to the Reckeen system according to the diagram below:
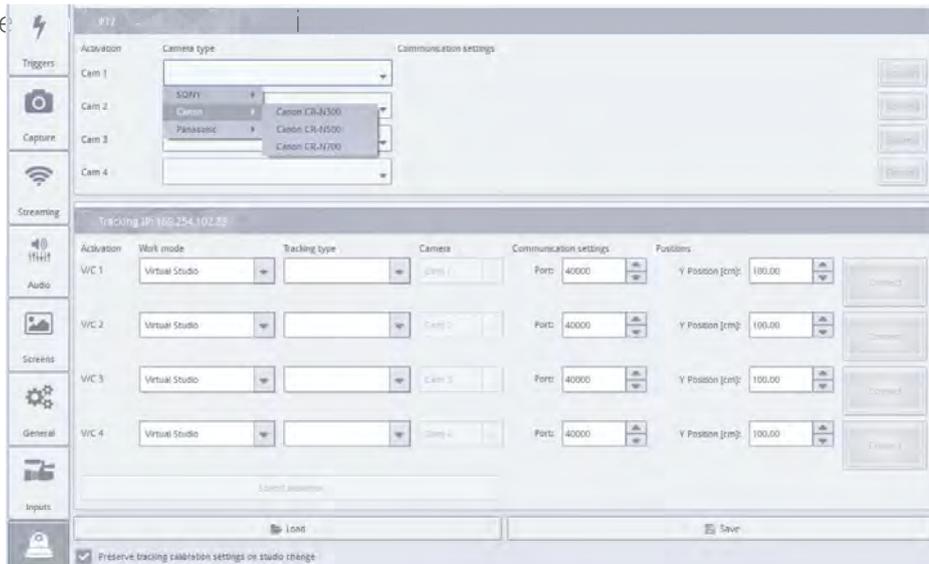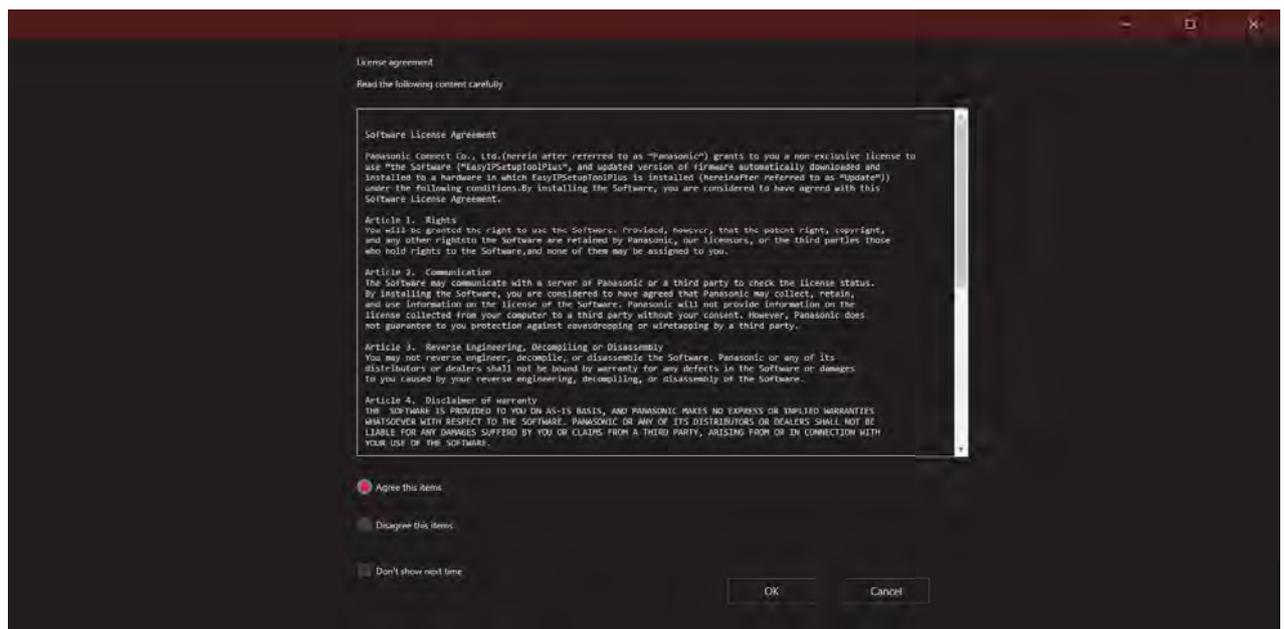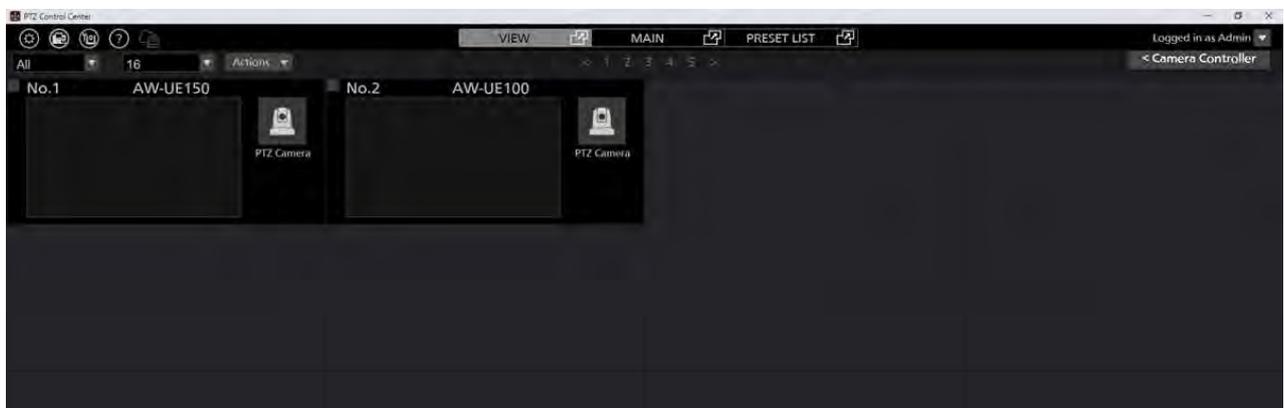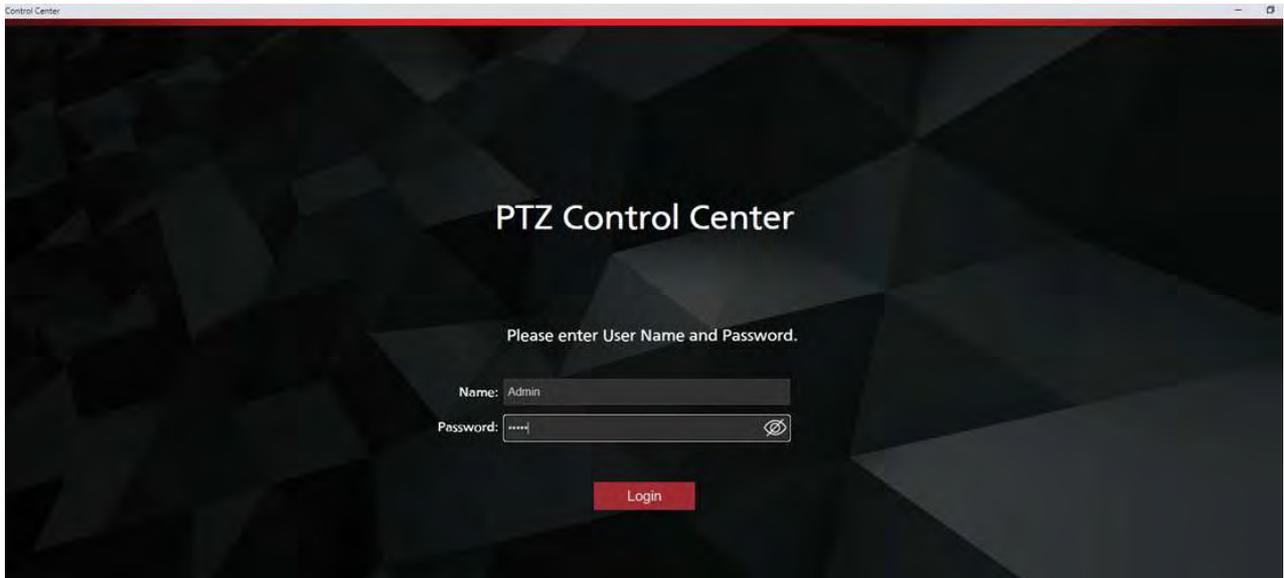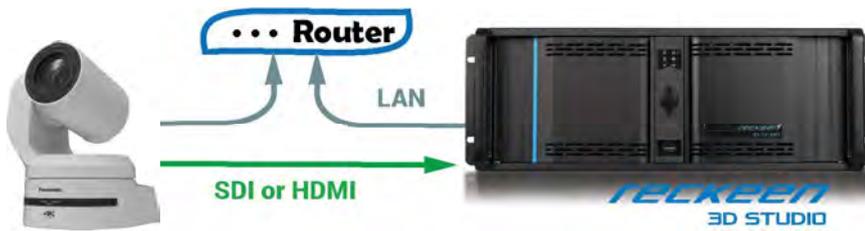

Now open the Configuration / Tracking tab / PTZ in the Reckeen application,

see figure below:

PTZ CAMERAS' CONTROL IN THE RECKEEN APPLICATION

The Reckeen application and Vkey control panels support functions such as:

- controlling the parameters such as pan, tilt and zoom position of the camera.

- recalling PTZ camera presets, programming presets.

- generate thumbnails for PTZ presets

Note: other parameters, such as specific camera settings, white balance, etc., must be made directly in the PTZ camera, e.g. using a remote control or a dedicated camera application or an external controller.
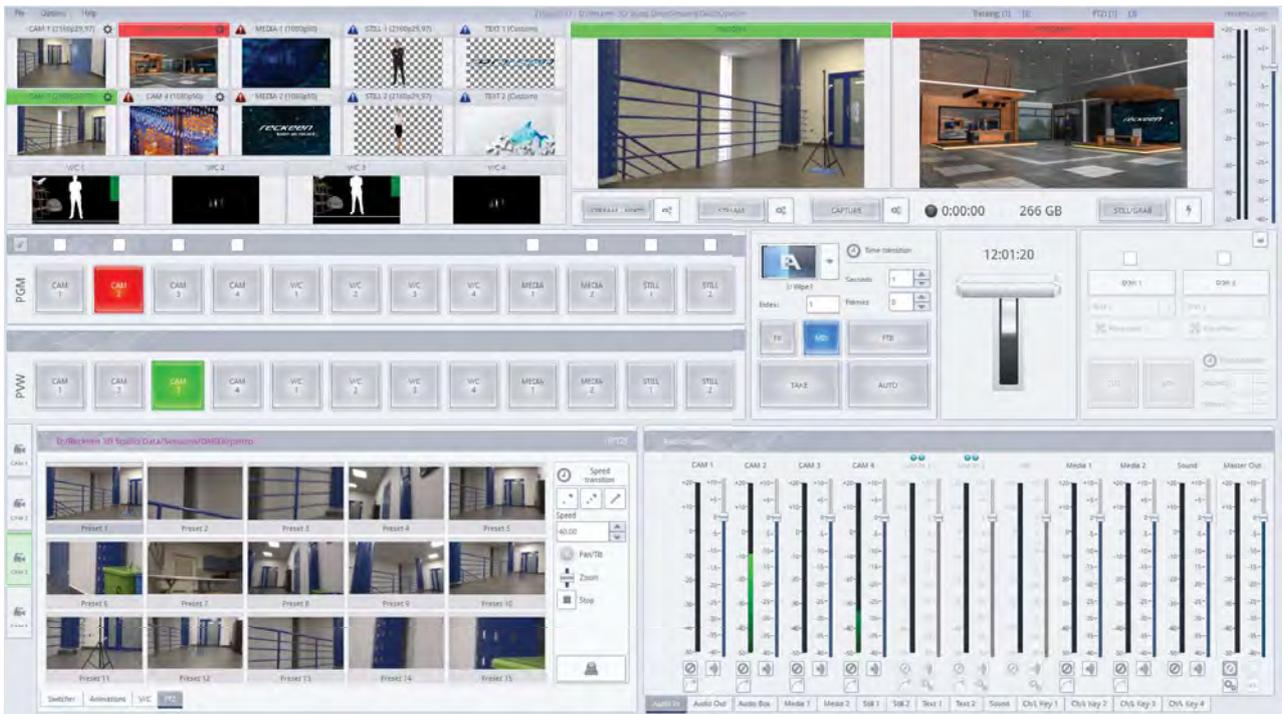
You can control your PTZ cameras directly from the production window, in the PTZ tab. This window is active only for a connected PTZ camera which is connected to the appropriate video input of the system such as SDI or HDMI, and when the IP address of the camera is associated with the corresponding CAM 1 to 4 inputs, under which we can see the view from this camera in the preview in the Multiviewer window.

Now let's move on to the PTZ tab, see picture below:

In this window, there are 15 pictures, which can be used for the PTZ camera presets positions, which can be controlled by clicking on generated thumbnails. PTZ tab will open for the selected CAM, only if the camera is connected. If no PTZ camera is connected to the given CAM, the window will be inactive, see figure below:

On the right side of the PTZ tab there is a control panel that allows you to control the PTZ: change the zoom position, and a small joystick allows you to change the pan and tilt position. At the top of this window, speed of the PTZ's movements can be set up.

PTZ SHOTS EDITOR

At the bottom there is an icon that leads us to the PTZ Shots Editor.

The Shot Editor is used to program, preview, and correct preset settings in the PTZ camera.
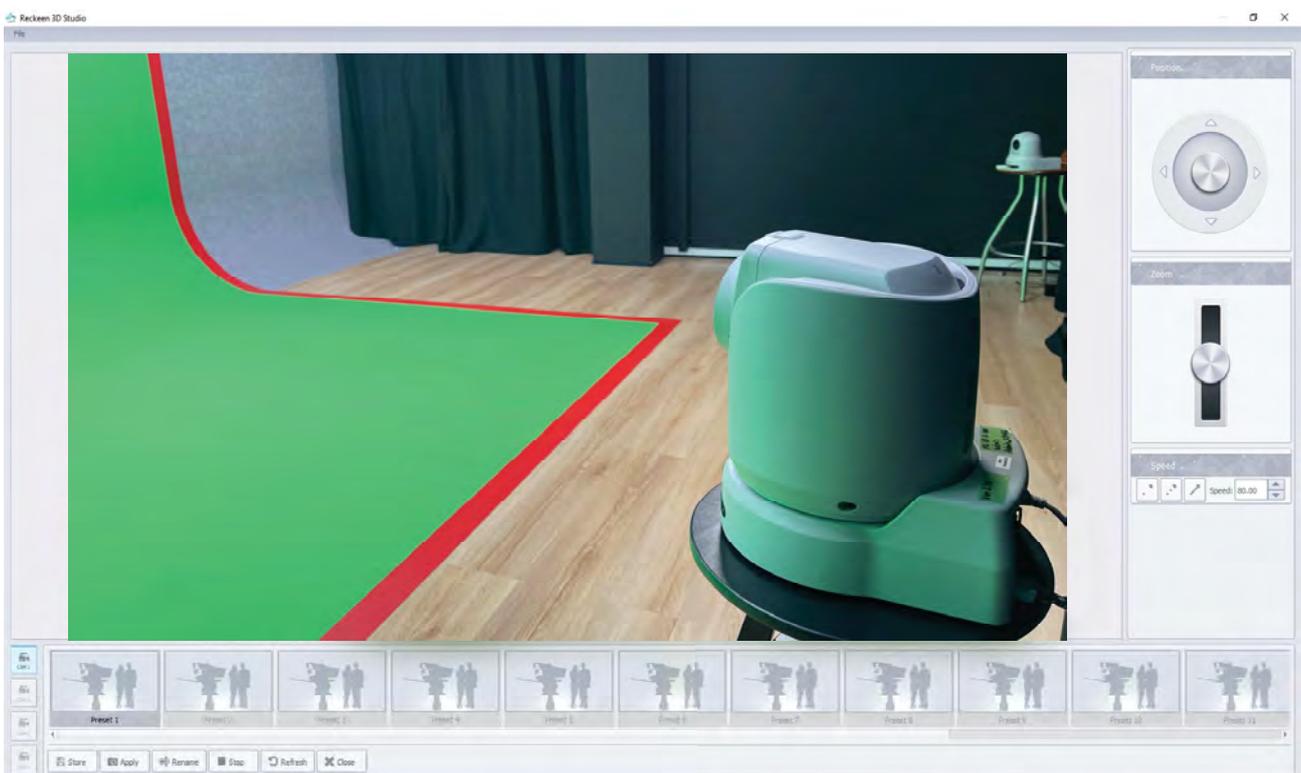
Note: THE PRESET SETTINGS ON THE PTZ CAMERA ARE STORED IN THE PTZ CAMERA AND NOT IN THE 3D STUDIO APPLICATION. Therefore, after loading the session, you must call the REFRESH function (in the Shot Editor) to recreate the shots and the PRESET position

In order to program a preset, we must first set the required PTZ camera position. Using the PTZ control interface with a jostick we can adjust the Pan and Tilt positions.

The slider located under the joystic is used to set the Zoom. A very important parameter that is also stored in the camera along with the position is the speed of the camera reaching the required position. The speed value should be set before saving the PTZ camera position.

At the bottom of the PTZ Shot Editor window, there are such buttons as:

STORE - save the set parameters in the selected PRESET.

First indicate with the mouse the image window in which you want to parameters.

APPLY - recalls a selected PRESET's position. First, single-click with the mouse on the preset window which you want to recall. The APPLY function is also triggered by double-clicking on the selected PRESET window shot with the mouse.

RENAME - allows you to rename the preset to your own. Your names are saved in the session and not in the PTZ camera.

STOP - stops the camera operation, it is useful when the camera is moving at a slow speed.

REFRESH - reads all preset parameters from 1 to 15 stored in the camera and creates thumbnails of the shots. This function takes time to run because it depends on the parameters of a given preset and the time stored in it.

CLOSE - closes the Shots Editor window.

VKEY100/200/200+ AND PTZ

Using the Vkey100 or Vkey 200 Control Panel you can also control the PTZ:

It is possible to control the shots if you choose CAM 1 - 4 on PGM or PRV bus. The condition is that under selected CAM, a PTZ camera must be configured. Keys 1-10 correspond with the PRESETS made in Shots Editor. The active presents' keys will be automatically illuminated. After pressing selected Shot, it will call up the appropriate PRESET in the PTZ camera.

With the JOYSTICK you can move the PTZ forwards, backwards, to the right and to the left, and zoom.

The three F, M, and S buttons are used to set PTZ moving speed.

F button - FAST, M button - MEDIUM, S button - SLOW.

The "Vkey 200+" control panel has a dedicated key PTZ that indicates the active assignment of the joystick function to the PTZ. This key is highlighted in blue.

Note: During the action of controlling the camera with the joystick, the selection of VC 1-4 is blocked.
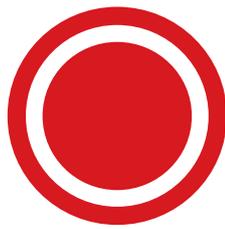
17

PTZ Tracking

XR features (PTZ tracking Virtual Studio and AR) are fully available after purchasing an add-on software license - **XR License**. There are time-based as well as lifetime licenses available - ask your distributor or send an email to **sales@reckeen.com** for more information.

Without purchasing the XR license, in the software version 1.9 or newer, the XR features are still available to test for free by 3D Studio users - testing mode results in a watermark being displayed on the Program Output only in XR Features.

PTZ TRACKING SETTINGS FOR AR & VR MODE

AR / VR Camera Positioning Data

To be able to incorporate realistic VR (virtual studio reality) or AR (augmented reality) studio sets in your live productions, accurate camera positioning data is imperative. Many PTZ cameras features the FreeD protocol, which provides you with the option to output Pan / Tilt / Zoom / Iris information via Serial (RS 422) and IP (UDP) directly from the camera to your tracking system. The FreeD protocol is supported by most popular virtual set systems, including Reckeen 3D Studio

About the FreeD Protocol

FreeD is a protocol that sends camera positioning data directly from the camera to a virtual reality production system. It enables productions to incorporate realistic virtual studio sets and elements into their live video workflow without the need for additional sensors or encoders.

AR OR VR MODE

AR, VR (Virtual Studio) differences

At the beginning, it is important to understand the differences between AR and VR modes. Since each of these modes work differently, the execution of production for each one requires a different approach.

• The camera image CAMERA LAYER is always the last visible layer.

• OBJECT LAYER is always the first visible layer.

• Does not require a green background (chroma key)

• The camera image is the first visible layer but after removing the green background, it can be any layer.

• OBJECT LAYER is always background, but some objects may be ahead of the CAMERA LAYER

• Requires a green background (chroma key)
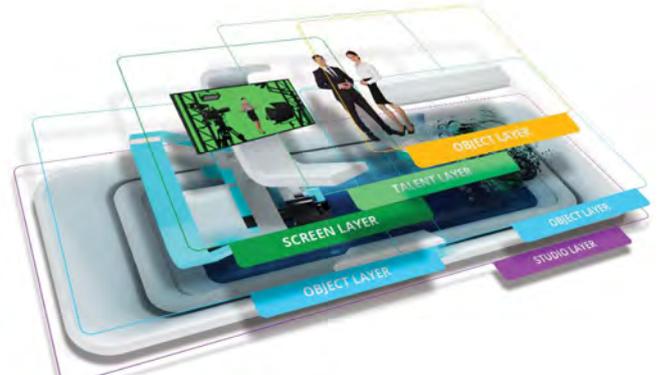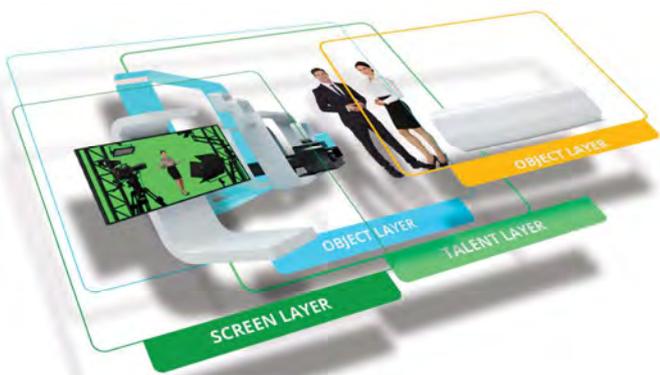
Both modes are available in Reckeen 3D Studio.

PTZ TRACKING - PREPARATION SONY CAMERAS

To use PTZ tracking, first you need to set up the PTZ camera as described in the previous chapter.

PTZ Tracking settings

Run RM-IP Setup Tool and copy chosen cameras's IP address. Go to a web browser and paste this IP address in the search bar. You should now have access to camera's settings.
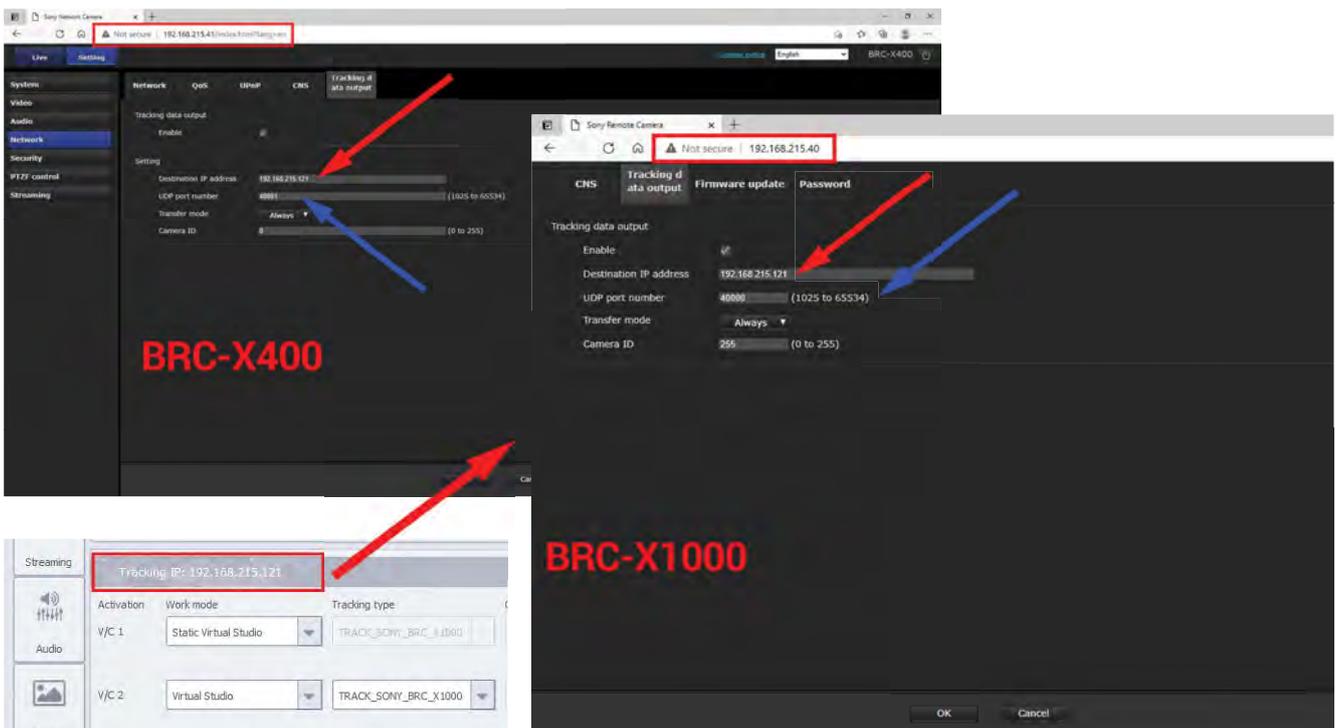
• Make sure that Enable checkbox for Tracking Data Output is ticked.

• Go to "Tracking data output", and under "Destination IP address" paste Tracking IP (192.168.215.121 in this example) address of Reckeen's tracking channel, which can found in the Configuration window under Tracking tab, as indicated in the picture above. Input a UDP port number, it can be any number from the range 1025-65534. You should define a different UDP port number for each PTZ camera, we suggest e.g. 40000 for the first camera, 40001 for the second one, etc. Input the same port number for given camera in the Reckeen's Configuration window in the Tracking tab.

• Transfer Mode should be set up for "Always"

Note: Check Sony PTZ firmware version - make sure your camera is running on firmware version 2.10 or newer.

PTZ TRACKING - PREPARATION CANON CAMERAS

Open browser, type ip adress in search bar and after connect to camera fill up fields with Administrator name and password. If camera tracking is to be used, open the "External Connection (IP)" subsection and configure the tracking settings. Output Tracking date set on - Eneable:
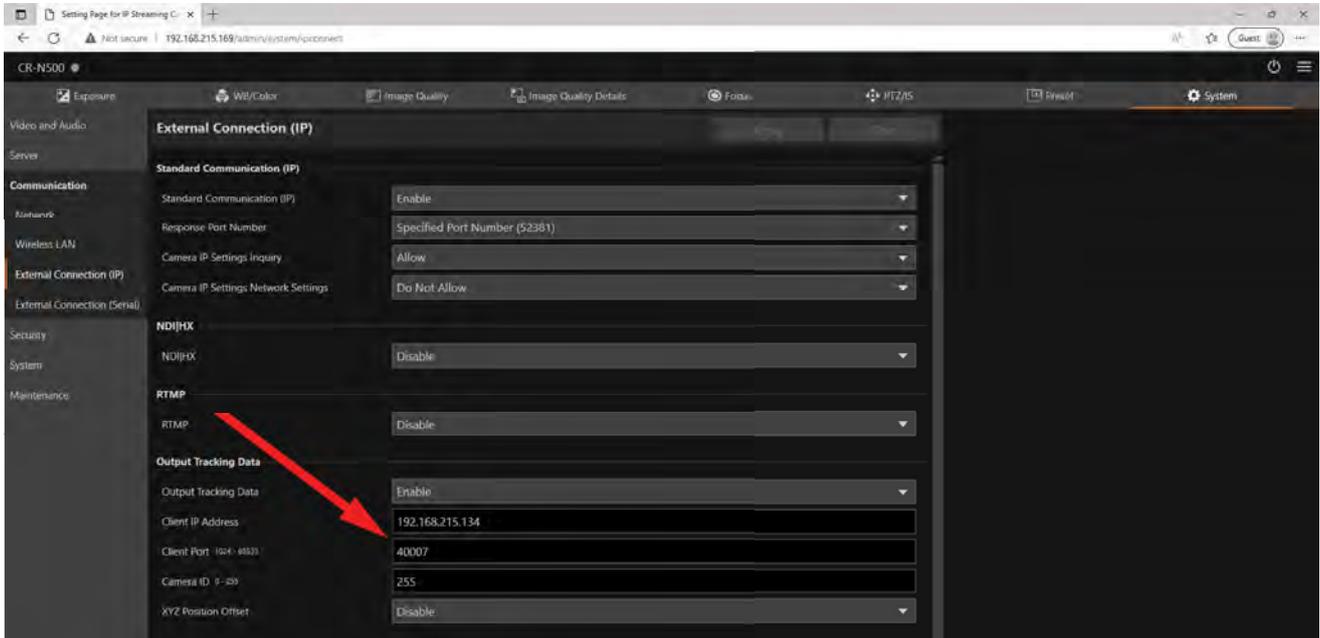
Go to section "Output Tracking Data", and under "Client IP Adress" paste Tracking IP (192.168.215.134

in this example) address of Reckeen's tracking channel, which can be found in the Configuration window under Tracking tab, as indicated in the picture below. Input a Client Port number, it can be any number from the range 1025-65534. You should define a different UDP port number for each PTZ camera, we suggest e.g. 40000 for the first camera, 40001, 40007 for the next one, etc. Input the same port number for given camera in the Reckeen's Configuration window in the Tracking tab.

PTZ TRACKING - PREPARATION PANASONIC CAMERAS

To configure the application for tracking, open a web browser and enter the previously assigned IP address after connect to camera and go to the 'Tracking Data Output' tab:
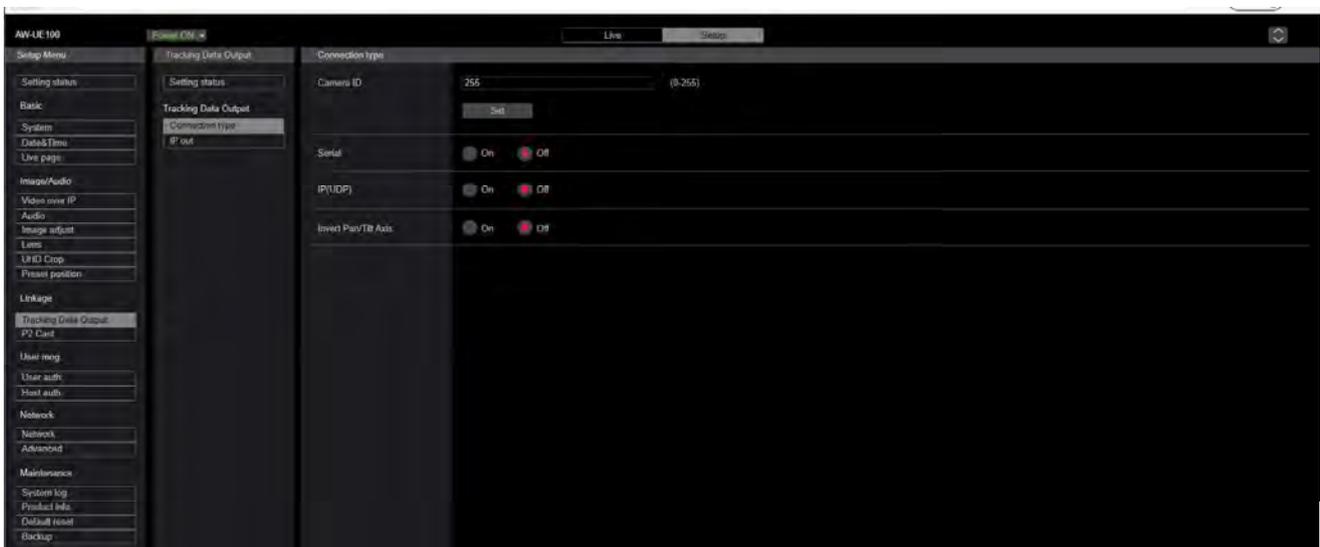
Check the IP (UDP) box to activate it, which should show 'On'. After activation, a message confirming the activation of the tracking mode on the camera will appear. Click "Ok".
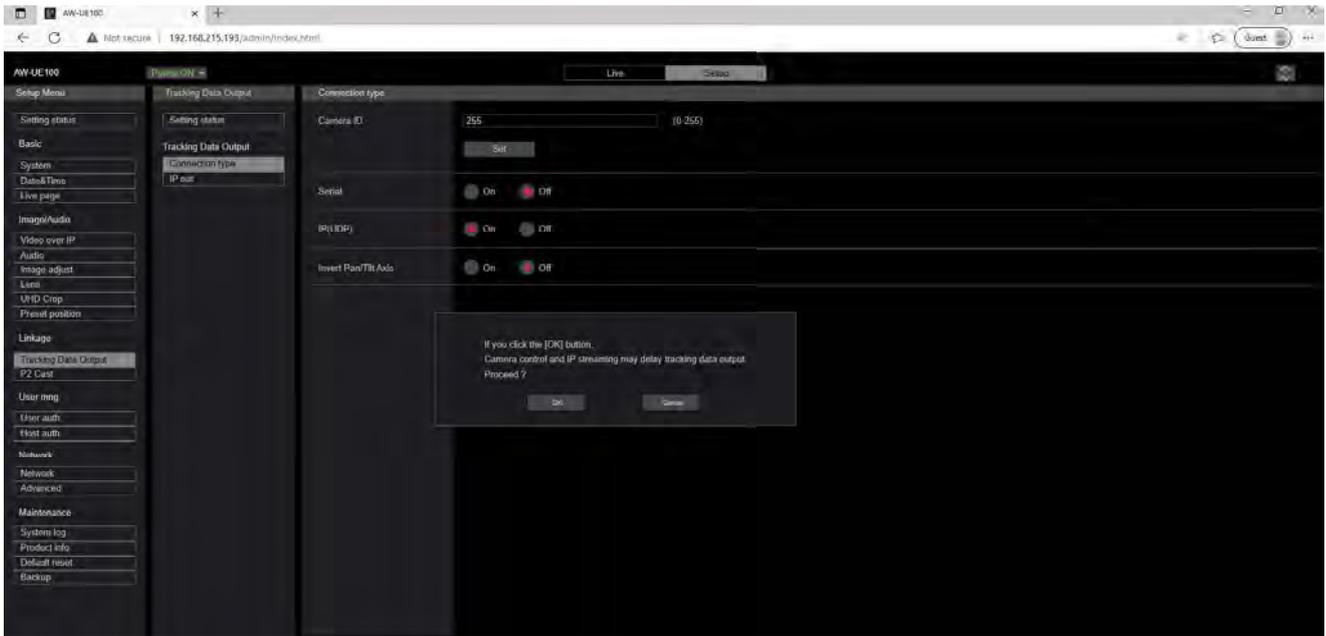
In the last step go to section "Tracking Data output" and subsection "IP out":
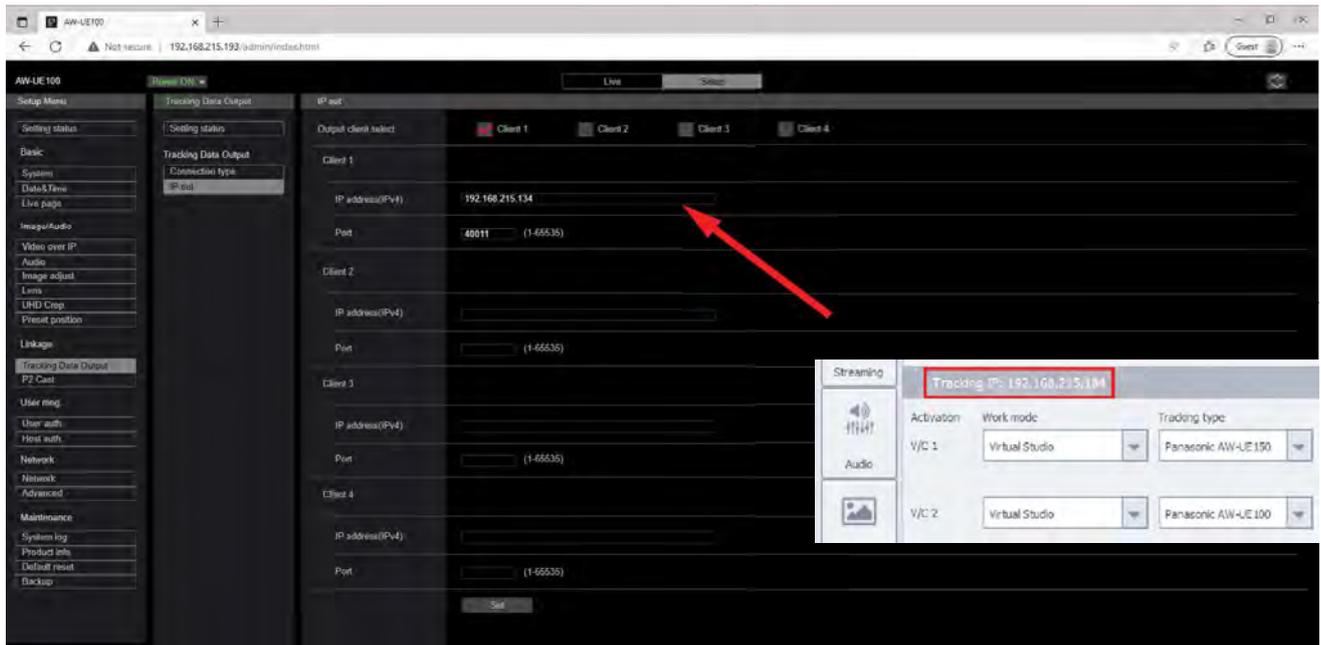
In section "Client1" in field "IP Address(IPv4)" paste Tracking IP (192.168.215.134 in this example) address of Reckeen's tracking channel, which can be found in the Configuration window under Tracking tab, as indicated in the picture below. Input a Client Port number, it can be any number from the range 1025-65534. You should define a different UDP port number for each PTZ camera, we suggest e.g. 40000 for the first camera, 40001 ,40011 for the next one, etc. Input the same port number for given camera in the Reckeen's Configuration window in the Tracking tab. Afterr applying IP and port click checkbox named "Client1" and then click "Set" button that is at the bottom of the page.

RECKEEN'S APPLICATION - AR, VR, STATIC OR TRACKLESS MODES OF OPERATION

Go to Reckeen's Configuration window in the Tracking tab.
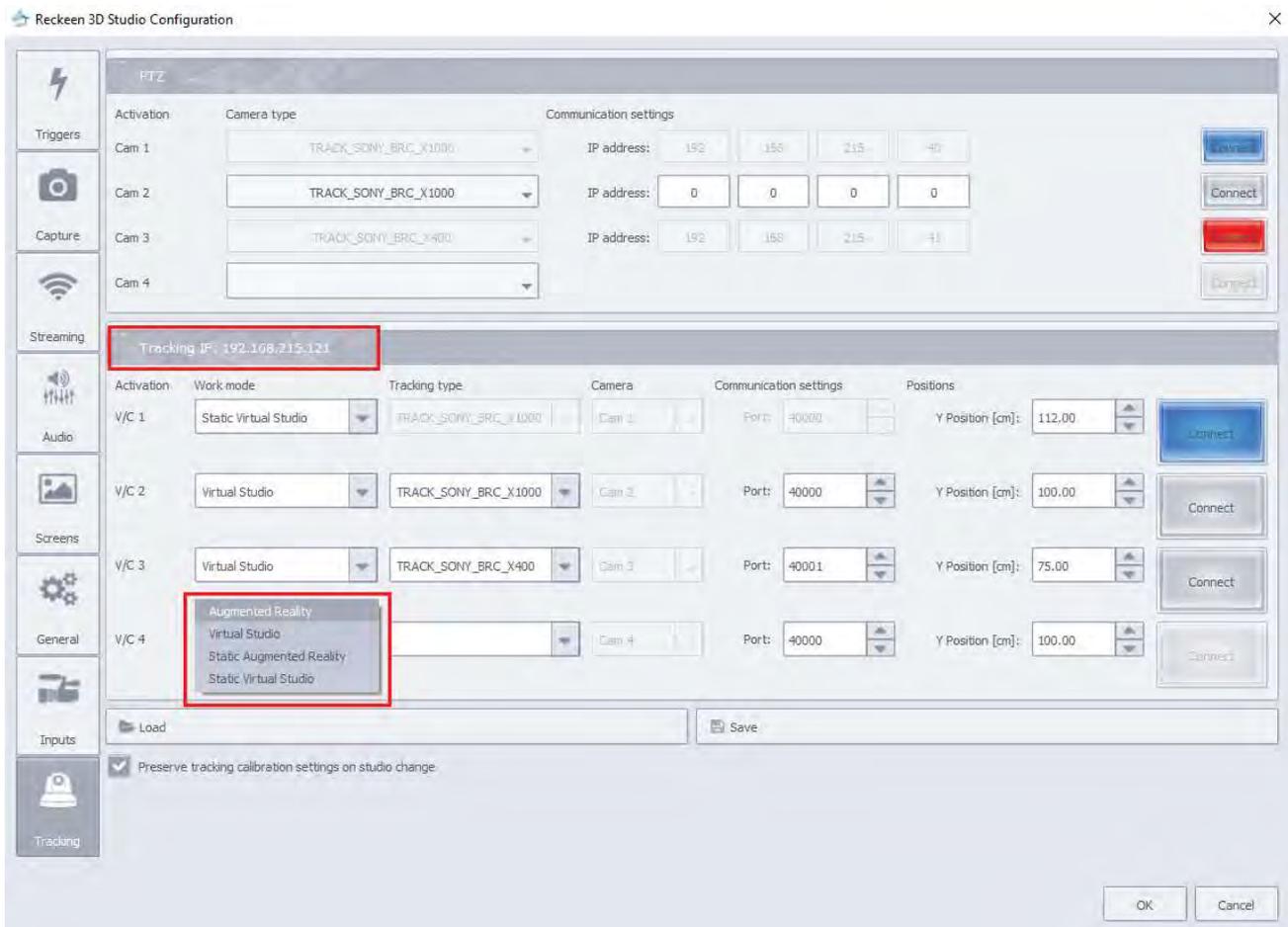
For each V/C we can set up a different working mode. There are 5 modes available:

• **Trackless Virtual Studio** - this is a default mode. It is used when you DO NOT CONNECT the cameras in Tracking tab.

• **Virtual studio** - chosen from the drop-down list in the PTZ configuration window, this mode enables PTZ tracking in a 3D virtual studio

• **Static Virtual Studio** - chosen from the drop-down list, this mode is supplementary to tracking Virtual Studio mode, when you want to set up a multi-camera production. This mode allows to place a trackless camera at an angle to your PTZ tracking camera(s)

• **Augmented Reality** - chosen from the drop-down list, this mode allows for AR productions, without the use of a virtual studio. Instead it's possible to add virtual, 3D elements to an authentic view from a camera.

• **Static Augmented Reality** - chosen from the drop-down list, this mode allows for AR productions, without the use of a virtual studio, using a fixed camera. In this mode it's possible to add virtual, 3D elements to an authentic view from any static camera.

This is also a supplementary mode to Augmented Reality mode with tracking, that allows to place a trackless camera at an angle to your PTZ tracking camera(s).

Note: All PTZ configuration and tracking settings are being preserved when saving the session.

RECKEEN'S APPLICATION - PTZ TRACKING SETTINGS

Choose work mode ect. Virtual Studio. Next, choose your Camera model from a drop-down list:
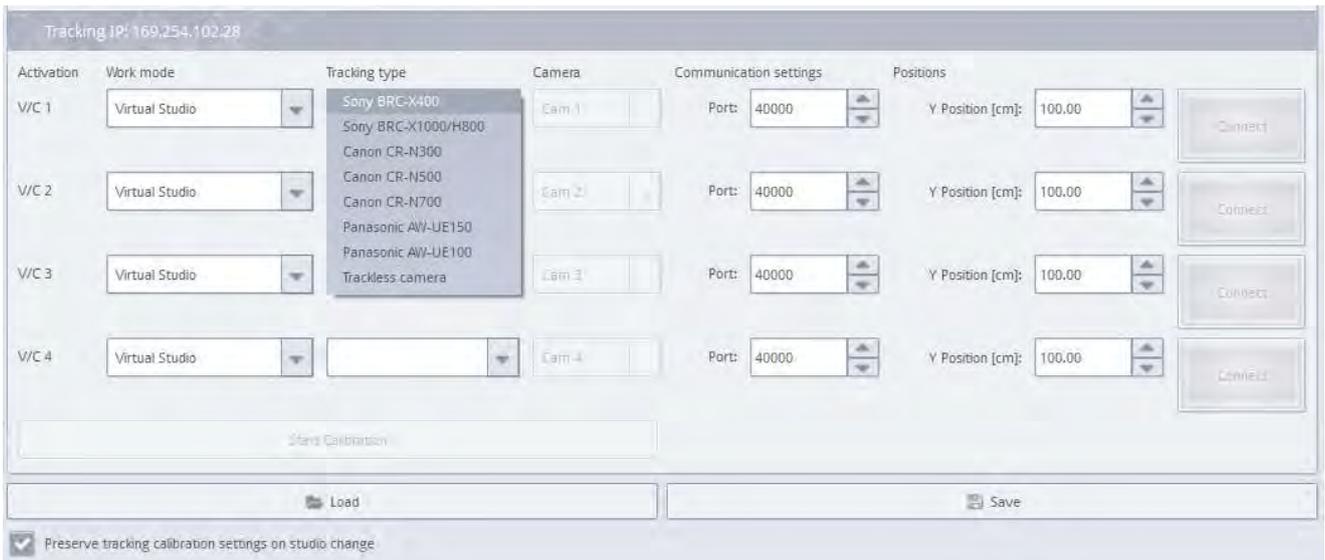
Under Communication Settings, input the UDP Port number you've chosen for this camera.

Under "Y Positions" input a distance from the floor to the PTZ camera's base. This distance needs to be measured in centimetres.
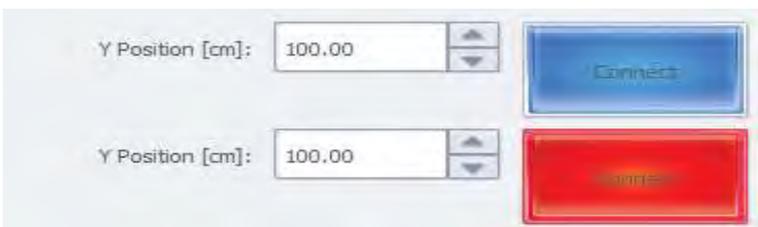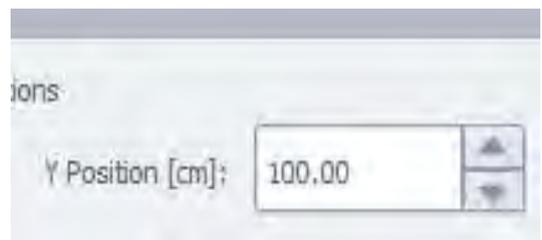
When you input all the information, click "**Connect**" button. If everything is set up correctly, the button will light up in Blue. < -- Blue colour.

<--Red colour indicates that the configuration was not successful - please check all information again.

Another reason for red-coloured button might be that the HDMI or SDI video connection was disconnected between the PTZ camera and the Reckeen system or LAN ports connection has been interrupted.

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Check that LAN cable and Video cable in both Reckeen system and PTZ camera is attached correctly. If the connection is restored, the system will automatically connect.

In the lower part of the configuration window, LOAD and SAVE buttons can be found, which allow to save and restore all PTZ and tracking configuration settings.
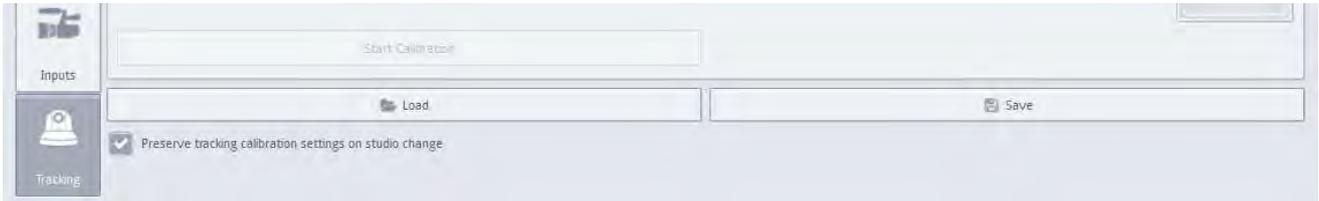
Preserve tracking calibration settings on studio change - this option saves all tracking calibrations settings when a virtual studio set is being changed in the session that's currently being used.

By default, this option is always active.

CALIBRATION IN PTZ MODE

Each of your PTZ cameras needs to be calibrated before being used to ensure that the PTZ image perfectly matches your virtual production. The calibration process is simple and automated and can be performed by anyone. Correct calibration is essential for propoer functioning of PTZ tracking.

The dimensions of the real studio must reflect dimensions of the virtual world, one meter in your real studio is also one meter in the virtual studio. Therefore a studio (green wall) when using tracking, should preferably be larger than what is needed for trackless mode

Each PTZ camera needs to be calibrated separately.
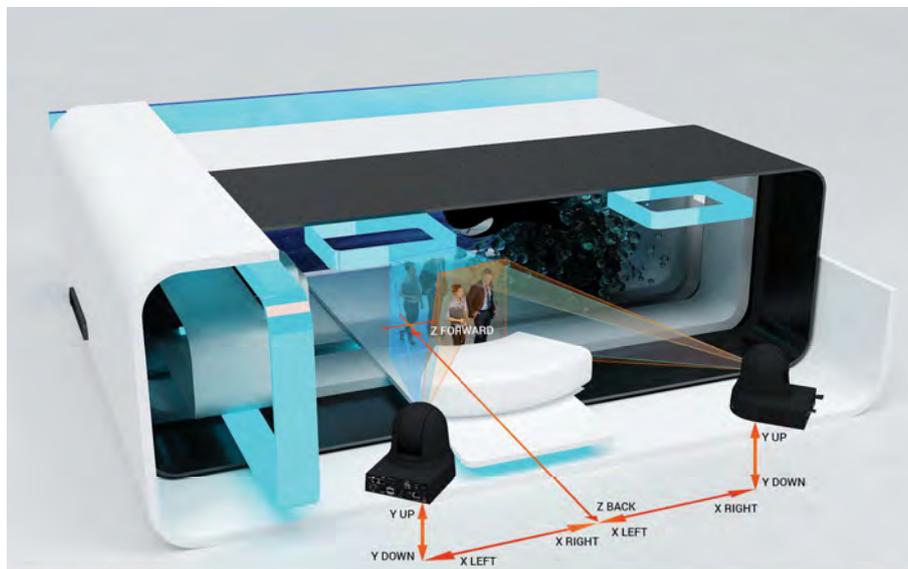
To make calibration easier, follow these steps:

1) We suggest placing an 2 objects in the middle of your green screen, which will act as a two reference point.You can put on the floor of your green studio two round discs, preferably in different colors, in the middle part of the studio.

2) Make sure that before starting calibration of the virtual studio, your PTZ camera should be at "home position" - in maximum Zoom OUT, and your reference point objects should be placed in sight of the PTZ camera.

3) In the first step, the cameras must be leveled in all planes relative to the floor of your green studio. The easiest way to do this is to use a leveling adapter and a long ruler.

The leveling base allows the user to make precise adjustments within a few +/- degrees in order to perfectly level the camera mounted on it. Each of the finger-adjustable adjustment rings has a locking ring (lock) to ensure stability when the desired position is set.

Tip 1 - Proper leveling of PTZ tracking camera is very important. Ensure that the camera is levelled properly in all axes, this is very important if you use more than one camera in your studio

Tip 2 - it's also a good idea to save "home position" as preset setting in PTZ Shot Editor, (information on how to do that can be found in the previous chapter).

Tip 3 - Video parameters of a tracking camera (fps + resolution) must be the same as Reckeen 3D Studio output. Please see also chapter 20 - Tracking & PTZ - Status monitor.

Tip 4 - Before you start the calibration you must enter the distance between the base of the camera and the floor "Y=100,15 cm", enter this value as accurately as you can measure it. This is described in an earlier chapter.

START CALIBRATION IN PTZ MODE

The calibration option will be active as long as the PTZ camera(s) are correctly connected to the Reckeen 3D Studio system. (if not, you must go back to the previous chapter and set the required options or connect the cameras). If none of the cameras are properly connected in tracking mode, the **Strat calibration** option will be greyed out and unavailable.

It is recommended to connect all PTZ cameras that are to be used in your production:
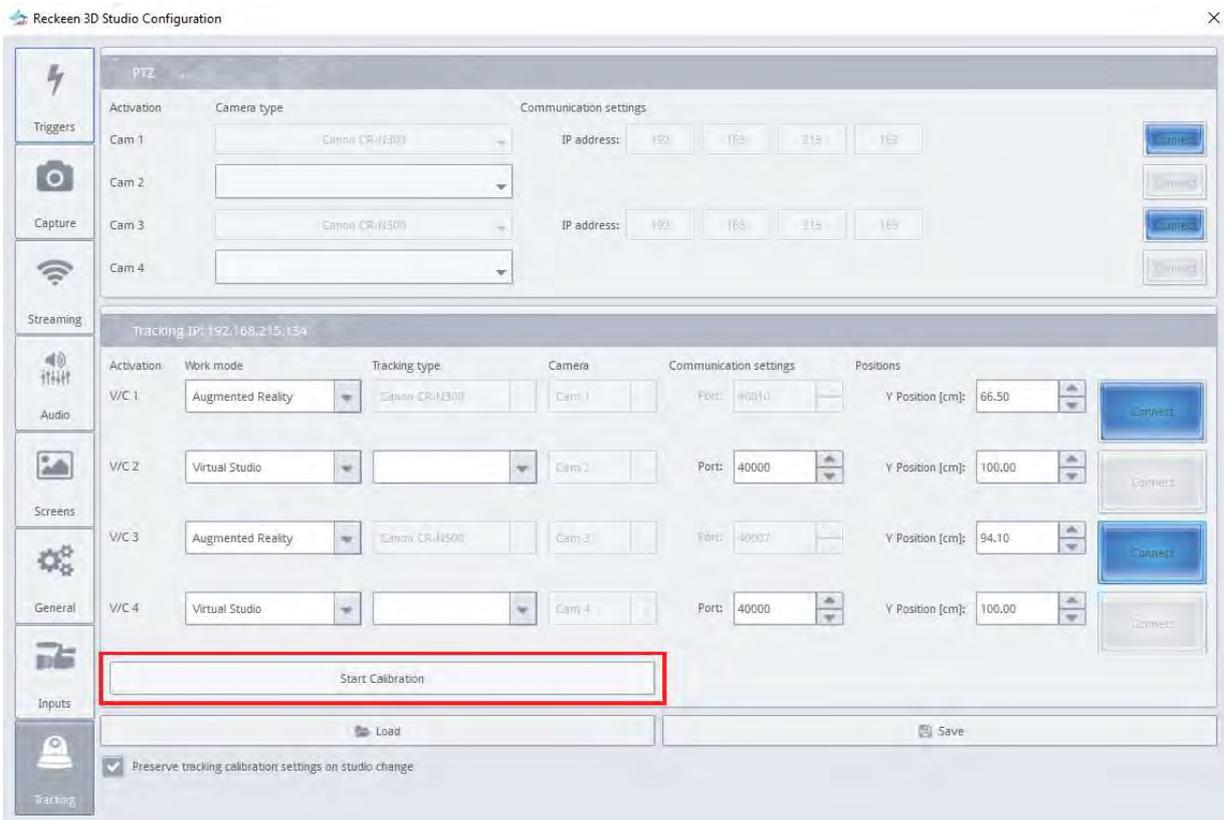
1. Click button "Start calibration". Window named "Camera calibration" will **pop-up** with three optional buttons:

Continue – After clicking this button previous calibration will be continued

Reset – Start new calibration (old calibration settings will be removed!)

Cancel – abort the calibration process
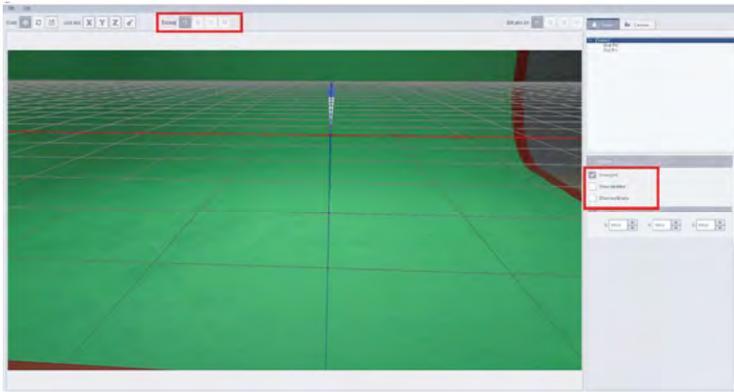
2. If this is the initial calibration process, select the "Reset" button. Calibration wizard window will appear. To make visible output from camera click button "T1" which is on top bar of the window.

Note: In the 3D Studio Editor, preview of each of the tracking camera settings assigned to VC1-4 are represented by **T1-T4** options. This allows you to see the rendered scene exactly from the angle the PTZ camera is looking at, while working in the 3D Studio.
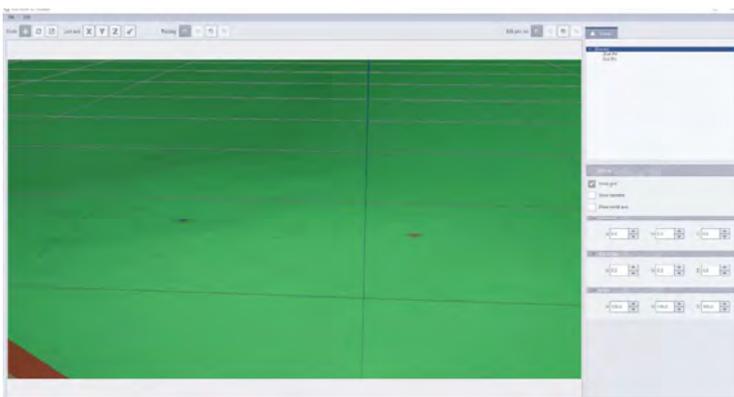
3. In the menu on the right-hand side, under Scene section you can choose the option "Show grid" to display **virtual studio's grid**, **baseline** and **world axis**. baseline – line used to check the level of the cameras in step [step no.]

4. To start calibration process put two markers (reference points) in the middle of your working area. They should be placed in some distance to each other, depending on the size from your working area. In the example below the markers are set 1m apart for the studio dimensions 3 x 3,5 m.
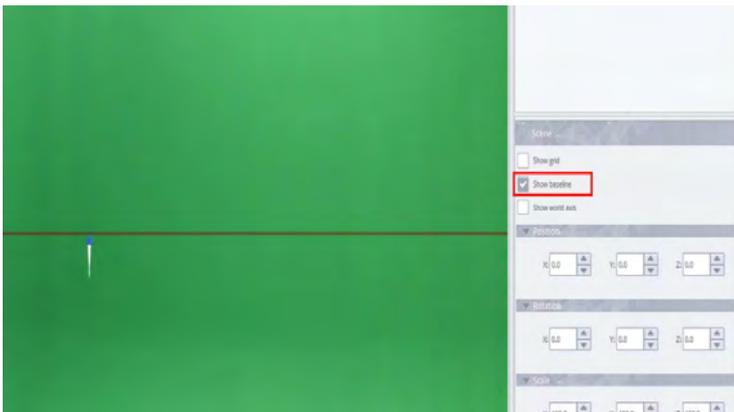
5. To properly perform the calibration, the camera must be levelled properly in all axes.

• Using remote control and set the camera to "Home" position,

• In Reckeen calibration wizard, tick "Show baseline" checkbox. We recommend to untick "Show grid" checkbox for this part of the calibration process.

• Using a ruler, check if the **left most point** of the image has the same value as **the right one**.

For 30 cm distance from camera (zoom out):

For 200 cm distance from camera (with zoom in = 75%):

Then check whether the camera is also leveled in the depth. Accuracy cannot exceed 1 mm.

For 30 cm distance from camera (zoom out):   For 200 cm distance from camera (zoom in=75%):
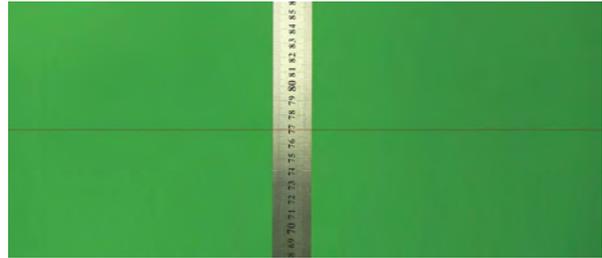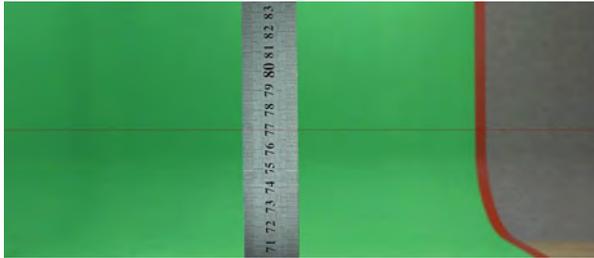
It is recommended to use a leveling table as shown in the picture below:

Repeat above leveling steps for all PTZ connected cameras.
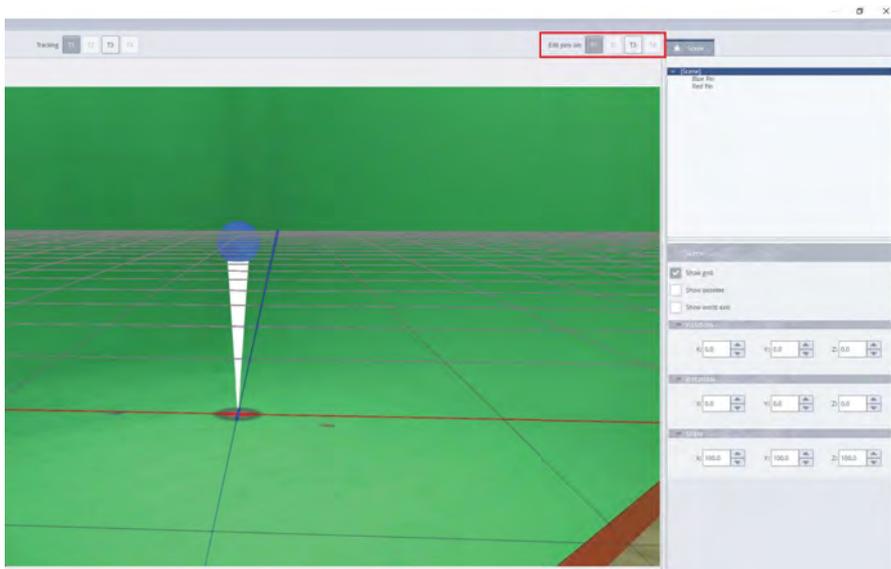
6. The first part of the calibration process is placing the pins on the reference points. From section "Tracking" select camera view (T1-T4) which you would like to perform this task on. Next, select the same camera from the menu "Edit pins on".

NOTE: "Edit pins on" once set, should NOT be changed for the rest of the remaining calibration process.

7. Using the mouse (scroll, RMB, LMB) set the center of the scene between reference points.

The center of the stage will be set the x,y,z = 0,0,0 position of your studio in the virtual world, corresponding position 0,0 on the grid, this point is marked with a **round gray circle**, at the intersection of the x (red) and y (blue) axes.
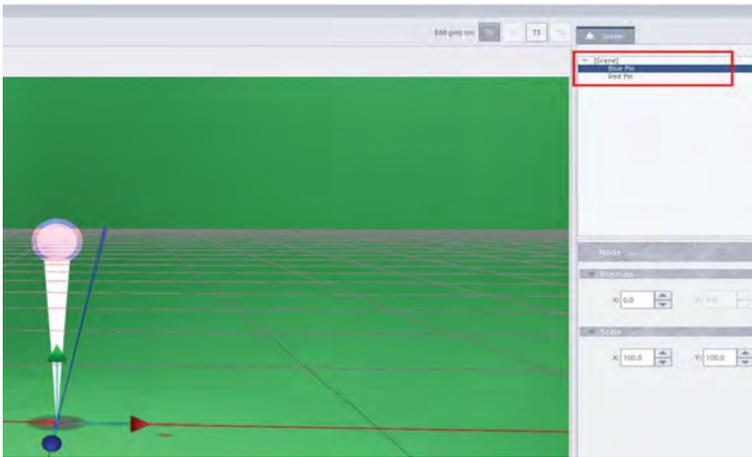
8. Click the "Blue pin" control - auxiliary axes will appear to set the pin on the reference point.
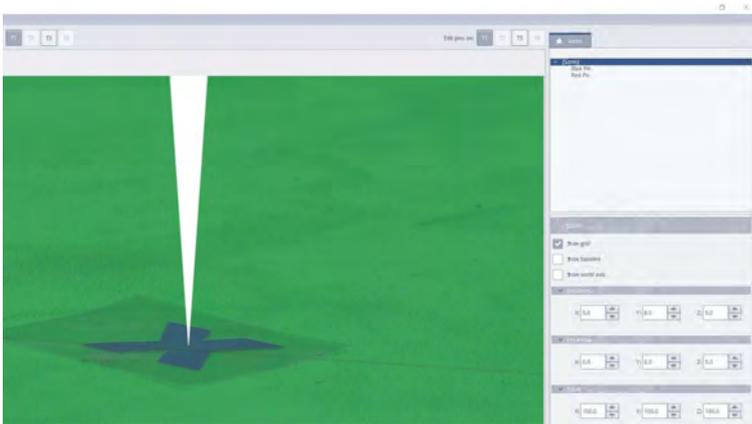
9. Set the pin to the reference point, you can use the camera zoom for more accurate positioning.
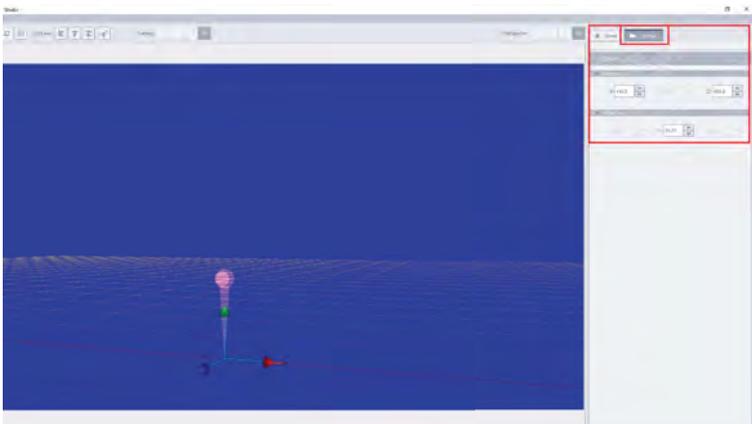
10. If you have problems with setting the pins, click on the "Camera" button to change the menu section where you can determine the position of the pins with an accuracy of 0.1 mm.
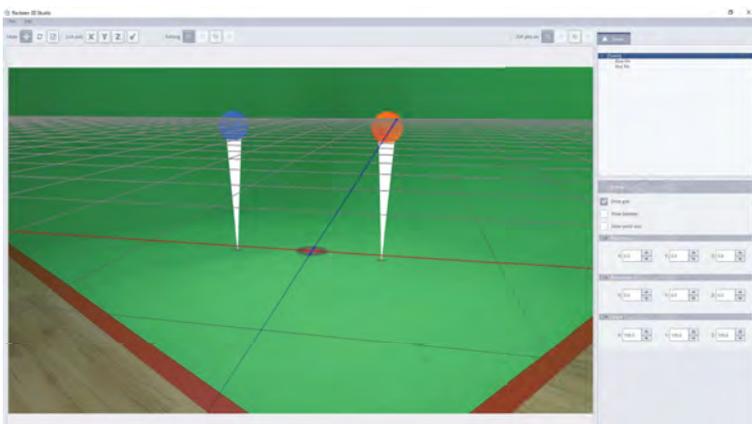
11. Click the "Red pin" control - auxiliary axes will appear to set the pin on second the reference point.

The final result after setting up the pins.
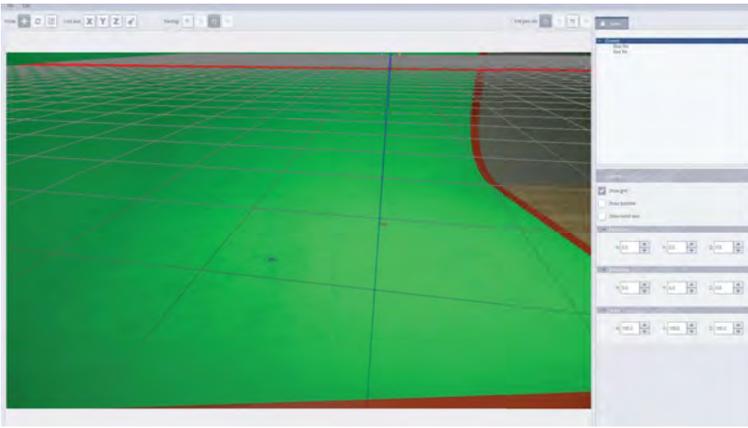
12. Swap the view to your next connected camera by clicking T1-T4 under Tracking section.
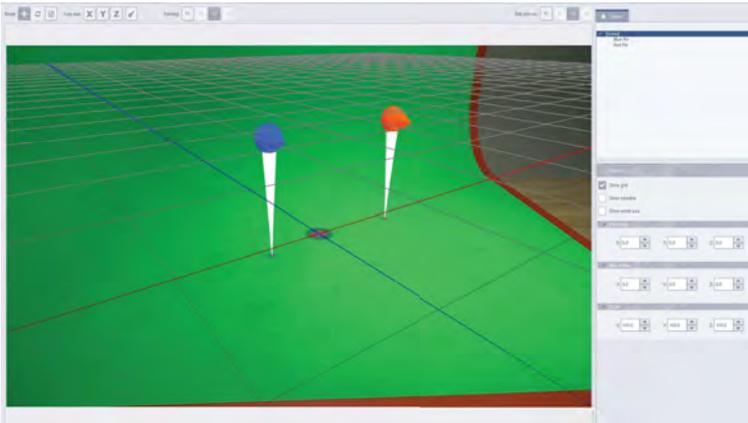
13. Using the mouse, set the scene so that the pins will match the reference positions.

Start by focusing on one pin only and match its position to the first reference point.

Next, click on that pin (the pin is selected when flashing), and by holding right mouse click, rotate the grid until the second pin is matched with the other reference point. Repeat that step for all other remaining tracking cameras.
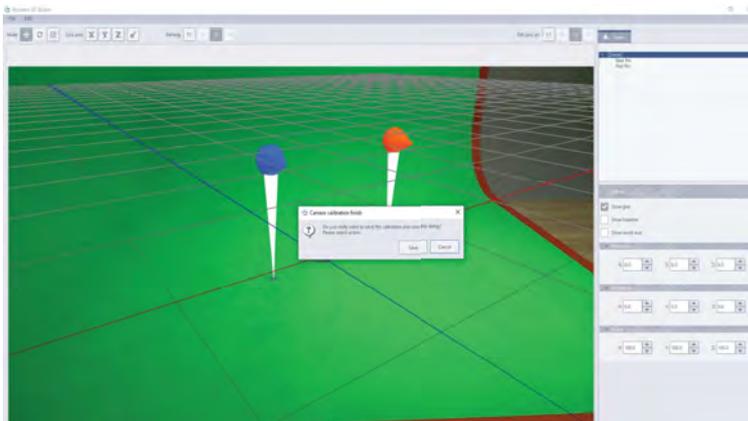
14. The calibration is successful when on all of the connected cameras the pins are set on the reference points. If there are discrepancies, make sure that the cameras are levelled correctly, and that "Edit pins on" **have NOT been manipulated after setting the pins initially.**

15. After successful setup exit the calibration window by clicking "X" located in the right top corner.

16. Click "Save" to confirm calibration. There is no option to undo changes made during the calibration.

17. It's obligatory to check if checkbox "Perserve tracking calibration settings on studio change" is active, because in antoher way calibration will not work in Augmented Reality mode. It's strongly recommended to save calibration settings using "Save" button, which is show in the picture below, it allows you to use single calibration settings with different reckeen sessions.

Tracking Configuration window includes, LOAD and SAVE buttons, which allow to save and restore all PTZ and tracking configuration settings including calibration settings.

Preserve tracking calibration settings on studio change - this option saves all tracking calibration settings when a virtual studio set is being changed in the session that's currently being used. By default, this option is always active.

Note: All tracking and calibration parameters are also saved in the Session. Loading a session has a higher priority than saving the parameters described in the options above.

CALIBRATION AND TRACKING DELAY TOOL

Tracking delay tool allows to change tracking delay. Tracking data is sent via LAN protocol, and video signals via cable in HDMI or SDI standards. Synchronization must be maintained between these signals, i.e. the tracking data of each image frame must match the same frame in the video image.

Tracking delays were selected by Reckeen and stored in the application's logs. However, in the target infrastructure in your studio, this data does not have to be optimal. That's why we provide a simple application thanks to which you can change the delay settings for your camera in your unique studio.

In the calibration mode, open the "CAMERA" tab, here are the delay adjustment registers for the PTZ camera. Each of the PTZ models can have different settings, so by selecting T1-T4, we can set the delay for available cameras. However, for a given type of cameras, the settings are common for this model.
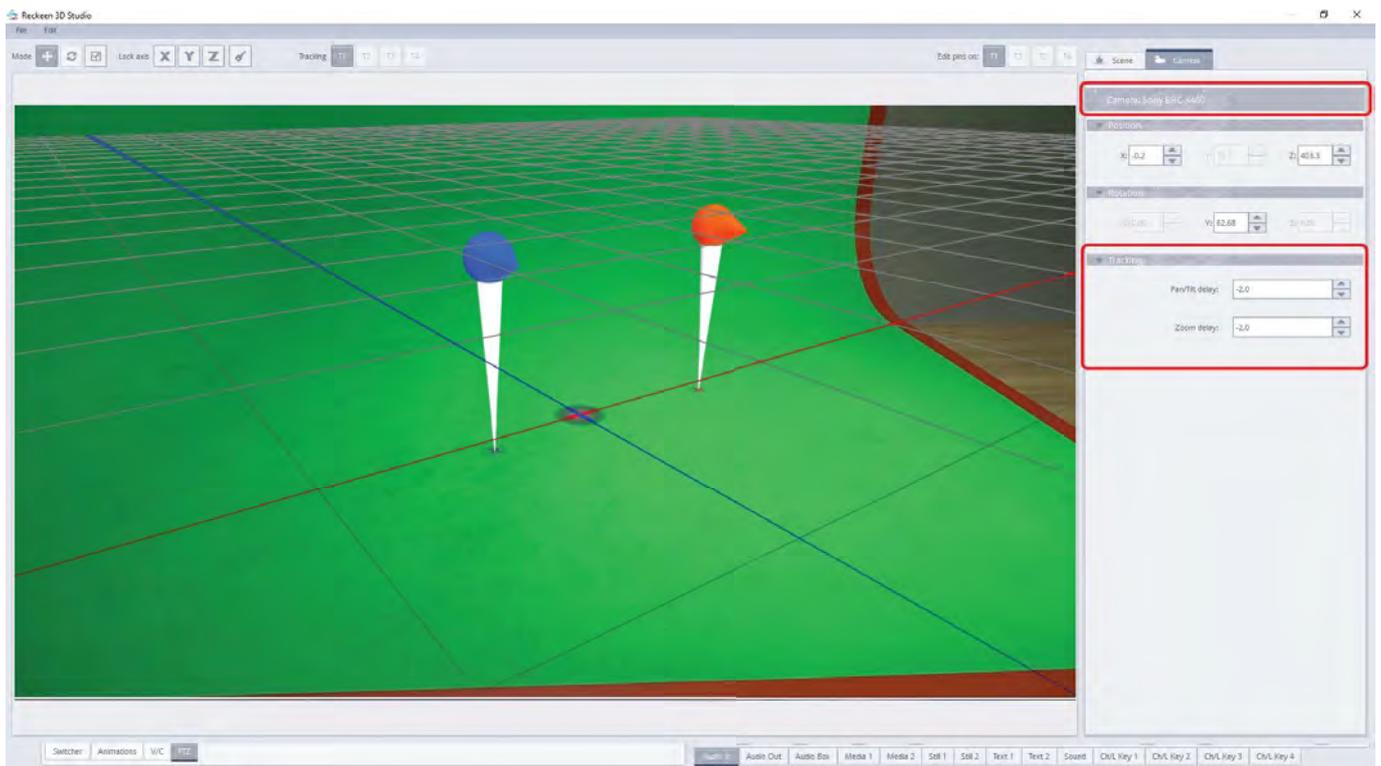
Delay is represented in frames (example: video output system is p50 [50 frames per second], delay is equal to 2, which means 2 * 1 frame in milliseconds, which is equal to 40 milliseconds. Fractions are allowed, but in most cases integer values are enough. The resolution of the changes can be set every 1/10 of the frame and will be interpolated for this value.

Delays are set independently for Pan/Tilt delay and Zoom delay.

Note: changing these parameters immediately changes the delay, which allows us to adjust looking at the smoothness of synchronization between the grid and the camera image.
Note: In case of Panasonic cameras, when the WebUI configuration is opened, tracking data is delayed. Configuration in WebUI is not recommended during Production.

Important - Video parameters of a tracking camera (fps + resolution) must be the same as Reckeen 3D Studio output, a different value of these settings may cause tracking infertility.

Please see also chapter 20 - Tracking & PTZ - Status monitor.
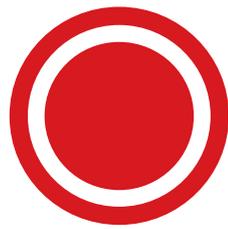
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AR in 3D Studio Editor

3D EDITOR - PREPARATION OF 3D SCENERY FOR AR & VS MODE

AR, Virtual Studio differences

At the beginning, it is important to understand the differences between AR and Virtual Studio modes. Since each of these modes work differently, the execution of production for each one requires a different approach.

MODE - AGUMENTED REALITY

OBJECT LAYER

CAMERA LAYER

MODE - VIRTUAL REALITY

OBJECT LAYER

CAMERA LAYER

• The camera image TALENT LAYER is always the last visible layer.

• OBJECT LAYER are always the first visible layer.

• Does not require a green background (chroma key)

• The camera image is the first visible layer but after removing the green background, it can be any layer.

• OBJECT LAYER is always background, but some objects may be ahead of the TALENT LAYER

• Requires a green background (chroma key)

Both modes are available in Reckeen 3D Studio. Preparation of a scenography depending on the chosen mode:

OBJECT LAYER

OBJECT LAYER

TALENT LAYER

SCREEN LAYER

OBJECT LAYER

TALENT LAYER

SCREEN LAYER

OBJECT LAYER

OBJECT LAYER

STUDIO LAYER

PROJECT PREPARATION - AR

Augmented reality (AR) is is the integration of digital information with the user's environment in real time. A real-world environment enhanced by computer-generated perceptual information. AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

In AR mode, the following steps are required to prepare a project.

• configure PTZ

• configure PTZ Tracking
• prepare 3D scenery
• set the PTZ shots to suit your needs (presets)
• make live productions with streaming and video recording.

3D Studio Editor - AR projects

Preparing an AR Project is easier than a tracking virtual studio scenography. The AR project can be entirely based on 3D objects (e.g. used from Reckeen library which in contains over 700 elements) which are arranged in the space of your implementation.
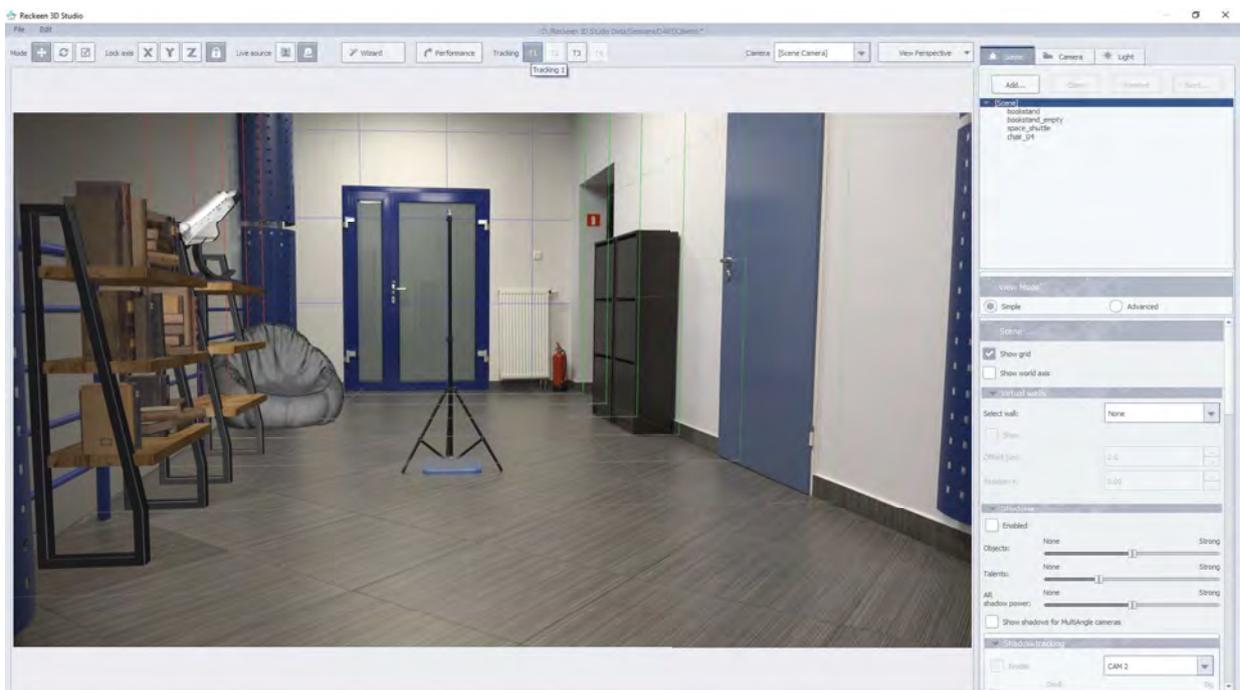
T1-T4 VIEWS OF TRACKING CAMERAS

A new element in relation to PTZ Tracking can be found in the 3D Studio Editor - T1-T4 shots.

The T1-T4 shots show the view for the respective PTZ cameras in relation to the reference point (the subject of the reference points is covered in the chapter on PTZ Tracking).

Thanks to this function, we can arrange the space so that the virtual perspective fits exactly the actual view from the PTZ cameras.

T1-T4 shots show actual shots from PTZ cameras for VC1 - VC4. The image in the 3D Studio Editor is rendered exactly for chosen camera shot.

V/C1 - V/C4 keys on the PREVIEW bus on the Vkey 100/200 control panel, correspond with T1-T4 settings, and vice versa. At the same time, the 1-10 keys make it possible to call corresponding PTZ camera shot PRESET.

NOTE: when working with the 3D Studio Editor, you should lock the calibration positions with a padlock, to avoid accidental changes of parameters caused when using a computer mouse.

T1 - shows the view from the first PTZ camera. The position of the graphics follows the tracking for this camera.

T3 - shows the view from the third PTZ camera. The position of the graphics follows the tracking for this camera.

The T1-T4 shots can also be turned off, to work using the virtual cameras. This can be useful when in AR Trackless mode.

This feature is also supported by the Vkey100 control panel.

GRID OF VIRTUAL WALLS

The first step in arranging a space in AR mode is setting up a space grid that will help us orientate ourselves in the editor's 3D spaces. The grid allows to use virtual cameras when designing AR scenography.

Let's choose the T1 shot - this PTZ view covers the largest real area, therefore is the best to set the grid of the virtual walls.

In the SCENE tab, enable "Show grid" option. You should see the grid on the FLOOR at 0 cm height.

Below, in the next Virtual Walls tab, there is a drop-down box in which we can choose one of the possible virtual walls depending on the direction LEFT, RIGHT, BACK.

We choose the wall on the LEFT side and check the "show" checkbox and place it where we want to mark the area on the left side.

We can do it with the mouse, move the pointer wall axis, or by specifying the distance in the "Offset (cm):" tab. Since in such a perspective it is necessary to define the angle of the walls, the next tab enables its rotation in the Y axis, "Rotation Y:" where we enter the value of the angle.

Set up Right and Back walls in the same manner.

Thanks to the correct location of the virtual walls, we can build the 3D Scene navigating through the virtual space only (turn off the T1 options), which makes it easier and shortens the time to prepare the AR project.
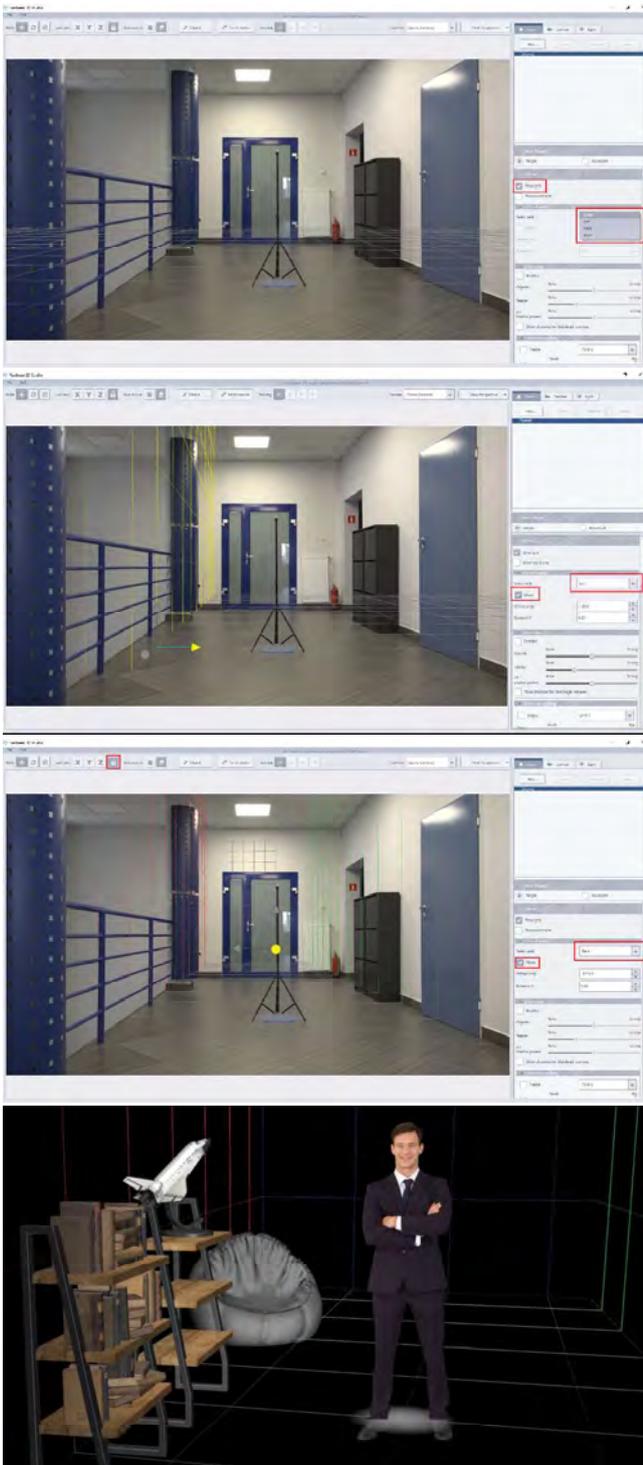
PLACING OBJECTS IN AR PROJECTS

After defining the virtual space mesh, we can start to add and arrange the virtual objects.

The Reckeen 3D Studio system has a very rich library of 3D objects, which can be used to quickly add elements to the project.
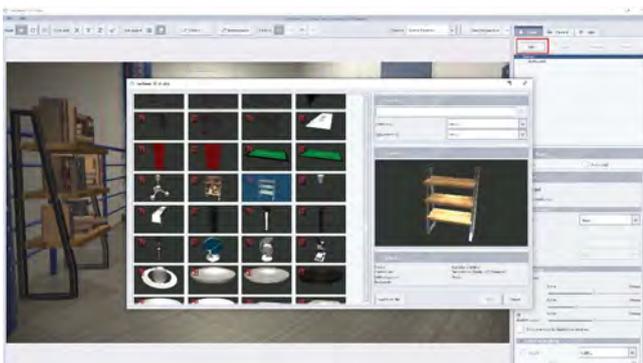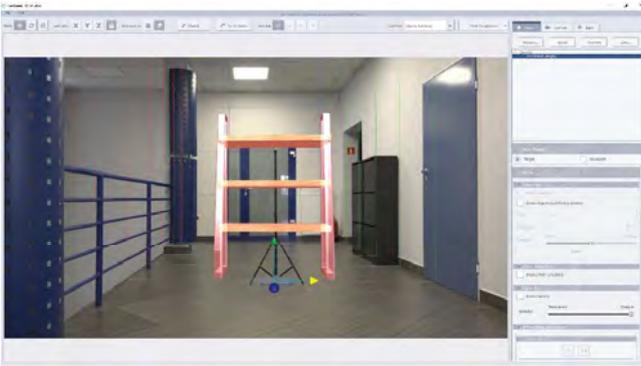
For the demonstration purposes, we chose a bookshelves to showcase the feature.

The object appears in position 0.0
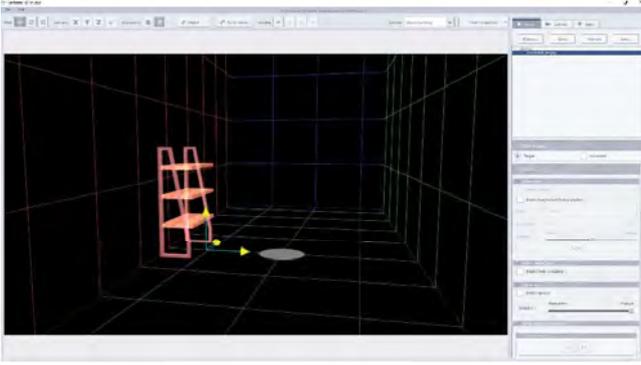
You can place the object anywhere using the tool for changing the position on the X, Y, Z axes, its rotation or or scale.

Virtual walls that define our working space are very helpful when arranging the scene.

On a similar principle, we can add an unlimited number of objects to build and AR project.
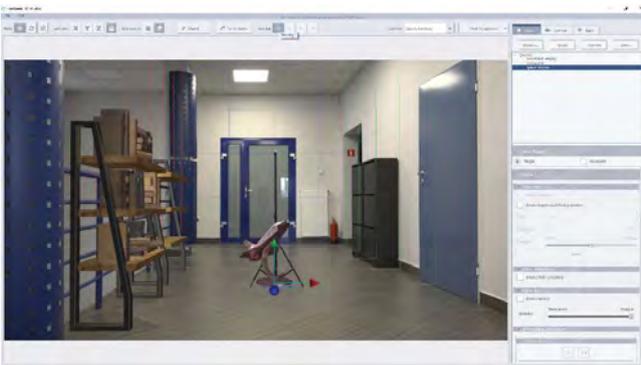
ANIMATIONS IN AR

Choose the object for which you want to enable animation for, so that it is highlighted in red. Now, it's possible to turn on the animation options for that object - see picture.

The principal of setting up the animations is the same as in a Virtual Studio. Embedded animations are also supported. Find out more about the topic of animations in the "Animations, how to set up inside Reckeen 3D Studio" chapter.

TIP: Use triggers (macro commands) to manage the animations easily - the topic of triggers is described in another chapter.
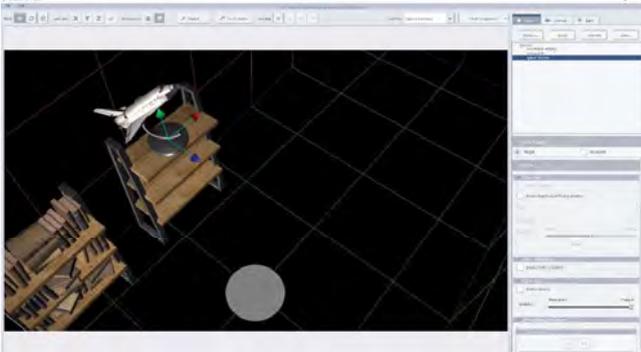
INTRO & OUTRO ANIMATION EFFECTS IN AR

Since software version V1.9, the list of entry and exit effects for objects animations has been extended.

These functions increase the possibilities and attractiveness of the presentation in AR mode.

ZOOM - the object appears/dissapears by changing size - from a value of 0 to a maximum value of 100% and vice versa,

OPACITY - the object appears/dissapears by changing transparency from 0 to 100%, and vice versa (or to another opacity value if set separately).

WIPE - the object appears/dissapears using wipe effect. The effect can be set at various angles (multiples of 45 degree angles).

All the above settings can be combined with each other in any configuration. These functions are available for the Intro and Outro animation phases.
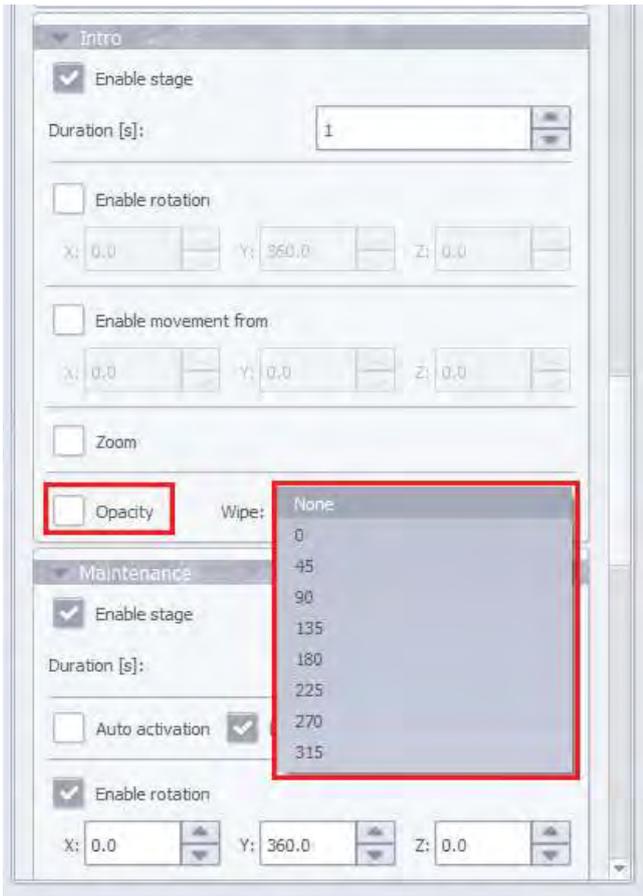
SHADOWS IN AR MODE

In the SHADOW tab for the whole SCENE, the global shadow value (shadows for all objects) can be turned on/off, and the strenghts of the shadows defined. The shadows can also be managed separately for each object after selecting the object and turning on the "Enable Augmented Reality shadow" function and using the RESET function. The RESET function resets the individual shadow value of the object to a global value.

The shadows of each object can have their own individual settings:
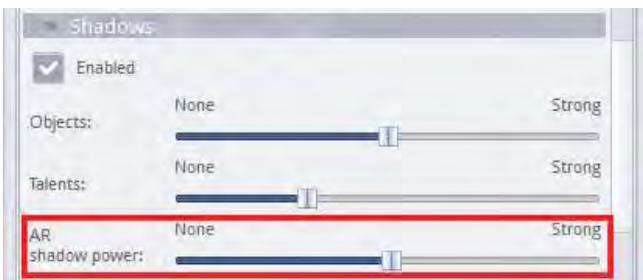
STRENGTH - adjusts the intensity of the object shadow. RESET set up this Streangth to Global value, described above.

LOW Boundary - sets the object shadow to level 0 of the object.

Object Y Position - sets the object shadow to level the object.

Fixed Y - sets shadow at a fixed distance from the object - requires Y distance (cm):

This option is very useful if we want the object to hang in the air, while the shadow is leveled with the floor - in that case we need to set the offset between the floor and the object.
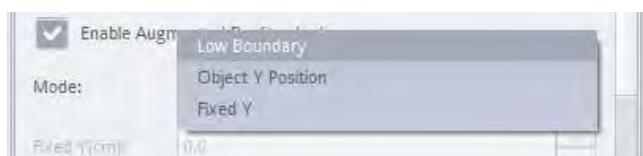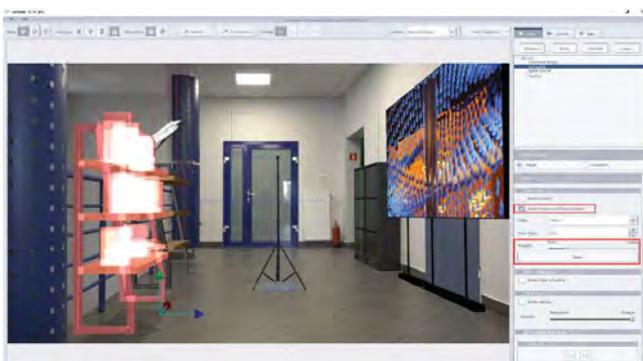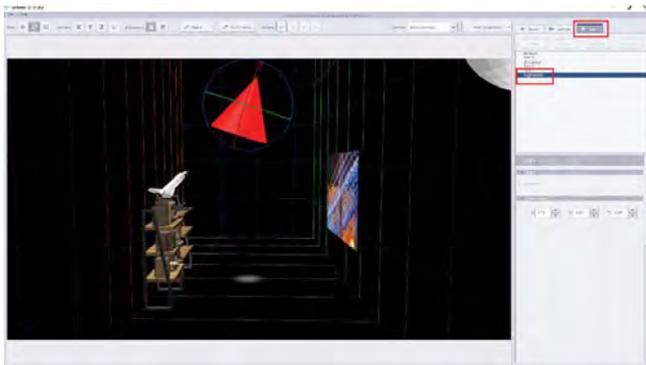
In the SCENE / LIGHT tab, there is a list of lights that can be used to illuminate objects, the principles of lighting objects, as well as the types and functions of lights, are the same Virtual Studio and AR mode and are described in detail in the sections describing the 3D Studio Editor.

The new item here is the "AUGMENTED" light, it has been marked in red.
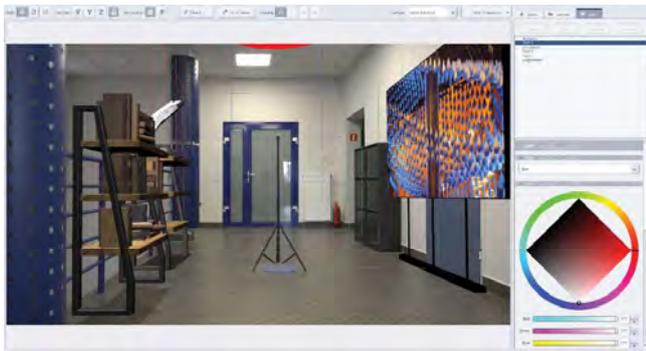
"AUGMENTED" light affects the shadows of all AR objects - the direction and the angle of inclination.

CHROMA KEY IN AR MODE TRACKLESS TALENT

The Trackless Talent can also be placed in an AR space in the form of a video input or video files, e.g. from a recorded person on a green background or a remotely connected speaker. Using chroma key we can insert a person into an AR project.

Tip: use the tools in Video Input settings window to change the ROTATION, PAN, TILT, ZOOM of the video signal. These changes can also be made in the 3D Studio Editor.

SMARTKEY IN AR MODE

Another way to utilise chromay keing in the AR mode. is Smartkey. Read more about this function in the SMARTKEY chapter. In the AR scenario, you can utilise a small green screen by placing it in the filming space: turn on the key on the video PTZ input (eg. V/C1, Ch/Key 1) and display a video file or graphics of your choosing using the SMARTKEY function. In this scenario, the green screen acts like a monitor for displaying content.

XR PRODUCTION - CHROMA KEY & AR MASK

Thanks to the use of a 3D AR mask and Garbage Object Mask with Chromatic Key, we can create projects that combine lively scenography with a virtual studio. A talent in such a space can freely move from one space to another, and the Chromatic Key will only work in the area of the mask. Thanks to this approach, we can realize part of the scenography in the Virtual Studio space, and the AR part will be our natural space.

Below is an example of such an implementation:

1. Connect PTZ cameras in tacking mode by selecting Augmented Reality. The selection of modes is described in earlier Chapter 17, *Reckeen's Application - AR, VR, Static or Trackless modes of operation*.
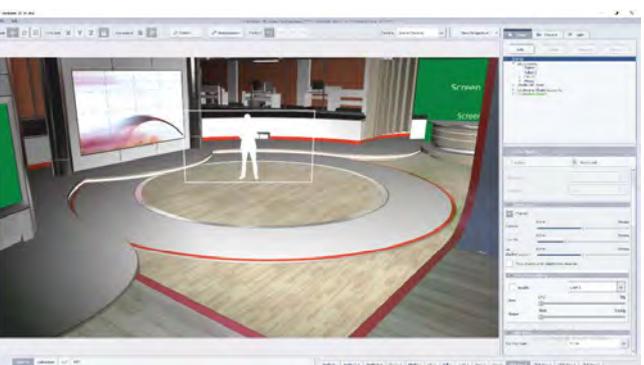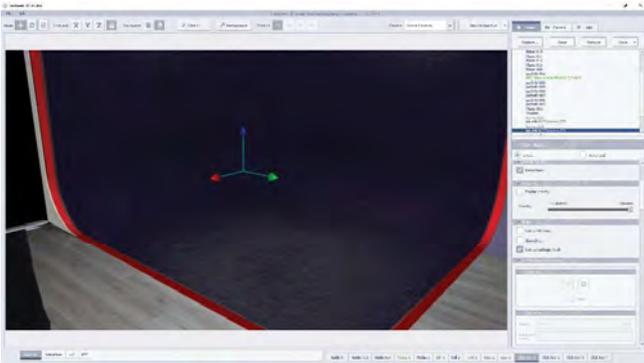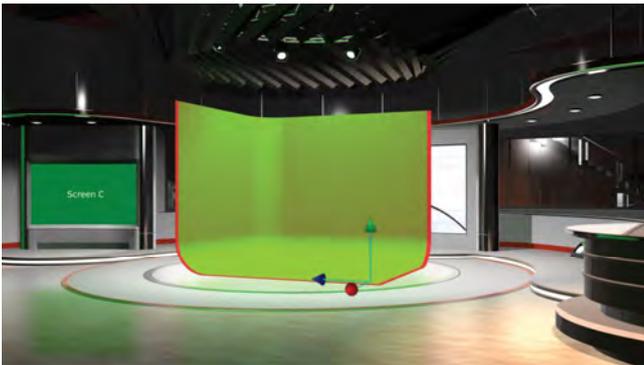
2. Set cameras, which is described in detail in Chapter 17 **PTZ tracking**.

3. Set the Chromatic Key mask in the space of your green studio. You can find detailed information in Chapter 23, **Setting the mask's area - objects garbage mask.**

4. After turning on the Chromatic Key in the space of the vital studio, we can use virtual scenography.

5. AR mask.

The 3D object that will act as 3D AR Mask should be designed in the real dimensions of your studio or in any shape depending on your project, i.e. the purpose of production.

It can be created in any 3D program such as "Blender" or "3D Max", then we import it to our studio as a 3D object that will be added to your own object library.

You can also use garbage masks to create your 3D AR Mask, any 3D objects available in your studio, by modifying and adjusting or combining elements to the dimensions of your studio.

There may be multiple AR Mask objects in your scene, they all form one object collection.

6. Turn on the AR mask.

Please open 3D Studio Editor , select Scene tab. Below the object list of your scene is the part labeled Mask. Indicate the object on the list of objects, then mark the feature in the mask tab with the "AR mask" option.
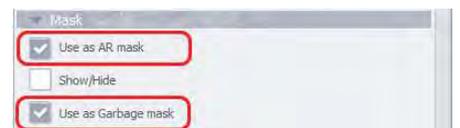
The selected any object becomes the AR Mask - which means that the Chromatic Key will work in the space of this shape of AR Mask.

The selection also makes such an object invisible in the scene during rendering. To see objects marked with the mask feature (invisible) you can use the Show/Hiden function in the Mask tab.

On the list of objects, all objects marked with the AR Mask feature change the color of the objects names to green.

PLACING OBJECTS IN XR PROJECTS
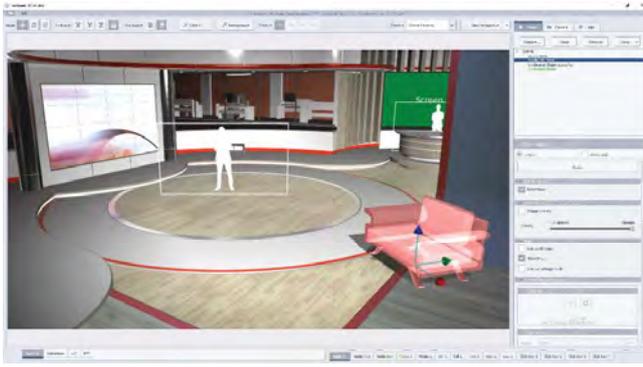
After defining the virtual space mesh, we can start to add and arrange the virtual objects.

The Reckeen 3D Studio system has a very rich library of 3D objects, which can be used to quickly add elements to the project.

For the demonstration purposes, we chose a sofa the feature. The object appears in position 0.0

You can place the object anywhere using the tool for changing the position on the X, Y, Z axes, its rotation or or scale. On a similar principle, we can add an unlimited number of objects to build and AR project.
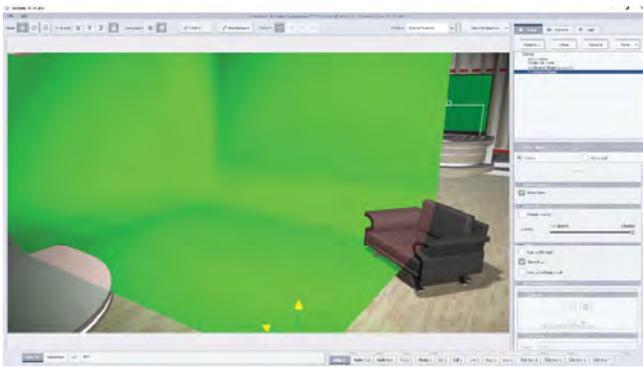
Note: AR objects that intersect the line between the green studio and the real scenery in XR mode must be placed at a depth less than the physical depth of your studio.

Note: You can use Virtual walls that define our working space are very helpful when arranging the scene.

Note: In the implementation of XR Mode, remember about the limitations associated with AR objects, they are created as the first layer before the talent.

Note. In simple video production implementations, we can use one mask object for both AR Mask and Garbage Mask for Chroma Key. Assigning features is possible for each 3D object the given features are independent.

STATIC TRACKLESS CAMERA IN AR MODE

Reckeen 3D Studio system offers a possibility of working with up to 4 cameras to create multi-camera production. These can be PTZ cameras with the FreeD protocol if you want to able to use tracking and optical zoom, but they can also be any cameras that can be used as static/ trackless cameras (without the option of using pan, tilt or zoom).

Any camera can be used for this purpose (usinh HDMI, SDI or NDI connection). For impressive, yet cost-effective productions we recommend using one tracking PTZ camera and one or more static/trackless cameras to achieve multi-camera capabilities.

The process of configuration and set-up of a static camera is the same as for a tracking camera.

Select the CONFIGURATION / TRACKING tab, then select for a given VC - "Static Agumented Reality", enter the height of the camera from the floor to the center of the lens (Y Postion (cm): eg. 112 cm) and press CONNECT. Picture above:

Set the camera zoom manually so that the view from it matches your desired shot.

Next, to go option Start Calibration the camera by specifying the distance from the Reference point, more information you can find in chapter 17, START CALIBRATION IN PTZ MODE. Setting of the static camera calibration option is the same as PTZ. Perform options 12-16 described in the chapter 17.

Swap the view to your connected static camera by clicking T1-T4 under Tracking section. Using the mouse, set the scene so that the pins will match the reference positions. Start by focusing on one pin only and match its position to the first reference point. Next, click on that pin (the pin is selected when flashing), and by holding right mouse click, rotate the grid until the second pin is matched with the other reference point.

Your secondary trackless camera is AR ready!

NOTE: The optical zoom and the position of this camera should not be changed during broadcast - it would cause the AR scene to decalibrate, and the 3D objects to appear in the wrong places.

PTZ SHOTS IN AR OR XR MODE

Lastly, once the project is complete, the PTZ shots (presets) should be set up. To do this, first send the appropriate V/C to PRG output - to be able to see the view from the PTZ input together with the AR graphics overlay.

NOTE: It is advisable that parameters such as **White Balance, Exposure Mode, IRIS functions, Speed, Gain** should be set up in the PTZ camera settings in advance. These functions can be accessed by using the remote control that was provided with the PTZ camera, by clicking "**Data Screen**" button. These parameters will be stored in your **PRESETS** therefore it is essential to set them up beforehand.

• Open the PTZ Shot Editor.

• Select the first shot.

• Using the joystick on the Vkey-100 control panel, or the one provided in the Shot Editor window, adjust the PTZ position.

• Set the appropriate TIME duration for the selected transition.

• STORE the shot for the first shot.

• Go to the next shot.

• At the end, use the REFRESH function - the camera will call all PRESETs one by one, and the application will generate snapshot previews together with graphics. The previews will be visible in the V/C tab on the production screen.

Now, you're fully ready to start broadcasting your AR production.

NOTE: Remember to save the session to keep all the parameters set up for the next use. Remember that the PRESETS of the PTZ camera are stored in the PTZ camera.

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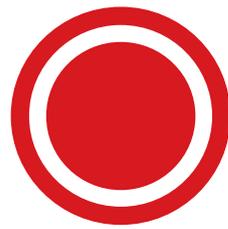
Tracking Virtual Studio in 3D Studio Editor

3D STUDIO EDITOR - PREPARATION FOR TRACKING VIRTAL STUDIO MODE PRODUCTION

At the beginning, it is important to understand the differences between AR and VR modes. Since each of these modes work differently, the execution of production for each one requires a different approach.

MODE - AGUMENTED REALITY

MODE - VIRTUAL REALITY

• The camera image TALENT LAYER is always the last visible layer.

• OBJECT LAYER are always the first visible layer.

• Does not require a green background (chroma key)

• The camera image is the first visible layer but after removing the green background, it can be any layer.

• OBJECT LAYER is always background, but some objects may be ahead of the TALENT LAYER

• Requires a green background (chroma key)
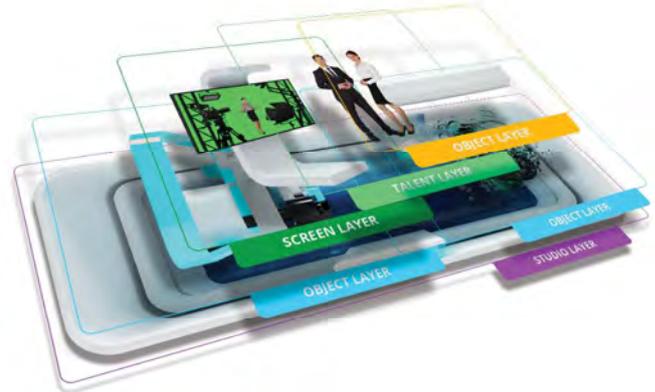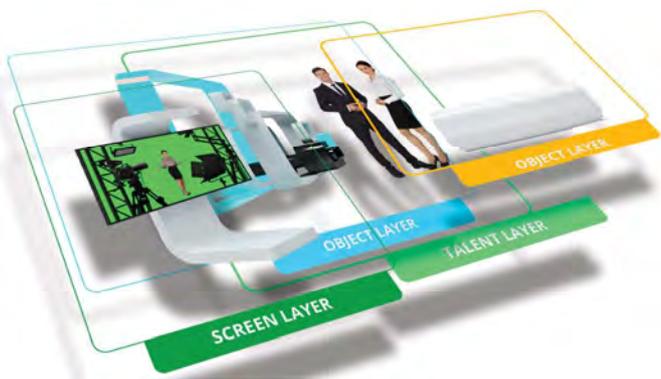
Both modes are available in Reckeen 3D Studio.

Preparation of scenography depending on the system operation mode:

PROJECT PREPARATION - TRACKING VIRTUAL STUDIO

In Tracking Virtual Studio mode, the following steps are required to prepare a project:

• PTZ configuration
• PTZ Tracking calibration
• Preparation of a 3D set
• Setting desired PTZ shots (PRESETS).
• Final broadcast of the production using streaming or video recording.

3D Editor Tracking Virtual Studio projects - 3D scene preparation

Start preparation of a Tracking Virtual Studio Project by loading a desired studio set. The steps for this process are the same as for trackless productions.
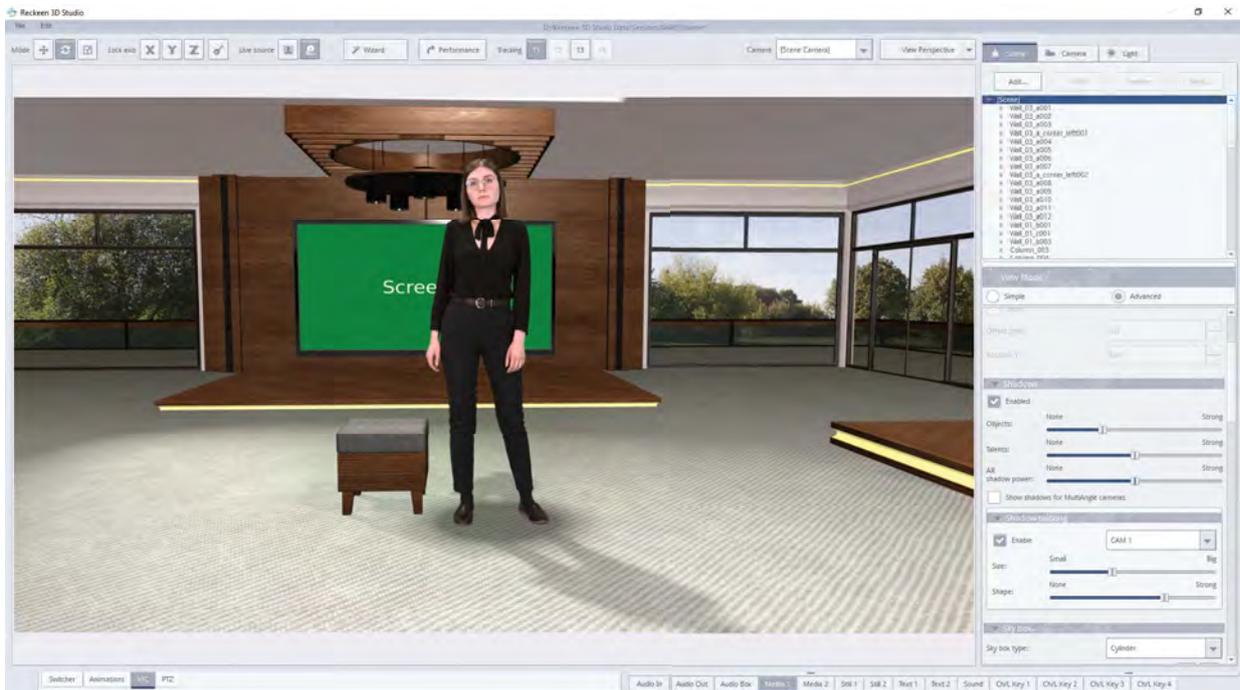
T1-T4 VIEWS OF TRACKING CAMERAS

A new element in relation to PTZ Tracking can be found in the 3D Studio Editor - T1-T4 shots.shots.

The T1-T4 shots show the view for the respective PTZ cameras in relation to the reference point (the subject of the reference points is covered in the chapter on PTZ Tracking).

Thanks to this function, we can arrange the space so that the virtual perspective fits exactly the actual view from the PTZ cameras.

T1-T4 shots show actual shots from PTZ cameras for VC1 - VC4. The image in the 3D Studio Editor is rendered exactly for chosen camera shot.

V/C1 - V/C4 keys on the PREVIEW bus on the Vkey 100/200 control panel, correspond with T1-T4 settings, and vice versa. At the same time, the 1-10 keys make it possible to call corresponding PTZ camera shot PRESET.

NOTE: when working with the 3D Studio Editor, you should lock the calibration positions with a padlock, to avoid accidental changes of parameters caused when using a computer mouse.

The rules of working in 3D Studio Editor in tracking mode are identical for both AR and Virtual Studio productions.
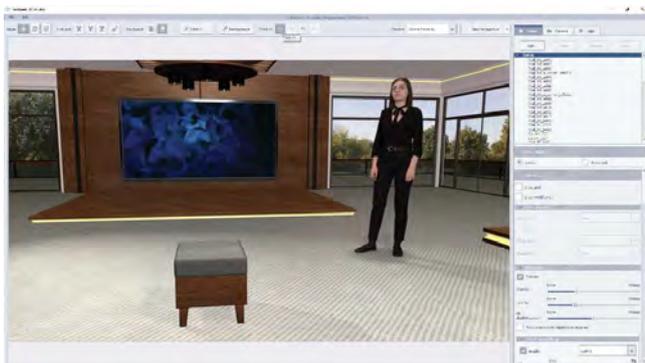
T1 - shows the view from the first PTZ camera. The position of the graphics follows the tracking for this camera.
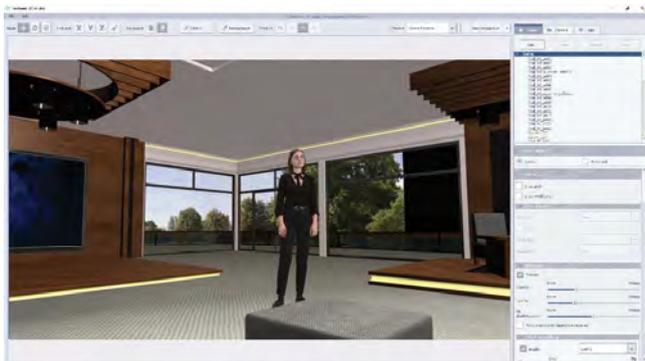
T3 - shows the view from the third PTZ camera. The position of the graphics follows the tracking for this camera.
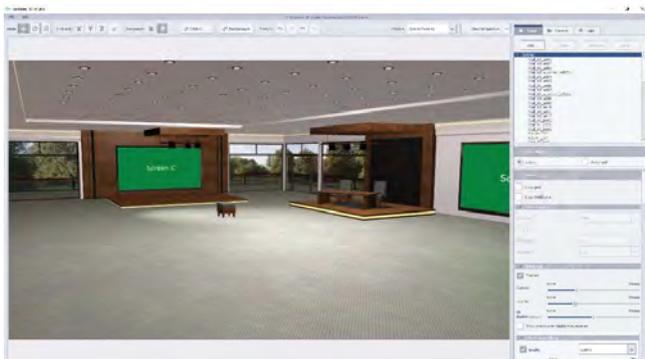
The T1-T4 shots can also be turned off, to be able to work using the virtual cameras only. This can be useful when production is partially made using Trackless mode.

This feature is also supported by the Vkey100 control panel.

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ADDITIONAL INFORMATION

1) To fully take advantage of the tracking mode, the size of the green background should ideally be large enough so that a talent has space to move around the freely. For the easiest calibration, the size of the virtual set should correspond with the size of the green screen.

2) The tracking system analyzes the space in front of the talent and on this basis generates shadows and precise reflections, therefore the floor of the green screen should be clean and uniform to avoid malfunctions of feet detection.

3) The scene should be evenly illuminated, the quality of lighting affects the quality of the chroma keying.

4) The quality of the camera, as well as setting correct parameters such as white balance, focus, ISO, etc. are very important and influence the final quality of the production.

5) Multi-camera productions - when using multiple cameras in one production, make sure that they are well-calibrated, so that the perspective of the shots from the cameras are coherent with the graphics and the view of a virtual scene.

SHADOWS IN TRACKING VIRTUAL STUDIO MODE

Important note: Version V3.0 includes the first beta version of Shadow Processor in Tracking mode. The development works are underway to improve the algorithms in this area. Feel free to test the feature and give us your feedback.
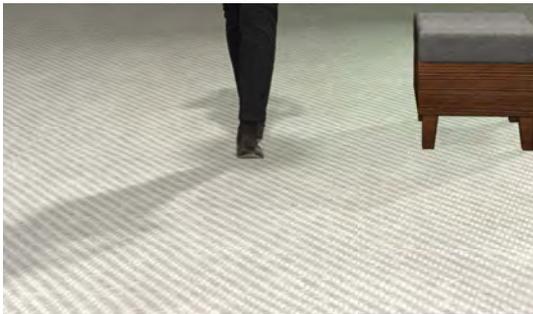
NOTE: the following rules related to generating talent shadows are specific to the tracking mode.

The green studio floor should be a uniform surface of the same color. The floor should not be dirty or damaged.

The height of the floor in a virtual studio set should be 0 cm. If the floor is on a different height, move the entire studio by adjusting Y axis value, so that the floor is at the level of 0 cm.

The algorithm analyzes the edge of the talent and generates shadows on this basis.

For shadows to be generated corectly, a talent's feet must be visible in the camera frame.

The correctness of generating shadows is affected by the chroma key settings. Make sure that the lighting of the studio is uniform, which helps the chroma key to work well. Make sure that all parameters of the chroma key are set to the best of your abilities.

ENABLE SHADOWS IN VIRTUAL STUDIO TRACKING MODE
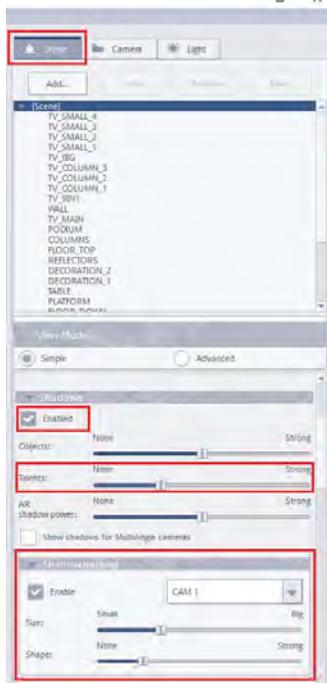
In the SCENE / SHADOWS tab, in the 3D Studio Editor, turn the global shadows on. In this tab we also define the shadow strength for Objects, Talents and all AR objects.

In the Shadows tab, turn on shadows by checking "Enabled".

Set the central slider "Talents" to an medium value. It is a global adjustment of the intensity of all shadows for talents.

The next sub-tab is Shadow tracking. Here we set individual shadow intensities for a given input from CAM 1 - CAM4 cameras.

In the Shadows Tracking tab, select CAM 1-4 and then turn on shadows by checking "Enable". Sliders Size and Shape regulate the size of the shadow circle under the feet and the intensity of the talent's shape shadow.
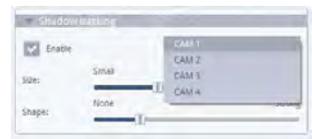
THE DEPTH OF OBJECTS IN THE SCENE

The shadow processor analyzes the depth of a talent in the green studio space, thanks to which it is possible for the talent to go around the 3D objects located in the virtual set. Make sure that a 3D object is positioned at a depth that a talent has enough physical space on a green screen to be able to go behind and in front of it.

THE DEPTH OF FIELD IN TRACKING MODE

In Camera Setup window, there is a DOF filter management option in lower corner.

The Reckeen system can, based on the tracking data, detect the distance of the Talent from the PTZ camera in a Virtual Studio, and on this basis it calculates depth of field.

These options are available in V/C Camera setup windows requires tracking to be enabled.
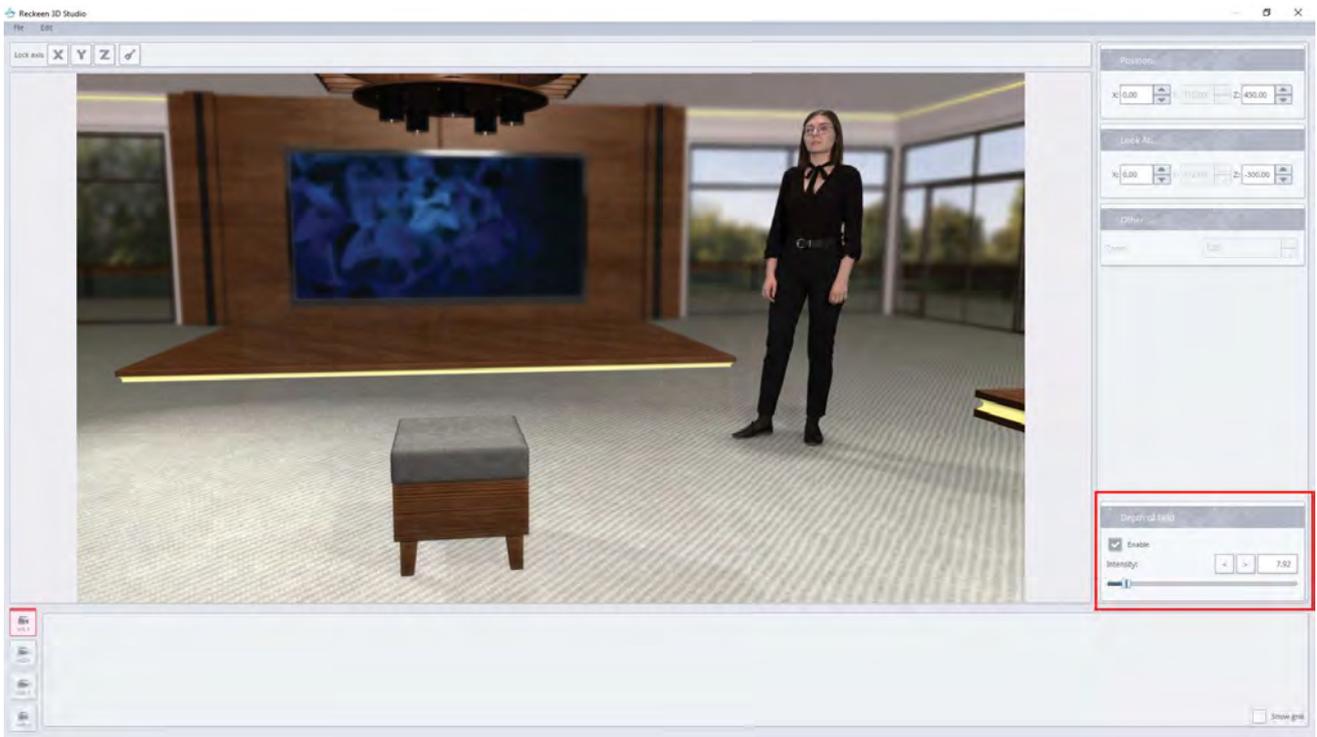
360° AND TRACKING
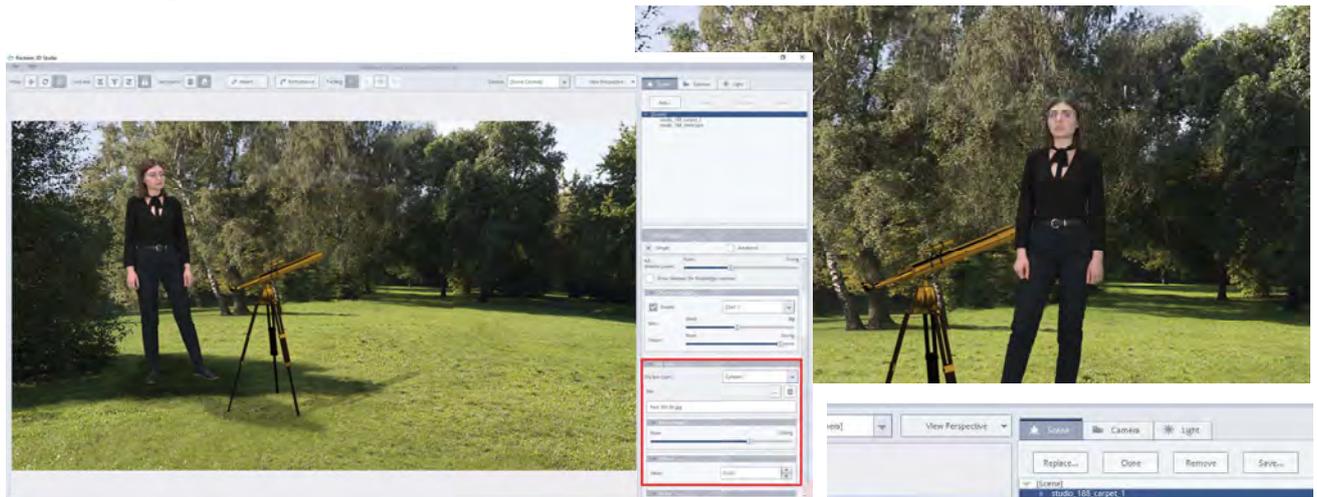
In the Virtual Studio tracking mode, you can easily get a 360° effect using a skybox. Load an appropriate sky map, and set parameters such as Movement and Offset.

Set the talent scale using the calibration parameters. The talent will be placed in space against the background of the skymap.

In this mode it is also possible to turn on the shadows. Because there is no floor, to obtain the shadows the following steps need to be followed:

1. Add a flat object such as a carpet, a podium, etc, which can act as a floor for a talent and objects

2. Change the texture/material of the added "floor" to a special material named "360" (search for it in a searchbar above the texture library). This material is 100% transparent, so it will not affect the background/skymap, but will emit shadows for objects and talent.
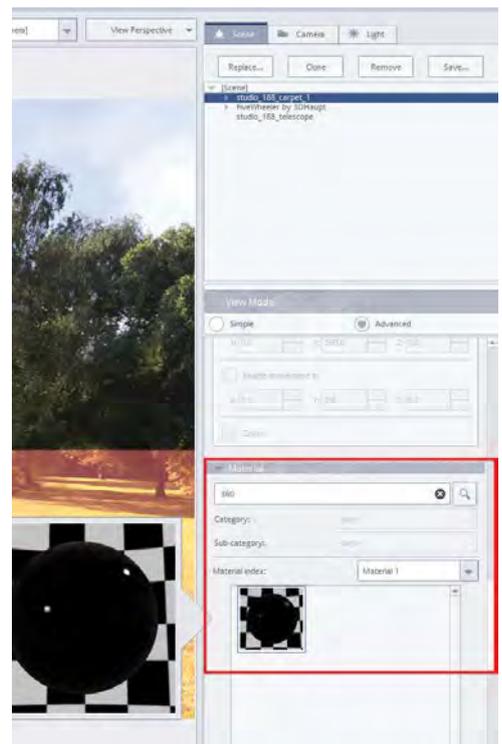
STATIC TRACKLESS CAMERA IN TRACKING VIRTUAL STUDIO MODE

Virtual Studio production becomes more advanced-looking as we use multiple cameras placed at

different angles. The Reckeen 3D Studio system offers the possibility of working with up to 4 cameras. These can be PTZ cameras with the FreeD protocol if you want to able to use tracking and optical zoom, but they can also be any cameras that can be used as static/ trackless cameras (without the option of using pan, tilt or zoom).

Any camera can be used for this purpose (using HDMI, SDI or NDI connection). For impressive, yet cost-effective productions we recommend using one tracking PTZ camera and one or more static/trackless cameras to achieve multi-camera capabilities.

The process of configuration and set-up of a static camera is the same as for a tracking camera.

Select the CONFIGURATION / TRACKING tab, then select for a given VC - "Static Agumented Reality", enter the height of the camera from the floor to the center of the lens (Y Postion (cm): eg. 112 cm) and press CONNECT. Picture above:

Set the camera zoom manually so that the view from it matches your desired shot.

Next, to go option Start Calibration the camera by specifying the distance from the Reference point, more information you can find in chapter 17, START CALIBRATION IN PTZ MODE. Setting of the static camera calibration option is the same as PTZ. Perform options 12-16 described in the chapter 17.

Swap the view to your connected static camera by clicking T1-T4 under Tracking section. Using the mouse, set the scene so that the pins will match the reference positions. Start by focusing on one pin only and match its position to the first reference point. Next, click on that pin (the pin is selected when flashing), and by holding right mouse click, rotate the grid until the second pin is matched with the other reference point.

Your secondary trackless camera in tracking mode is ready!

NOTE: The optical zoom and the position of this camera should not be changed during broadcast - it would cause the virtual scene to decalibrate, and the 3D objects to appear in the wrong places.

PTZ SHOTS IN TRACKING VIRTUAL STUDIO MODE

Lastly, once the project is complete, the PTZ shots (presets) should be set up. To do this, first send the appropriate V/C to PRG output - to be able to see the view from the PTZ input together with the image from a Virtual Studio set.

NOTE: It is advisable that parameters such as **White Balance, Exposure Mode, IRIS functions, Speed, Gain** should be set up in the PTZ camera settings in advance. These functions can be accessed by using the remote control that was provided with the PTZ camera, by clicking "**Data Screen**" button. These parameters will be stored in your **PRESETS** therefore it is essential to set them up beforehand.

• Open the PTZ Shot Editor.

• Select the first shot.

• Using the joystick on the Vkey-100 control panel, or the one provided in the Shot Editor window, adjust the PTZ position.

•Set the appropriate TIME duration for the selected transition.

• STORE the shot for the first shot.

• Go to the next shot.

• At the end, use the REFRESH function - the camera will call all PRESETs one by one, and the application will generate snapshot thumbnails with a virtual studio background. The thumbnails will be visible in the V/C tab on the production screen.

Now, you're fully ready to start broadcasting your tracking virtual studio production.
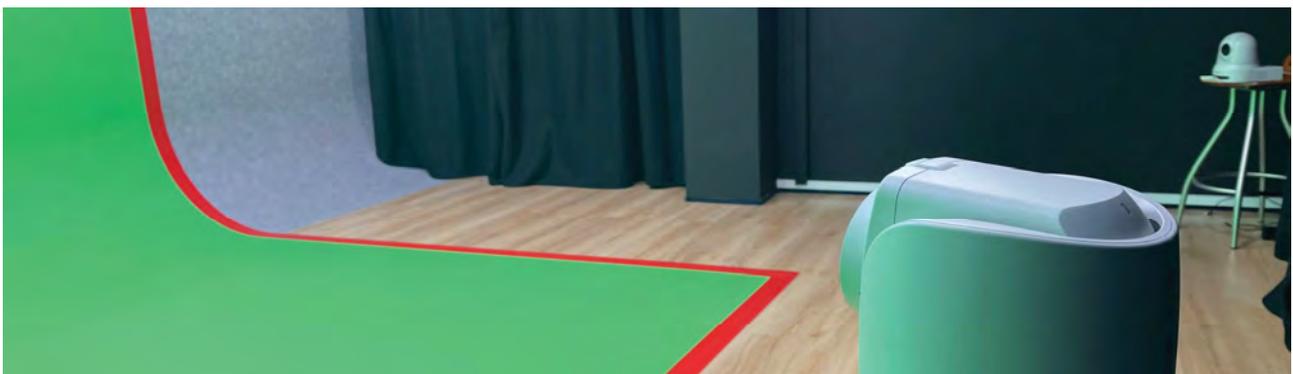
NOTE: Remember to save the session to keep all the parameters set up for the next use. Remember that the PRESETS of the PTZ camera are stored in the PTZ camera.

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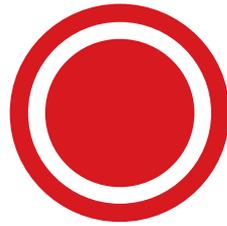
PTZ Tracking in 3D
Production

PTZ TRACKING IN 3D PRODUCTION MODULE

After clicking on the 3D Production icon on the start screen, the main application of the system - - production module appears on the screen.
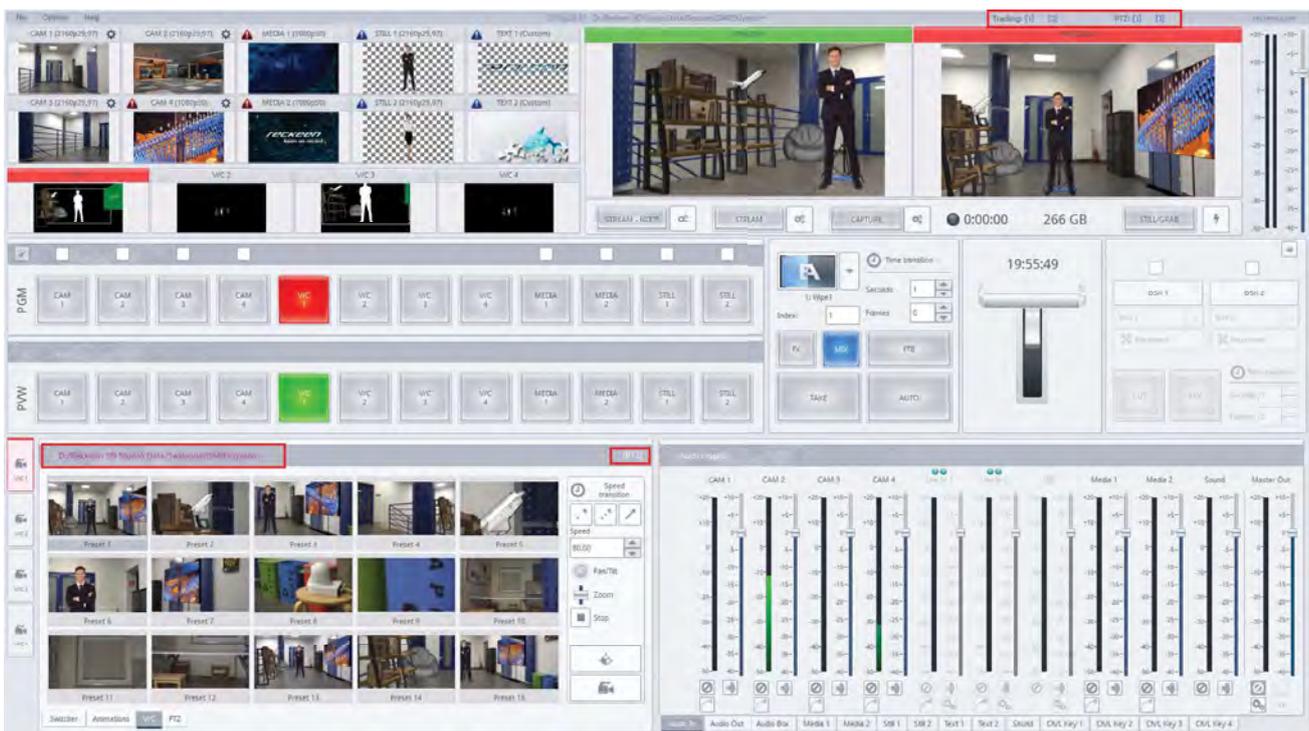
Due to new features for PTZ cameras being introduced, some changes to 3D Production Screean have been implemented:

- Tracking & PTZ work status monitor - upper right corner above the PRG window.

- PTZ tab in the lower left corner - described in detail in the PTZ chapter.

- In the V/C tab, signaling of the operation of a given V/C in a given mode

3D PRODUCTION

Trackless & Tracking

Reckeen 3D Studio allows you to work in tracking and trakless modes simultaneously at the same time.

The approach to the principles of handling production in both of these modes is the same. To recognise which mode is linked to which VC, the appropriate signaling of the used mode appers on each VC tab.

If the given VC is linked with trackless - the font color of the loaded scene path dose not change and mode is indicated by [V/C] symbol it the right corner.
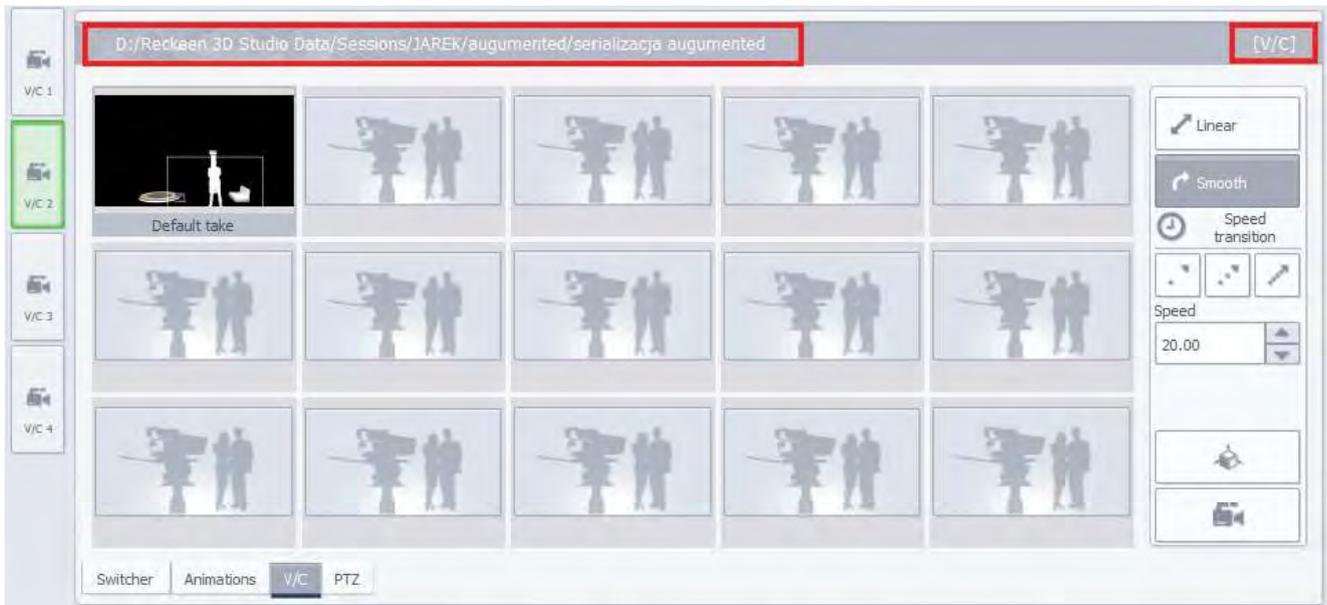
If the given VC is linked with tracking - the production window signals it in the form of a change of the font color of the loaded scene path, and additionally mode is indicated by [PTZ] symbol it the right corner.
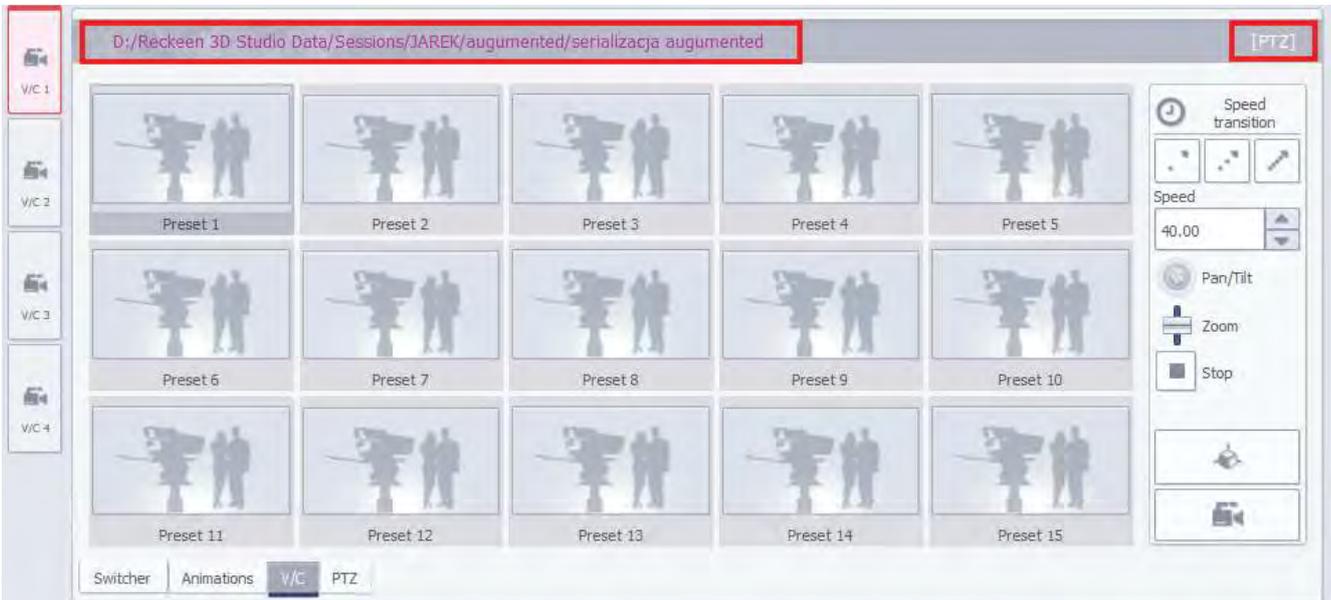
In the tracking mode you can control your PTZ cameras directly from the production window in the V/C tab. There is a small joystick to control parameters such as Pan / Tilt, Zoom control and the STOP key, useful if we want to stop the PTZ operation mid-movement.

This window is active only for a connected PTZ camera & Tracking which is connected to corresponding V/C 1 to 4.

Note: THE PRESET SETTINGS ON THE PTZ CAMERA ARE STORED IN THE PTZ CAMERA AND NOT IN THE 3D STUDIO APPLICATION. Therefore, after loading the session, you must call the REFRESH function (in the Shot Editor) to recreate the shots and the PRESET positions.

(in the Shot Editor - REFRESH) - reads all preset parameters from 1 to 15 stored in the camera and creates thumbnails of the shots. At the same time, thumbnails of the shots with a scene graphics layer will be generated for the 3D Production window for both AR and VR modes.

VKEY100/200/200+ AND TRACKING

Using the Vkey100 Control Panel you can control the PTZ postion in the Tracking mode:

It

It is possible to control the shots if you choose V/C 1- 4 or CAM 1 - 4 on PRG or PRV bus. The condition is that under selected V/C or CAM, a PTZ camera must be configured. Keys 1-10 correspond with the PRESETS made in Shots Editor. The active presets' keys will be automatically illuminated. After pressing a selected Shot, it will call up the appropriate PRESET in the PTZ camera.

Using the JOYSTICK you can move the PTZ head, upwards, downwards, to the right and to the left.

The three F, M, and S buttons are used to set PTZ moving speed.

F button - FAST, M button - MEDIUM, S button - SLOW.

The Vkey 200+ control panel has a dedicated key PTZ that indicates the active assignment of the joystick function to the PTZ. This key is highlighted in blue.

Note: When the camera is moving with the joystick pushed out, the swicher the selection of VC 1-4 is blocked.

TRACKING & PTZ - STATUS MONITOR

The monitor specifying the current status of Tracking and PTZ is placed above the PRG window. It appears only when PTZ and Tracking are connected and configured.

The monitor has two separate sections for Tracking and PTZ. **Tracking: [1] [2] [3] [4]   PTZ: [1] [2] [3] [4]**

the colors indicate the operation status:

blue [1] [2] [3] [4] - normal condition.

red color [1] [2] [3] [4] - incorrect condition.

Reason for red-coloured indicator might be that the HDMI or SDI video connection was disconnected between the PTZ camera and the Reckeen system or LAN ports connection has been interrupted. Check that LAN cable and Video cable in both Reckeen system and PTZ camera is attached correctly. If the connection is restored, the system will automatically connect and the indicator will confirm it by turning blue.

Tracking: [1] [2]   PTZ: [1]   [3]

Another important warning **[1 !]** , the exclamation mark "!" appearing in the tracking section, means that the FPS of the PTZ camera is incompatible with the FPS of the Reckeen 3D Studio system. Video parameters of tracking camera (fps + resolution) must be the same as Reckeen 3D Studio output.

NOTE: The incompatibility of FPS and video formats makes tracking unsmooth.

Tracking: [1 !]   PTZ: [1]   [3]
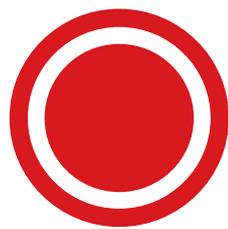
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Media tray

The Reckeen 3D Studio system allows you to use video files, image files or texts during the broadcast of your program.

It is worth to prepare all the necessary media before the broadcast.

WARNING! If you have media files (videos, images, sounds) stored on external sources, such as a memory stick or an external hard drive - you should copy them to the Reckeen 3D Studio system hard drive. External storage may not have an adequate file transfer parameters during the production, which may result in improper recording of your work or unstable operation of the whole system!

Shortcuts to the media files should be located in the appropriate tabs of the media tray. This will facilitate usage of the media during the program production, as opening files on a regular basis requires multiple clicks and there may not be enough time for that while operating on the air. Media tray is used for adding the media and managing the shortcuts, as illustrated in the picture below. Tabs with media files are marked in red.
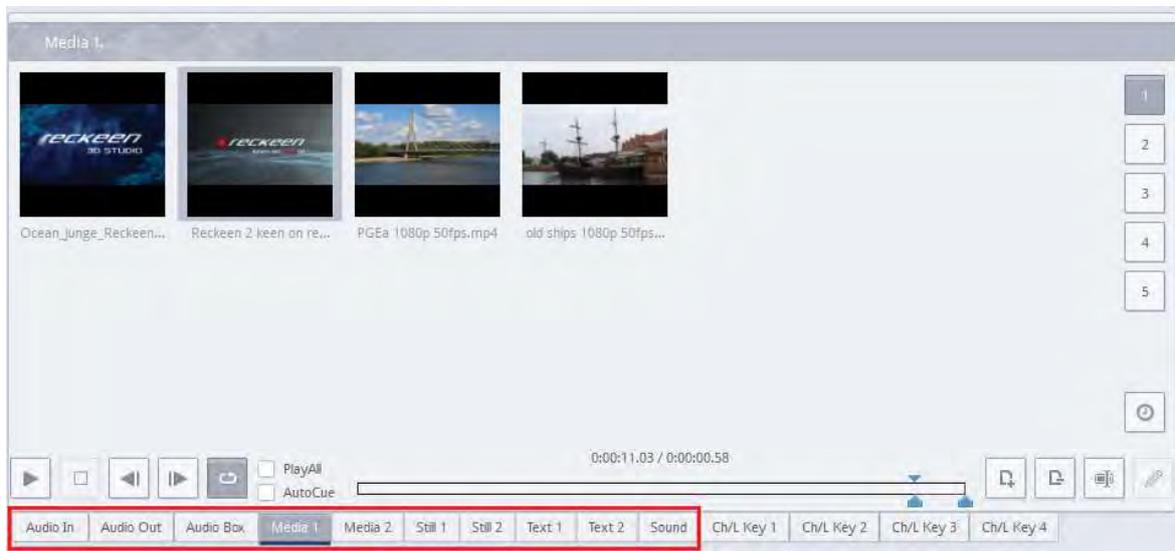
Please note that no operation on the media files in the tray changes them on your hard drive. Removing or renaming a file in the media tray only affects the files' shortcuts in the tabs. It is also possible to add the same file multiple times on the same or on the different tab in the tray. You can also change file names (shortcuts) and use the same file under different names.

There is a possibility to group the files within the tabs, thereby creating categories of your interest. It is made possible thanks to sections (labeled from 1 to 5) located in the trays. With the sections you can organize files for specific tasks.

Note! When you replay a file from any of the sections (1 to 5) within the PGM source, that is live, then switching the section to a different one will trigger the file's from the new section autoplay and going on the air. It is suggested, therefore, to prepare necessary videos and images in advance.

A tray holds 7 tabs assigned to specific players. There are two tabs for video files (Media 1, Media 2), for image files (Still 1 and Still 2), for text or image boards (Text 1, Text 2) and audio files (Sound). The Reckeen 3D Studio system supports multiple media formats. It also has an integrated support for multiple codecs for playing video files.

Media 1 and Media 2 - as shown in the picture below, this is where you can view video clips.

Click on the Add icon (in the lower right corner of the screen, with a small plus sign) to browse your local hard drive and add video files. You can put video files in five sections. You change the section by clicking on the buttons marked with numbers from 1 to 5 located on the right side of the screen.
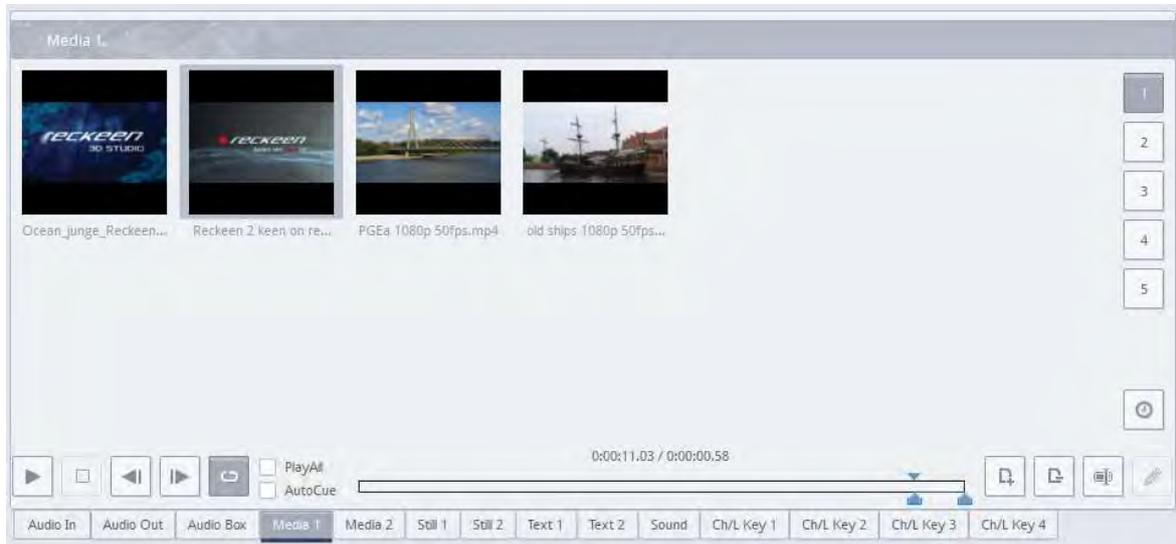
Supported video files formats and codecs (concerning media added to Media 1 and Media 2 tabs):
MPEG2, MPEG4 and H.264 containers: *.mpg, *.mpeg, *.mp4, *.avi, *.mxf, *.mov
Still 1 and Still 2 - as shown in the picture below, this is where you can view image files.
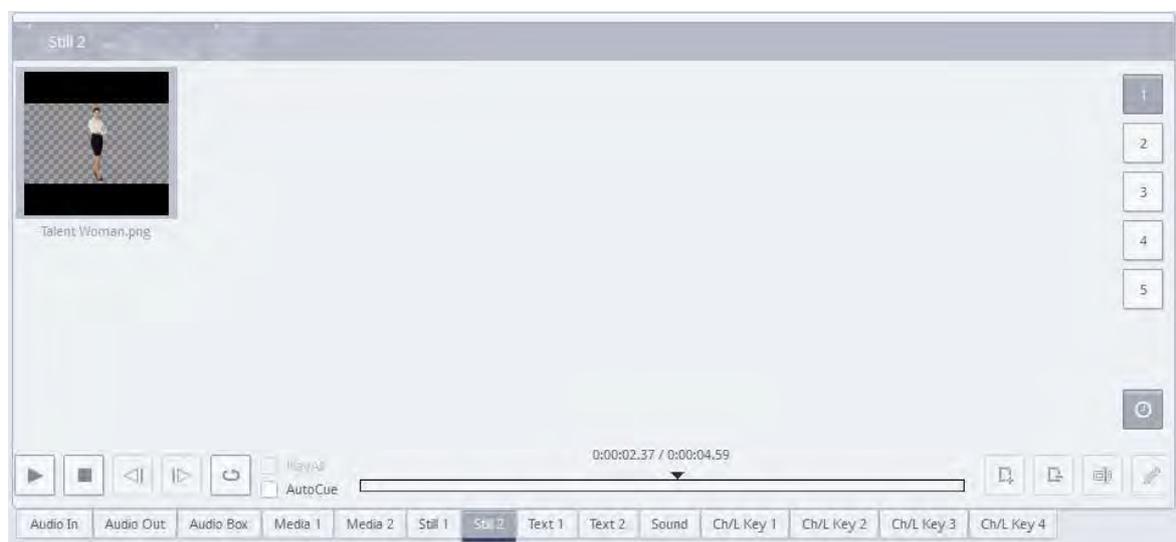
Click on the Add icon (in the lower right corner of the screen, with a small plus sign) to browse your local hard drive and add image files. You can put image files in five sections. You change the section by clicking on the buttons marked with numbers from 1 to 5 located on the right side of the screen.

Supported file formats of a bitmap type (concerning media added to Still 1 and Still 2 tabs): *.jpeg, *.jpg, *.bmp, *.png (with transparency)

Text 1 and Text 2 - as shown in the picture below, this is where you can view files with text boards or images, most often used in the DSK module.

Click on the Add icon to browse your local hard drive and add text board files. Just as before, you can put text board files in five sections. You change the section by clicking on the buttons marked with numbers from 1 to 5 located on the right side of the screen. Supported file formats of a text board and image type (concerning media added to Text 1 and Text 2 tabs)

*.jpeg, *.jpg, *.bmp, *.png (with transparency) , *.recstill, (STILL editor module format)

Reckeen 3D Studio allows you to use videos and still images in the broadcasted program. The use of media requires two steps: adding a file to the tray, loading the medium into a virtual player.

For each file added to the media tray, an icon is automatically generated. It shows you a preview of its content. At the same time it is a shortcut allowing you to access the file.

You can sort the icons within the tab with drag and drop. Files with the alpha channel (transparency) have a preview showing on object on a background of a gray white grid.

In order to add a file to a tray, select the appropriate tab (optionally its sub-tab). Then press the Add File button or double-click on an empty area in the selected tray. Then select a file on your hard drive with a typical file selection window.

Delete file (with small minus sign) button is located next to the Add file one. It allows you to remove the currently selected file from the tray. If the file being deleted has already been loaded into the player, you will be asked to confirm the action. After removing the file (media), the preview of the given player will display a blue background.

An another operation on a file in the media tray allows you to change the file name. In order to rename a file, select the file's icon and press the Rename button (on the right side of Delete file button). Then enter the new file name.

PREPARING MEDIA FOR BROADCAST

Using the medium added to the media tray is very simple, it requires only one step. You just have to find the file in an appropriate tab of the media tray and double-click it with a mouse. From this moment on, the medium is replayed (Media 1, Media 2, Still 1 or Still 2, Text 1 or Text 2, Sound) and can be used directly in a live program.

You can select a single file from each of the tray media tabs and load it into a player. In the case of video files (Media 1, Media 2), you can play up to two video files at the same time

- one from each of the tabs, that is one file in the Media 1 tab, and the second one in the Media 2 tab. The keys used to control the playback of a file loaded into a player are located at the bottom of the media tray.

There are the following functions available:

Play , Pause (on the same button as Play) , Stop , previous Frame, Next Frame , Loop (switch the playback loop) Additionally, a playback progress bar is displayed along with information about the length of the movie, the current playback position (picture below), Mark In and Mark Out markers (picture above) and PLAY ALL and AUTOCUT functions.

When you double click on a video file's icon in the tray, this video file is directly loaded into the virtual player and starts to play in a loop. Play media after selection through double-clicking function and the loop function are enabled by default.

In order to turn the Play media after selection through double-clicking function off or on, you have to click on the Configuration icon at the top left of the production screen, and then select Configuration from the drop-down menu.

This opens a window, where you have to click on the General icon on the left.
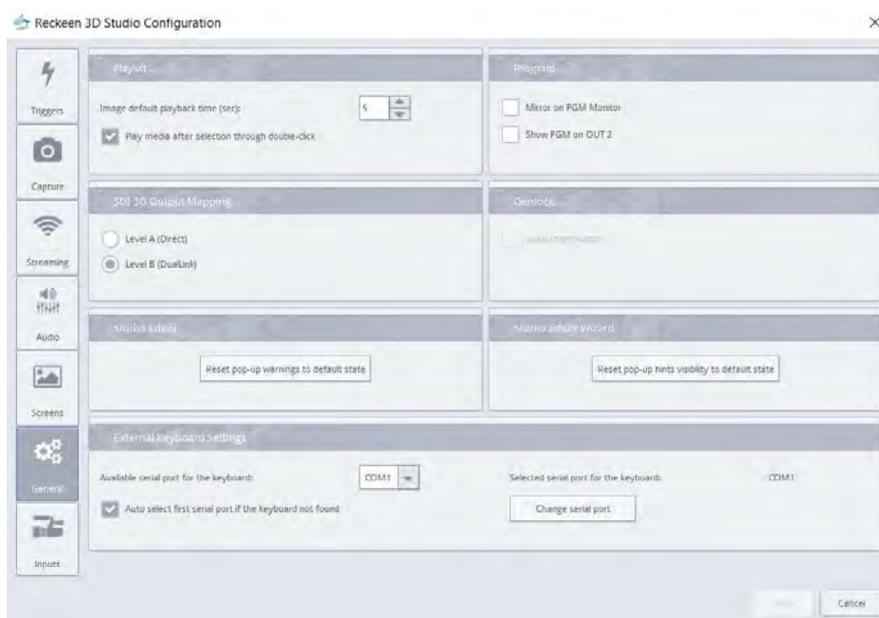
When the loop is off, the video stops at its last frame. Pressing the stop button sets the playback to the first frame.

SETTING VIDEO PLAYBACK TIME. MARK IN AND MARK OUT TAGS

If you want to show on the air only a part of the video that interests you, you have to use the markers of a beginning and of an end - Mark In and Mark Out. You can set them to replay any selected portion of the video. The first marker - Mark In marks the beginning of the video file fragment, while the other one - Mark Out, its end. You can move the markers with your cursor on the playback progress bar.

If you want to set a Mark In marker precisely on a chosen video frame, use the buttons that allow you to move the playback position marker (blue triangle) by one frame forwards or backwards.

When you set the playback position marker exactly on the selected frame, place a cursor on the progress bar area, and click the left mouse button. Select Mark In from the drop-down list. The picture below.
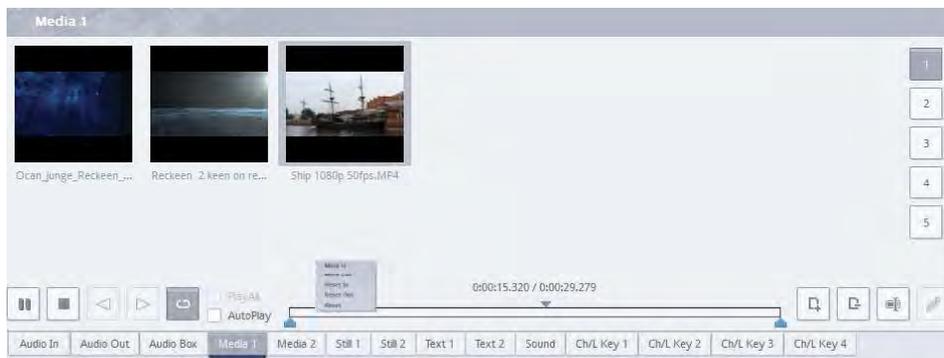
Then, the Mark In marker will be set in the exact same position as the playback position marker is located.
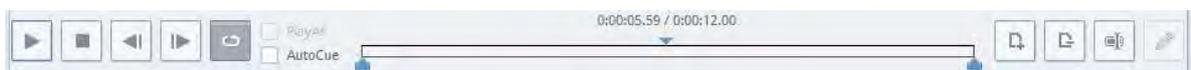
If you want to use several fragments of a given video, you have to load the video file several times into the tray and mark the respective fragments in each file separately. In order to make them into a single continuous video, a Play All (playlist) function, described further in this manual, should be used.

CREATING A VIDEO FILES PLAYLIST

If you have already prepared a couple of files, you can replay them in a given order. A Play All function is used for that purpose. This way you will create an aggregate video, the length of which will be the sum of the lengths of all the files. Note that, before you will be able to turn this function on in the tray, replaying all the files has to be stopped. It is therefore necessary to press the Stop button before enabling this function.

VIDEO FILE AUTOPLAY FUNCTION

When you enable the AUTO PLAY function, in the moment of entering the vision (or the PGM screen), a video file will start playing from the beginning, regardless of whether it is an only source on the vision or it is a source displayed on a virtual scenography screen. If the Mark In marker has been set in the file, the playback will start from that selection. In the case of a playlist - it will start from the beginning of the first file or from the location of the Mark In marker in the first file.

Selected files can be automatically played back from the beginning with the pressing of the **Media 1&2 or Still 1&2** keys under the active AutoPlay function, the activation of which is located just above the Media 1 to Still2 keys on the PGM BUS panel. Activation of the AutoPlay function we need to tick the "AutoPlay" box. picture above:
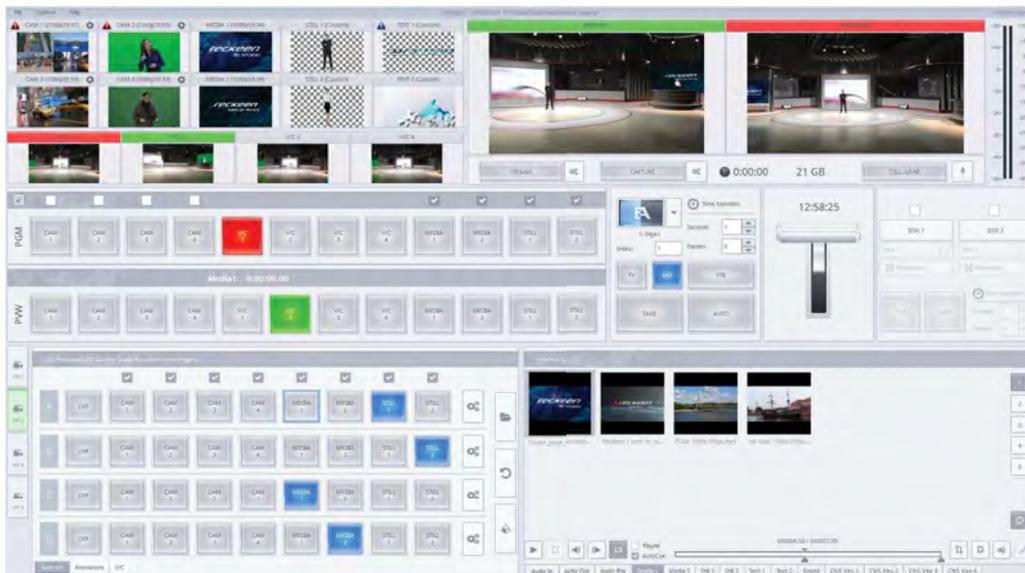
starting media playback with the AutoPlay function is also possible in a virtual V/C studio, because media in the 3D studio are common to all V/Cs 1 to 4, and to activate the AutoPlay function in V/C you must select one of the following check boxes

In Studio LITE, each V/C is independent, therefore it is possible to configure the AutoPlay function for each V/C1 to 4.

VIDEO INPUT with a preset for the video file can also be used as additional media trays. Thanks to this, we can play up to 4 additional video files independently of Media 1 & 2 on Cam1 to Cam4.
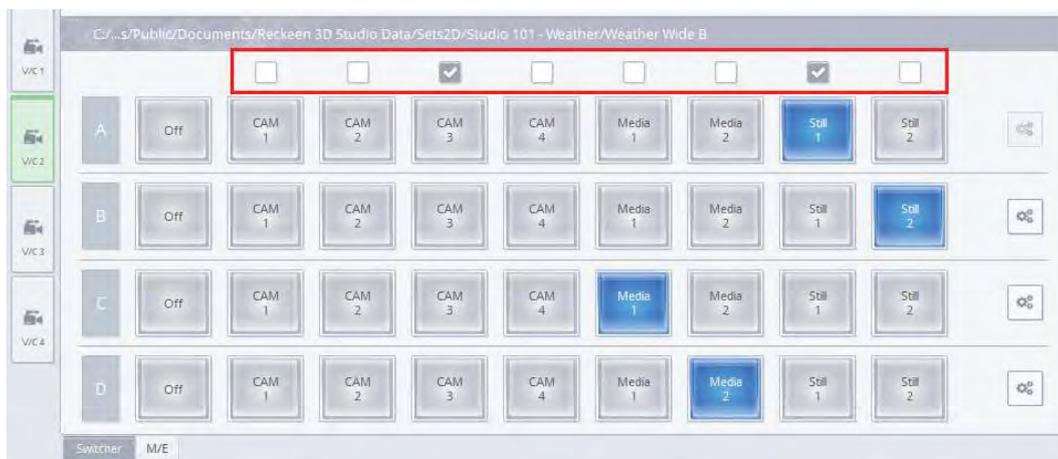
Selected files can be automatically played back from the beginning with the pressing of the CAM1 .. CAM4 keys under the active AutoPlay function, the activation of which is located just above the CAM1 - CAM4 keys on the PGM BUS panel. Activation of the AutoPlay function we need to tick the "AutoPlay" box. picture below:

Because the configuration of the AutoPlay function is in the BUS PGM area, on the left there is a PADLOCK icon that blocks changes to the AutoPlay settings. This prevents accidental change of settings in the production process.

See chapter 8 for more information on this topic in the subsection - "Configure input's as additionaly media trays, AutoPlay & AutoCue function"

VIDEO FILE AUTOCUE FUNCTION

AutoCue functions are also available this function at the end of the file automatically triggers the transition to BUS PVW.

Activation of the AutoCue function we need to tick the "AutoCue" box. picture below:

AutoCue functions are also available for files in Video Inputs.

DISPLAYING IMAGES IN THE SPECIFIED TIME

Each image file has a default playback time set to 5 seconds. To change this value, click on the file and select Set playback time from drop-down menu.

Then, set the desired value in seconds with the white arrow keys, as shown below.
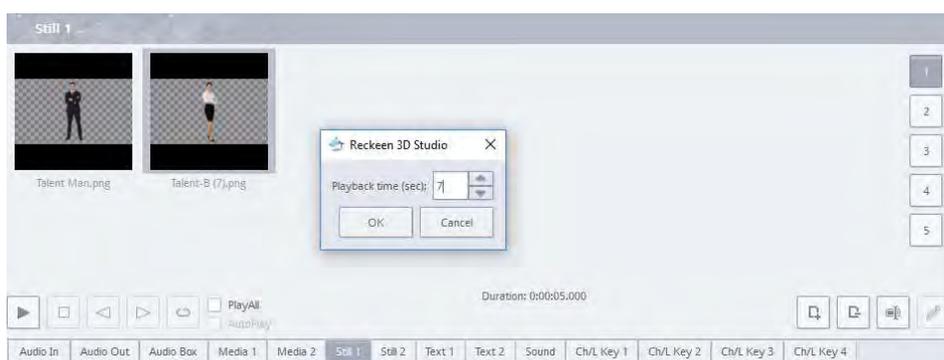
PLAY ALL FUNCTION

You can display a couple of images one after another. If you change the second image's playback length to 25 seconds, you will see the total playback length on the screen - in this case 31 seconds. Note that, in order to be able to turn the PlayAll function on, you have to click the Stop icon first.
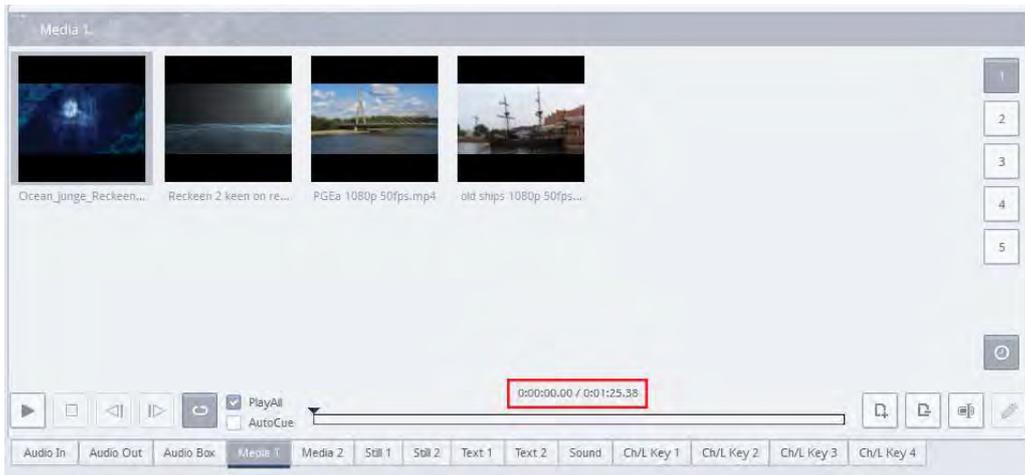
The same principles as to the images (Still1 and Still2 tab) apply to the texts (Text1 and Text2 tab).If you want to set a break between the two displayed captions, you have to load an empty file between these files and adjust its playback time (length of the pause).

DISPLAYING TIME FOR BROADCAST

The tab (Media1 and Media2) and (Still1 and Still2) has a clock symbol that activates the time clock that is displayed between PGM BUS and PRV, for the clocks to show up on the production panel, you must activate this function by pressing the clock symbol, picture below:

time clocks will appear on the production panel:
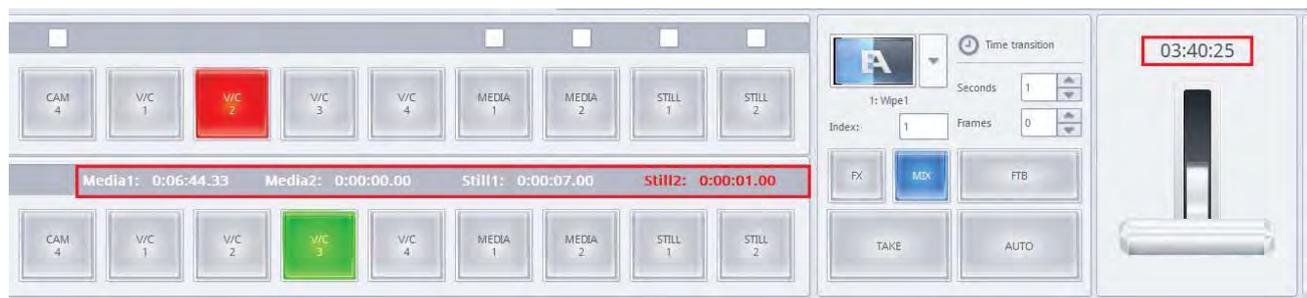
The system clock is permanently displayed above the T-bar.

All media clocks change color from white to red in the last five seconds of the file being played, this allows you to prepare the appropriate action.
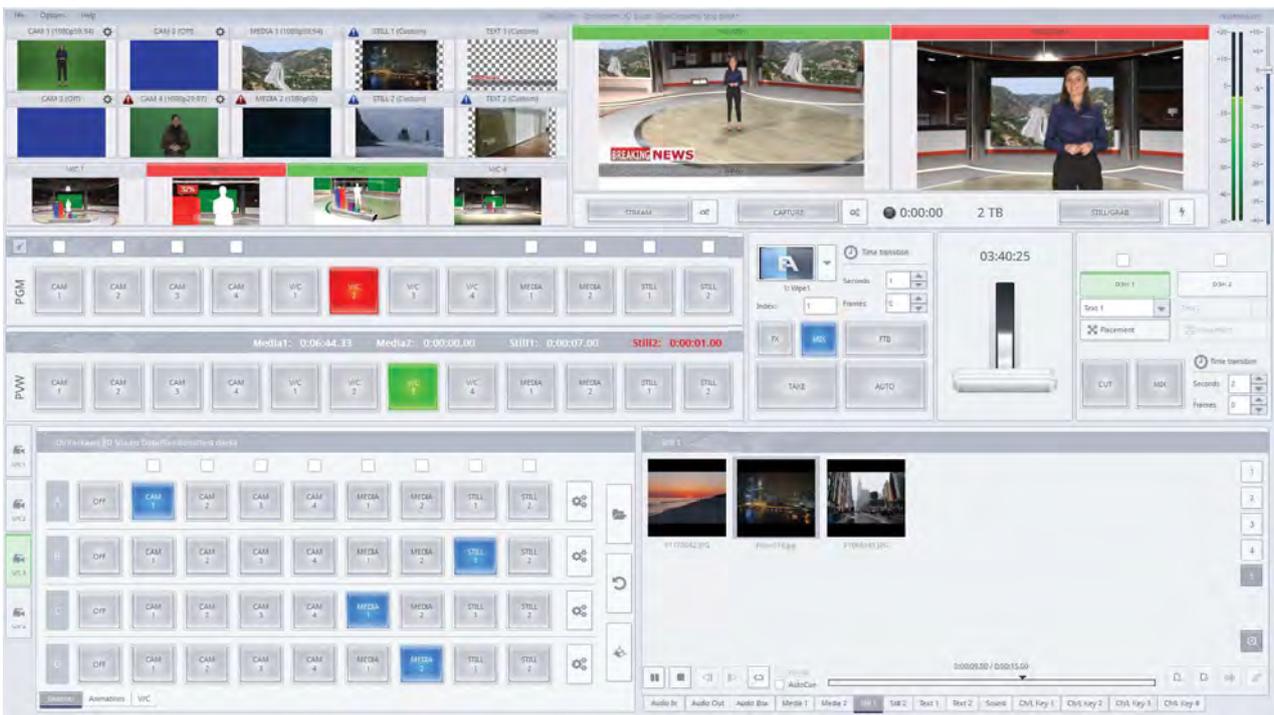
The media time is also displayed in the multiviewer window above the appropriate windows.

LIST OF IMAGES OR TEXTS AUTOPLAY

Enabling the AutoPlay function means that the image list will start playing from the first one in the moment of medium's, that is the tray image's, introduction on the air - the PGM screen. Similarly, if you want to get subtitles with important news that will be changing automatically during the program, you can create a list of such subtitles directly on the ready-made boards in *.recstill files, set the display time for each text and then enable the AutoPlay. Use the Loop function if you want the list to be played again in a continuous manner after it comes to its end. If you want to change the text already on the air please see chapter : DSK function: Swapping the text content already on the air.

ADDITIONAL MONITORS SUPPORT

The Reckeen 3D Studio system operates on multiple input and output signals. To ensure even better preview of these signals, you can use additional monitors connected to your workstation. By using a separate monitor, you are able to obtain a preview larger than the one on the screen in the 3D Production application.

A second monitor can be used to display the Multiview view. Clear interface shows the previews available in the 3D Production module.

There are the following previews in the Multiview view:

- PREVIEW - presentation of the item selected to be broadcasted next,
- PROGRAM - presentation of the currently broadcasting signal (system output),
- previews of the virtual cameras V/C 1, V/C 2, V/C 3, V/C 4,

- a preview of all the media loaded into the virtual players,

- a preview of the cameras CAM1, CAM2 , CAM3 , CAM4.

The third monitor, after the appropriate configuration, may display a full screen image from PREVIEW or PROGRAM output. Previews on the extra monitors retain their proper aspect ratio. Aspect ratio is consistent with the chosen format, in which the system's broadcasting output operates.

In the picture - a Multiview view on a separate monitor for the Reckeen 3D Studio system.

SETTING THE DISPLAYED CONTENT ON THE MONITORS

After connecting the monitors to the Reckeen 3D Studio system, the displayed content can be set on the screens.

For this purpose, after opening the 3D Production module, click Options on the top Menu bar, then click on the Layout and select the previews' layout that suits your needs from the dropdown menu.

There are the following options depending on the number of the monitors connected:
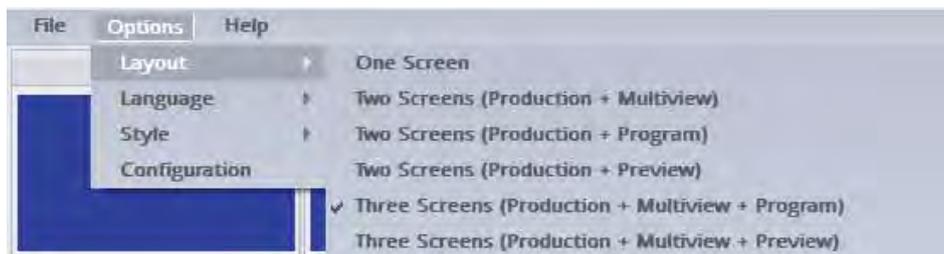
- One Screen,
- Two Screens (Production + Multiviewer),
- Two Screens (Production + Program),
- Two Screens (Production + Preview),
- Three Screens (Production + Multiviewer + Program),
- Three Screens (Production + Multiviewer + Preview) .

After setting the previews' content on the screens, you can also specify which preview from the already selected will appear on which specific monitor. For example, if you have two monitors and the screens already selected (Production + MultiViewer), you can set, which exact monitor will show the specific content. To do this, click again on the Options icon at the top left of the production screen and select Configuration from the drop-down menu.

Click on the Screens icon in the window that opens.
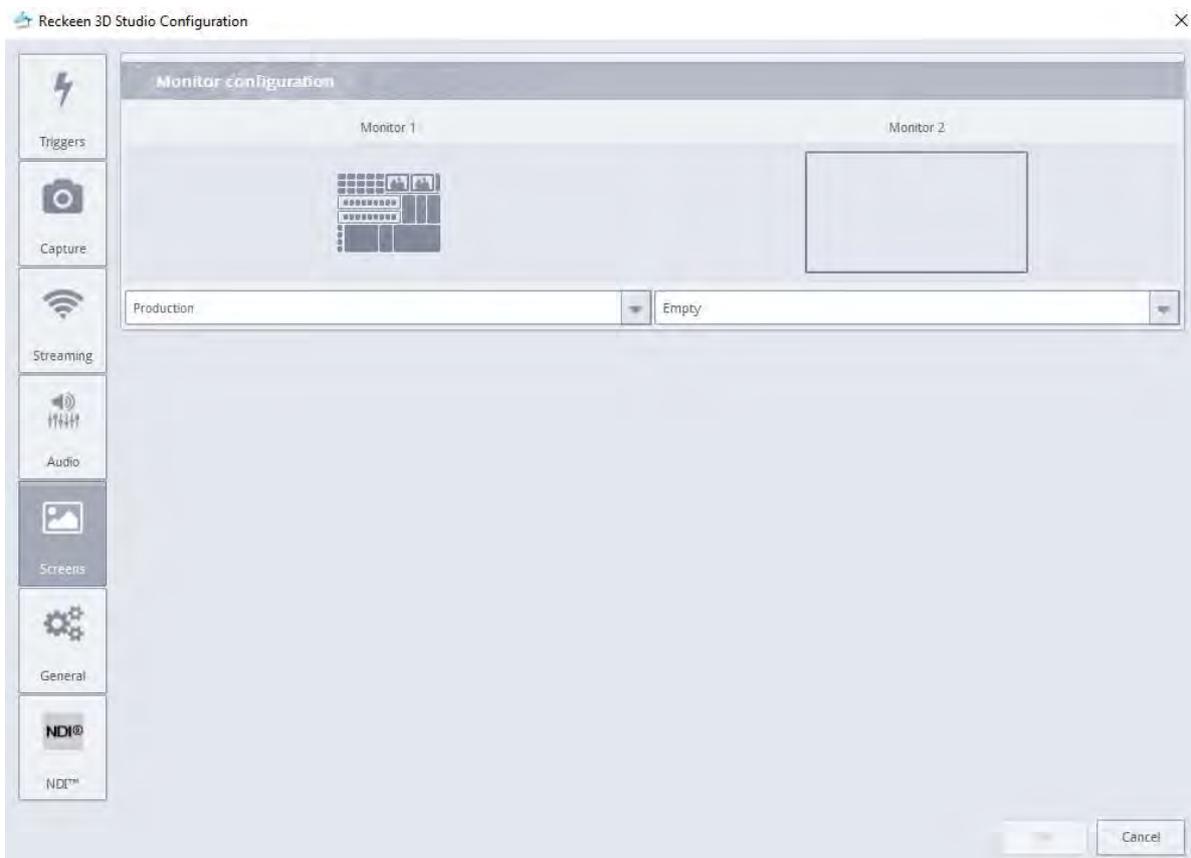
In the opened Monitor configuration window, you can set what Monitor1 and Monitor2 will show (Production + MultiViewer or MultiViewer + Production).

MIRROR IMAGE ON THE PGM MONITOR

In the course of making the program, an inverted view from the monitor displaying the Program (PGM screen) is often needed. This facilitates the work of people facing the camera (their view is a mirror image on the PGM screen). To set such a PGM monitor preview, click on the Options icon at the top left of the production screen and select Configuration from the drop-down menu.
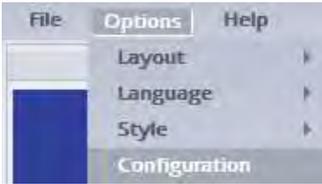
Click on the General in the window that opens. Then, check the Mirror on PGM Monitor option under the Program caption. The image on the monitor will change after pressing the OK icon in the lower right corner of the window.
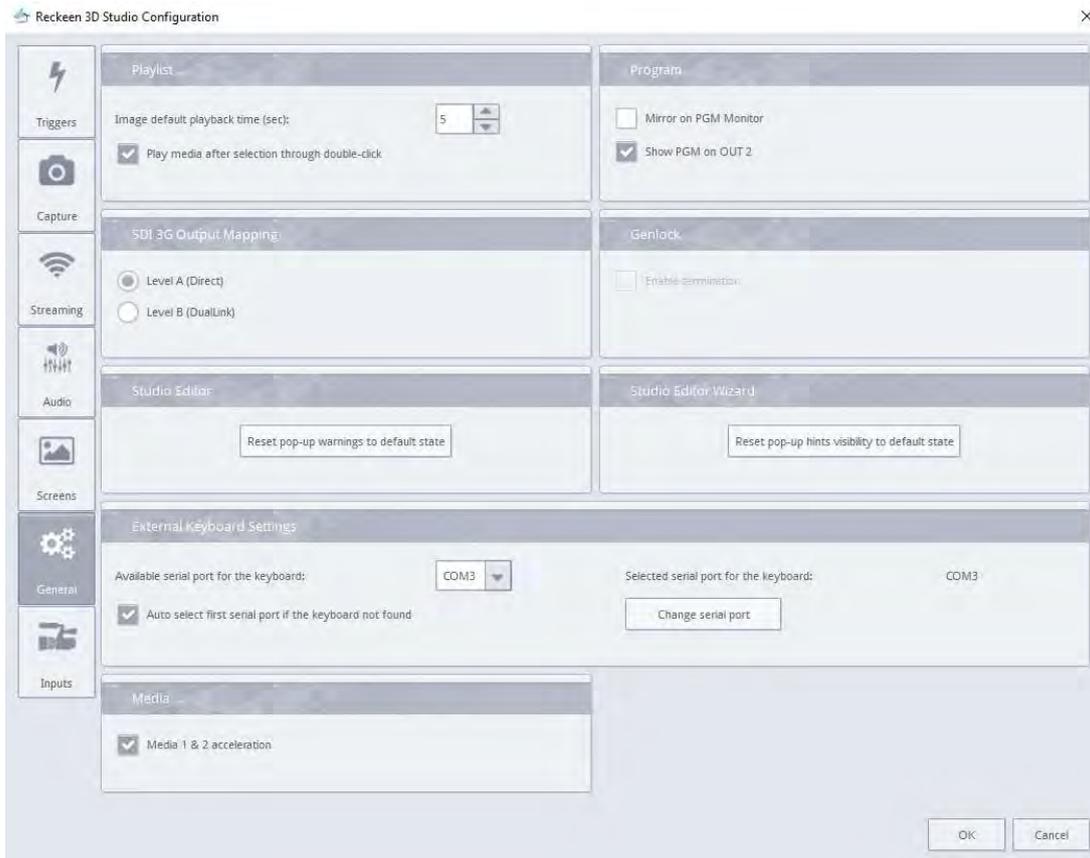
SUPPORT OF MEDIA PLAYBACK - GPU ACCELERATION

Supporting video playback in Media tray

Integrating the AMD / NVIDIA GPU with relatively strong graphics systems in Reckeen systems from version V1.8 also provides hardware support for video playback.

After enabling this function, the graphics chip takes over most of the calculations from the CPU, which results in a lower CPU load. Reducing the CPU load after enabling hardware acceleration increases the "reaction" speed of the video itself, as well as of background tasks. Enabling GPU acceleration shortens the conversion time of sample video material, especially in 4K formats.

In the case of AMD and Nvidia graphics cards, multi-functional stream processors are most often used for simple calculations. Nevertheless, Hardware Acceleration achieves an excellent result. Computing with acceleration enabled is performed in half as fast and does not burden the CPU.

The Reckeen system allows the user to choose whether the file should be accelerated or not. This applies to the INPUT and alos to MEDIA TRAY.

In order for the media trays to work in the video acceleration mode, in the General tab in the Configuration window and select the Media tray acceleration option. It is turned on by default.

Each file that is currently playing is indicated by a bold outline in the media tray. The border color confirms whether the files are in accelerated mode or not.

If the **outline is blue** the files cannot be accelerated or you are running in nonaccelerated mode.

If the **outline is purple** - the played file is currently accelerated.
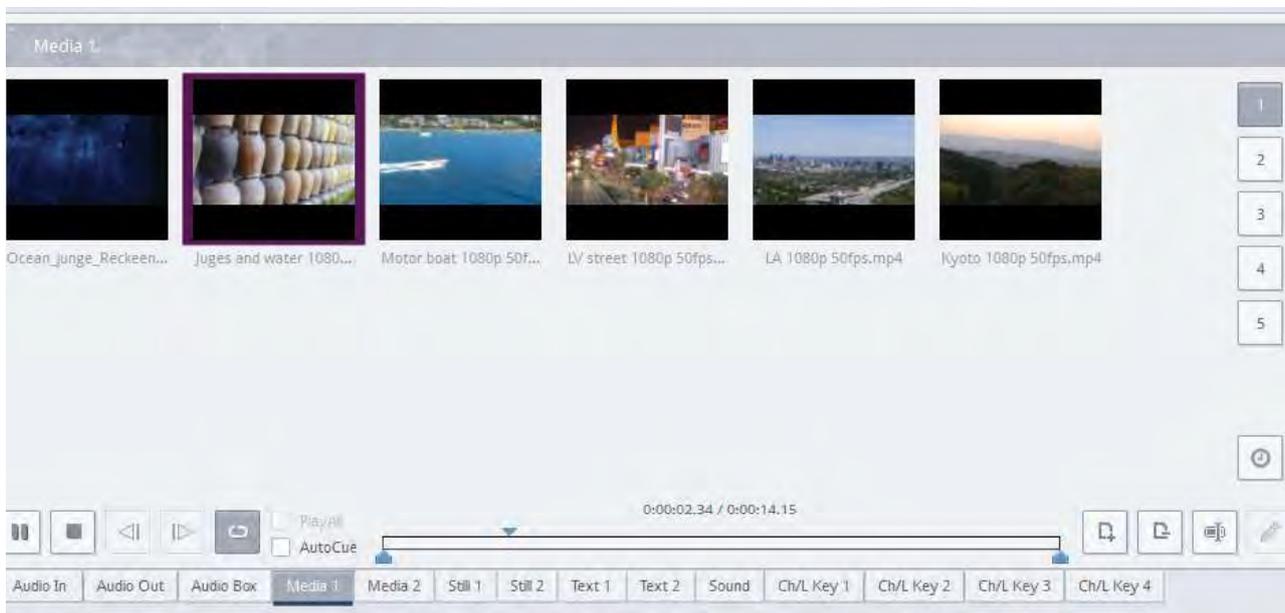
22
Sound mixer
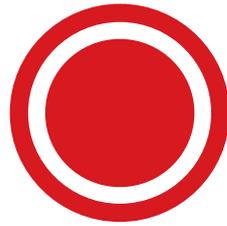
The Reckeen 3D Studio system is equipped with a sound mixer function. It allows you to mix the audio signals. It also gives you a possibility to adjust a signal level of each of the sources, along with a separate adjustment of the signal level for audio output. The sound mixer on the 3D Production screen represents hree tabs. Audio In, Audio Out, Audiobox.

AUDIO IN TAB

Below is picture with audio inputs

In the Reckeen 3D Studio system, you can adjust the following input channels:

- Cam 1 Input, the signal received from the first card input,

- Cam 2 Input, the signal received from the second card input,

- Cam 3 Input, the signal received from the third card input,

- Cam 4 Input, the signal received from the fourth card input,

- Line In 1 (XLR); the signal received from the front audio panel,

- Line In 2 (Jack 6,3 mm); the signal received from the front audio panel,

- MIC – signal from microphone (Jack 6,3mm) the signal received from the front audio panel,

- Media 1 - input channel of video files played back by a virtual player supported by a media tray - Media 1 tab

- Media 2 - input channel of video files played back by a virtual player supported by a media tray - Media 2 tab

- Sound - input channel coming from sound files played back by a virtual player and being placed in the Sound tab,

- Master Out - adjusting the main signal level for audio output. For better operation, the Master Out indicator is also included in the audio input tab.

AUDIO OUT TAB

Below is picture with audio outputs

You can adjust the following output channels:

- Capture - setting a volume of a video file recorded from the Program window level. The file being recorded is automatically placed in the tab 5 of Media 1 and Media 2 trays.

- Streaming - setting the volume of a live broadcast streaming from the Program window level.

- NOTE: The Mute function for Capture and the Streaming - when STREAMING or CAPTURE is started, a message about no audio will appear .

- Headphone – (Jack 6,3 mm) when connecting headphones, you can select from the drop-down list which channel you want to hear on the headphones .

- NOTE: The Mute function works for each input source and the master output. Selected sources are mixed, and create a Master Out signal. On the Headphones you can hear the signal from any input or Master Out output. In this case, the Mute function will not work for the Headphones, despite the checkboxes are on . You can listen any channel on the Headphones with Mute function enabled .

- Master Out - adjusting the main signal level for audio output.

- Settings lock - in the upper right corner there is a padlock that locks changes to settings for capture and straming audio level.
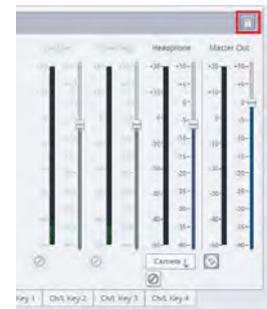
For each channel, you can adjust the signal level using a slider located next to the signal level column. In addition, you can set the output level with a separate slider - Master Out. You can adjust the sound in the range of -40 to +10 dB, where the 0 level (Line In 1,2) corresponds to -10 dBV (-7.8 dBu or 0.316 V RMS) in case on consumer level , or 4dBu (1.78 dBV or =1.23 vlts RMS) in case professional level analog inputs/outputs on audio panel. It depends on audio level setting in Configuration Window: Audio Tab. This has been described on the next page.

In case digital Audio input /output (Camera Input) 0 level corresponds to -20dBFs. Level 0 for the Media file means the maximum digital value of the signal. In addition, you can enable for the channels the following:

- Follow - this feature allows you to mute the sound of a chosen channel up until a video signal associated with the given sound source appears on the vision. This applies to the sources: Media 1, Media 2, and CAM associated with the Line In (Line in 1 when CAM1 appears on the vision and Line in 2 when CAM2 appears on the vision). Enabling this feature for a chosen channel mutes a given sound source, when the source is not used (displayed) on the PRG output.

- Solo - a feature that enables sending a selected signal individually to the output. Enabling this feature for the chosen channel mutes all the other input channels. Only the signal for which the Solo feature has been enabled is sent to the outputs.

- Mute - checking this feature completely mutes the signal of the given source.

CONFIGURATION WINDOW : AUDIO TAB
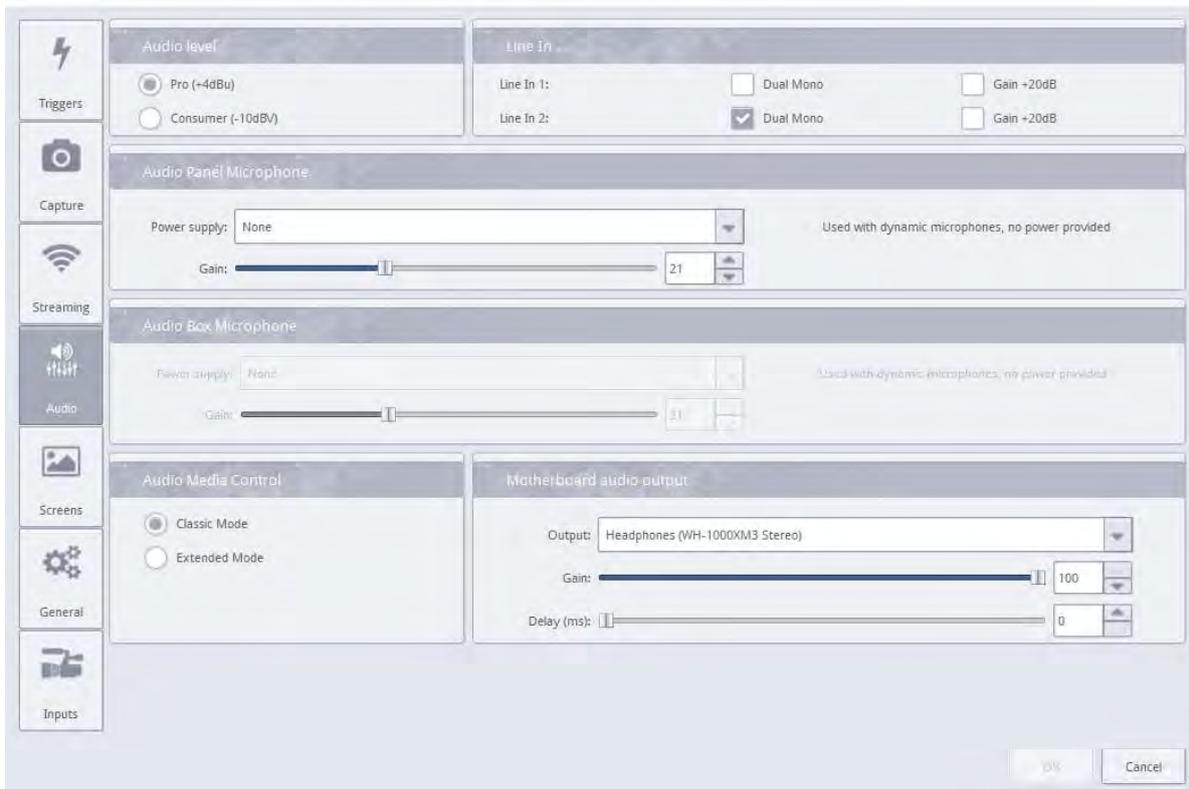
When you open Configuration Window in 3DProduction Module or LITE Production Module: Menu>Options>Configurations. In the AUDIO Tab - you can find settings of the system's sound. There are two levels of the line signal to choose from:

- The first one - Pro, - is a professional one, where level 0 has a value of +4 dBu. This signal level is the most common for the XLR connector, commonly known as Cannon, and for the TRS connector, that is 6.3 mm stereo Jack. You may also find it on the TS connector.

- The second signal level - Consumer - has the 0 level for the value of - 10 dBV and it is most common for the RCA connector, commonly known as Cinch. The difference between them, are described below.

Different voltage reference levels have been chosen for Pro and Consumer levels.

- Professional level:
  4 dBu, then we get level 0 on analog inputs and outputs. This equals 1.23 V.

- When working with Consumer signal, in order to get 0 value on the output and on the input, a signal with a value of 0.32 V has to be connected. These principles apply to the AUDIO Panel connectors at the front of the Reckeen workstation and analog connectors in external AUDIO BOX panel(ADB-100). In the case of digital inputs and outputs, such as a camera, level 0 is a level of - 20 dBFS. Level 0 for the Media file means the maximum digital value of the signal.

CONFIGURATION WINDOW : AUDIO TAB - LINE IN 1&2

These two levels of analog signal refer to the analog connectors of the AUDIO PANEL located at the front of the Reckeen workstation, i.e.: Line in 1 and Line in 2. Input is similar for analog inputs and outputs located on the additional ADB-100 panel: AB Analog 1 input and AB Analog 2.

The configuration window also contains additional settings for the Line In 1 and Line In 2 analog inputs.
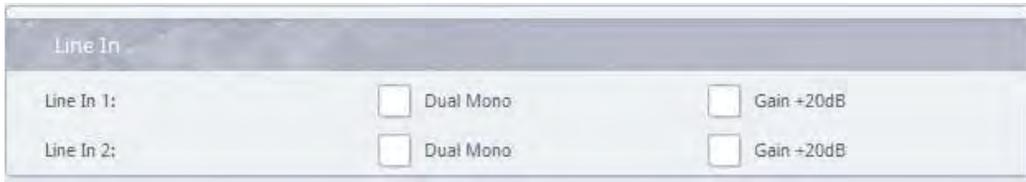
The Dual Mono option allows you to copy one of the audio channels to another. This means as an example that after connecting only the Right XLR connector to the Audio Panel, it is possible to copy this signal to the Left XLR channel. Thanks to this we will get a Mono input signal with the same level value.

The Gain + 20dB option allows you to amplify the signal by + 20dB.

If we open the Audio tab at the bottom of the Production, we will find the settings of the input sound levels, for which it is possible to set the Solo, Mute, Audio Follow video options. There is an additional "gear" button for the analog inputs, picture below:

After clicking on the button, the input configuration window will open. There are also buttons to enable Dual mono and Gain + 20. Below, however, is an additional slider to adjust the audio input delay, in the range of 0 to 500 ms, picture below:

CONFIGURATION WINDOW : AUDIO TAB - MICROPHONE

You can find two Microphone settings below the AUDIO Level settings. The first for the microphone connector located on AUDIO PANEL on the front of the Reckeen workstation, and the second for the microphone connected to external AUDIO BOX panel (ADB -100). There are two operating modes: a None mode with a dynamic microphone, for which you can set the Gain value with a slider, and a Phantom mode with a condenser microphone. When you switch to the Phantom mode, you will be warned that a voltage of 48 V will be applied to the speech insert. A red LED lights up on the AUDIO Panel located at the front of the Reckeen workstation.

Warning ! It is recommended not to connect or disconnect a microphone to the AUDIO Panel during the time the red LED is lit up. You can safely connect a microphone only in None mode.
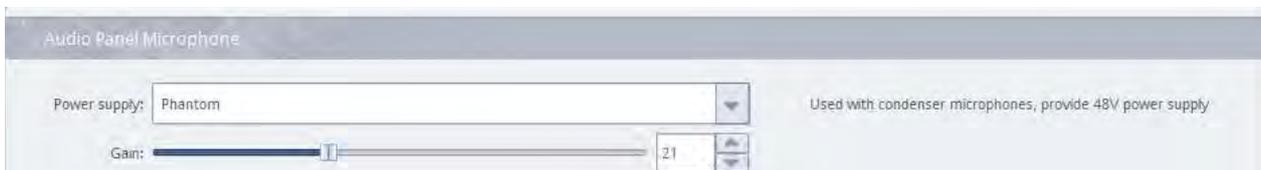
Exactly the same settings are found in the audio mixer after selecting the "gear" button for the MIC microphone input. In the window you will find the delay adjustment and the possibility of connecting +48V Phantom voltage.

Below Microphone settings, you can see the settings options of Motherboard AUDIO Output. The available outputs are shown in the drop-down list.
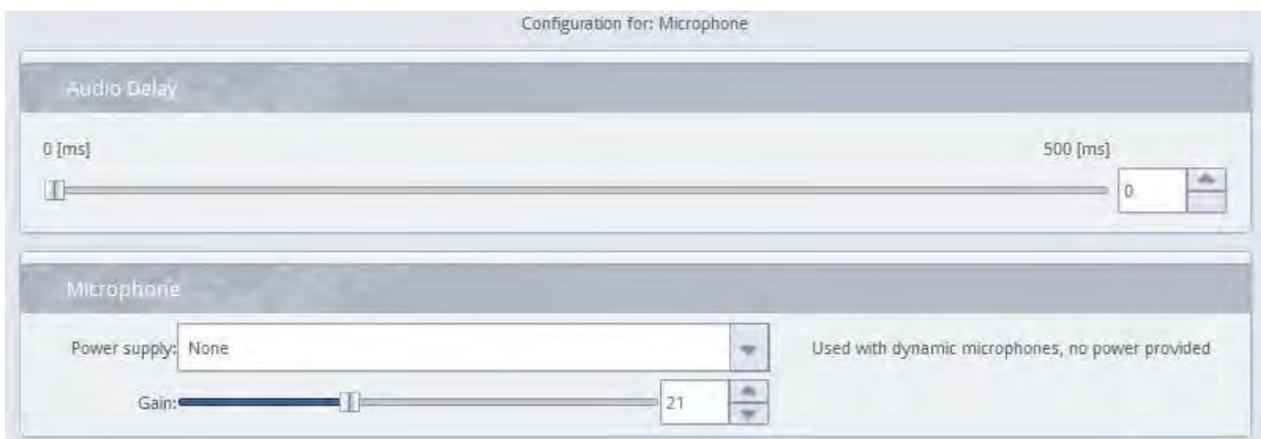
CONFIGURATION WINDOW : AUDIO TAB - MOTHERBOARD AUDIO OUTPUT

On right side of the drop down list, you can select the audio output from your graphics card or motherboard. They will vary depending on the system configuration and the type and number of connected monitors.

The list of monitors attached to the system will appear in the drop down list. (Item # 1 in the list in the image above). If you select this monitor from the list then the sound can be played through this monitor (you can connect, for example, headphones to this monitor)

Digital Display Audio - output sound from the graphics card (you can select the sound output on different connectors of the card, such as HDMI, DVI, DP), In the picture above, points 2, 3 and 4 in the list.

- Realtek Digital Output - is a digital output from the motherboard.

- Realtek Digital Output (optical) - digital (optical) output from the motherboard.

- Speakers (Realtek High Definition Audio) - mini Jack output from motherboard. If you choose this option, a signal from Master Out will go to the output on the rear panel of the Reckeen workstation.

- If your computer includes support for devices Bluetooth technology enables short-range wireless communication between the phone / smartphone and various accessories, such as wireless headphones, headsets, portable speakers or USB audio interfaces. Such devices will appear on the list.

- Note - After switching on/off the system, we have to refresh the Bluetooth connection so that the system transmits the audio signal there. Windows always keeps a list of all devices that were ever connected even once.

Adjust the audio delay relative to the video output for proper synchronization. With the slider Delay you can set the delay (in ms) for the audio signal going out of the system and with slider Gain - the volume.

CONFIGURATION WINDOW : AUDIO TAB - CLASSIC/EXTENDED MODE

In AUDIO TAB at the bottom there is a tab where you can select the audio mixer operating mode for Audio input. The choice is between classic and extended mode.

These modes are related to the operation of the audio mixer. There are two separate possible audio schemes here - the first is for the settings for Virtual Studio VC 1-4 and the second is for the mixer mode for the full-screen outputs. Such as CAM 1- 4, Media 1,2 or Still 1,2.

In CLASSIC MODE there is only one mixer shared for the VC and the full-screen outputs, in the EXTENDED MODE, two separate mixers are active.

In each of these schemes (extended mode) we can set the mixer in a different way.

This will allow us to turn on the folow to audio function or mute, for example, aduio from media or audio inputs from cameras, etc. in a different way in VC 1-4 and in a different way in full screen-mode.

Classic mode is nothing more than a single audio setup scheme for both VC and full screen outputs.

In the AUDIO IN tab, there are icons indicating which mode the mixer is in.

Below is a photo of the operation in VC mode:

Below is a photo of the operation in Full-screen mode:

There is also a gear wheel that allows you to quickly choose between modes:
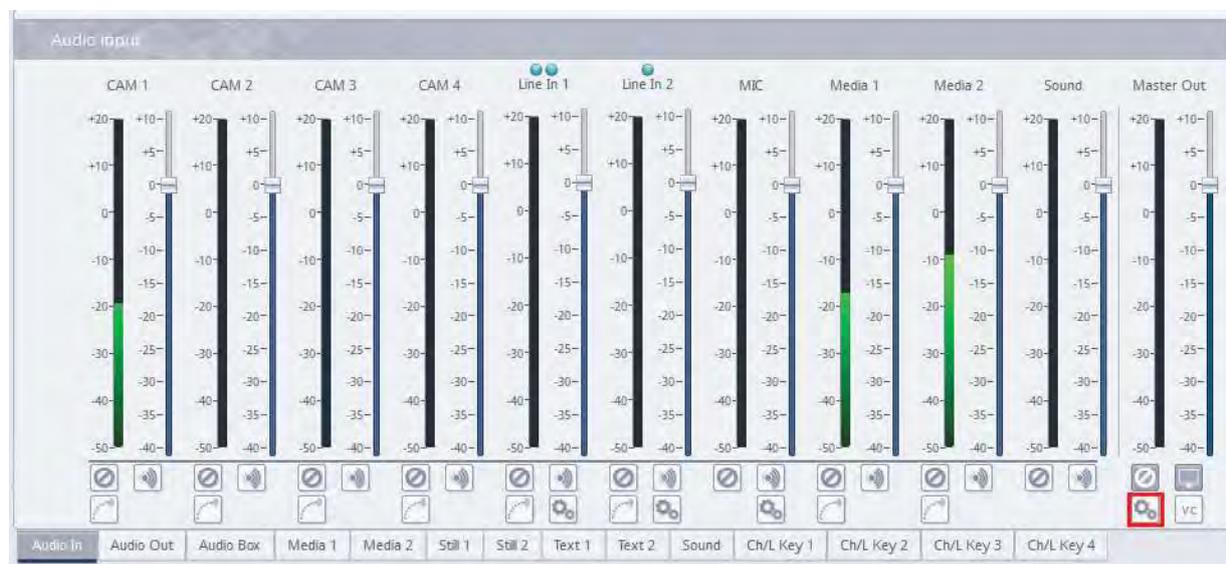
SOUND TAB

In the Sound tab, you can store shortcuts to audio files previously added to the hard drive, just as in the media tray.

Click on the icon Add (with small plus sign) to browse your local hard drive and add sound files.

Supported audio file formats: .wav and .mp3

In the mixer, you can add music played in the player to an audio track and adjust its volume with a Sound slider.

AUDIO BOX ADB100

ADB 100 module is designed for professional producers, yet it maintains a size of 1U and a price at a reasonable level. The device is equipped with professional inputs and connections with the highest AES / EBU signal quality (AES3), used mainly in studio technology.

ADB 100 works well at home, in the director's room, in the studio, in the transmission car as well as on the stage. The richness of various analog and digital interfaces provides maximum flexibility and supports user productivity in the studio.

With ADB 100 your Reckeen Studio is enriched with the highest professional sound quality without any distortions.
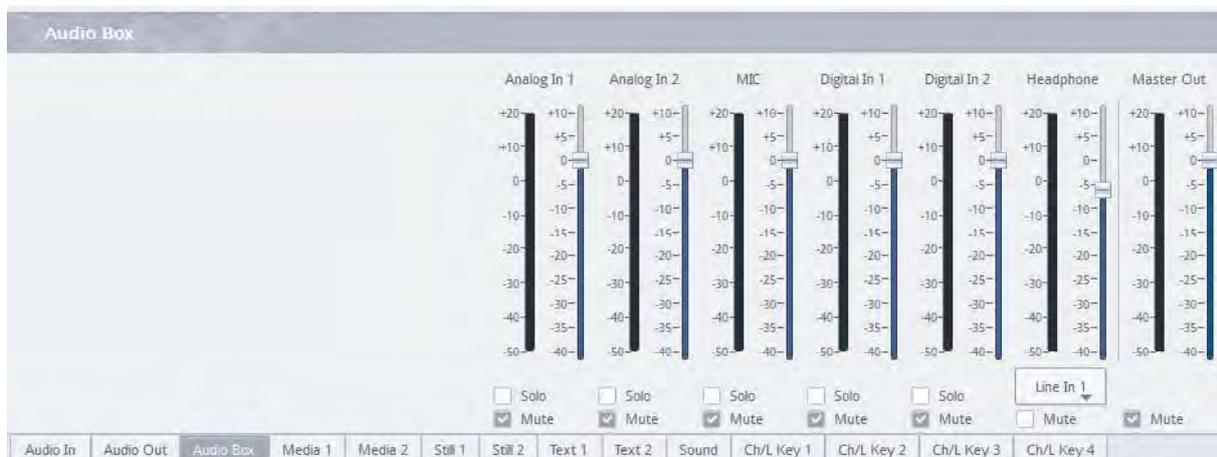
With its built-in Audio Link interfaces, ADB100 can be installed directly in the studio as well as on the stage. The use of RJ 45 cable and Audio Link technology enables transferring all inputs and outputs stream to greater distances (with a single RJ45 cable). This enables you to separate a recording studio from a closed and acoustically insulated director's room in which the Reckeen Studio 3D or Lite station is installed. The sound transferred digitally from ADB 100 device through RJ 45 connector maintains the highest quality and avoids noise.

If you connect an additional ADB-100 device to Audio Link connector, you can expand the Reckeen system adding additional inputs and outputs:

- two digital inputs on XLR connector (AB Digital 1, AB Digital 2)
- two analog inputs on XLR connector (AB Line In 1 stereo, AB Line In 2 stereo)
- microphone input for dynamic and condenser microphone
- two digital outputs on XLR connector
- two analog outputs on XLR connector (stereo output 1, stereo output 2)
- stereo headphone output

Warning !

It is recommended not to connect or disconnect a microphone to the ADB-100 during the time the red LED is lit up. You can safely connect a microphone only in None mode.

An additional ADB-100 tab appears automatically after connecting the device to power supply and communication cable.

A sound from system's MASTER OUT is always supported on the digital outputs: AB Digital 1 and AB Digital 2 and on the analogue outputs: AB Line 1 and AB Line 1.

When you set a headphone source with a drop down list, you set it jointly for AUDIO Panel and AUDIO BOX headphone outputs.

You can adjust the sound in the range of -40 to +10 dB, where the 0 level (AB Line In 1, AB Line In 2) corresponds to -10 dBV (-7.8 dBu or 0.316 V RMS) in the case of a consumer level, or 4dBu (1.78 dBV or =1.23 volts RMS) in the case of a professional level analog inputs/outputs on ADB -100 panel. It depends on audio level settings in Configuration Window: Audio Tab.

In the case of digital Audio input /output (AB Digital 1,2), 0 level corresponds to -20dBFs
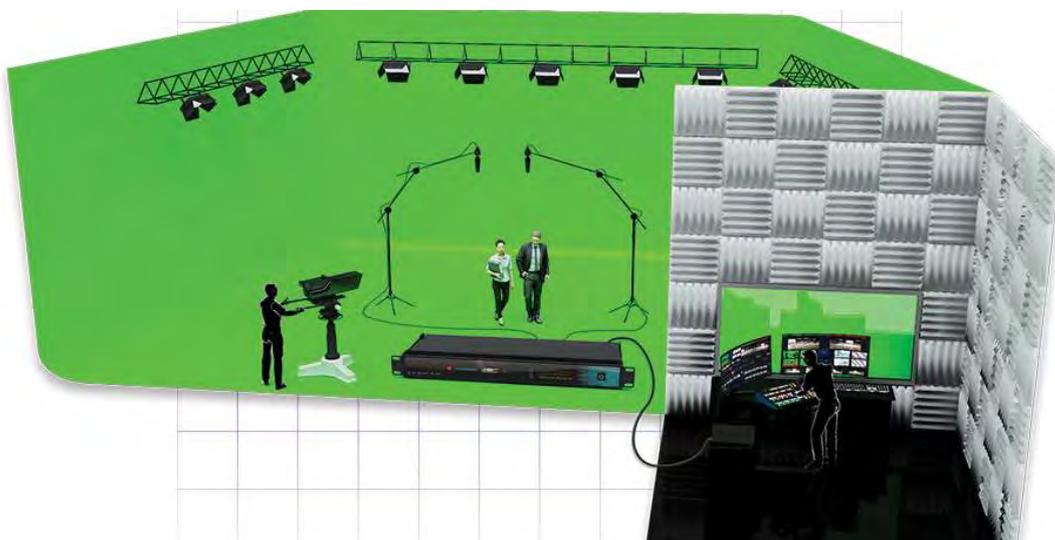
23
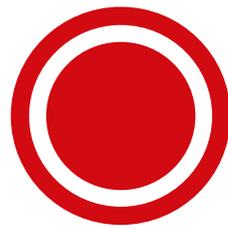
Chroma and luma keying

Keying is a special filter that in the Reckeen 3D Studio system can be used for camera inputs. The principal of its operation is to remove the areas of a specific color (e.g. green) from the image. The green color is removed after you turn the keying on and set its parameters. This way a figure of a presenter filmed on a green background can be placed against any virtual decoration.

The key can operate in either luminance (luma-keying) or chrominance (chroma-keying) mode. Setting the parameters of the key is done in a few simple steps, through which a special wizard can lead you. Thanks to this solution, selection of optimal key parameters is achievable even for the inexperienced users. And the results are impressive.

SELECTING THE KEYING MODE

From the 2.0 software version, the chroma key has been expanded with additional possibilities, the table below shows possible configurations of the key operation:
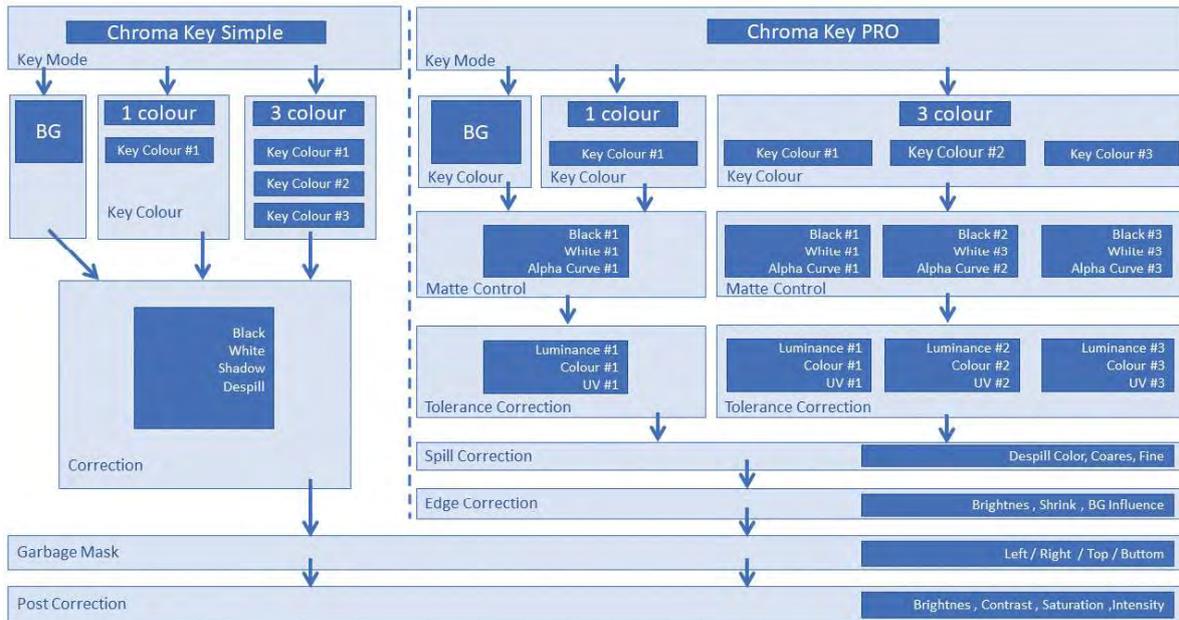
Click on the highlighted square button Mode to choose the keying mode (as shown in the picture below).

There are four options of keying available:

- Chroma Key Pro - precise set-up of chroma key
- Chroma Key Simple - quick set-up of chroma key,
- NOTE: Chroma Key Pro and Simple can work in one or three color modes or with automatic generation of the color and background mask
- Luma Key - set up of the key on the basis of luminance,
- Disable Key - work without the chroma/luma key.

COLOR MODE SELECTION

After selecting the operating mode of the key, the next step is to choose key operation mode:

CAPTURE BACKGROUND or PICK 1 COLOR or PICK 3 COLOURS:
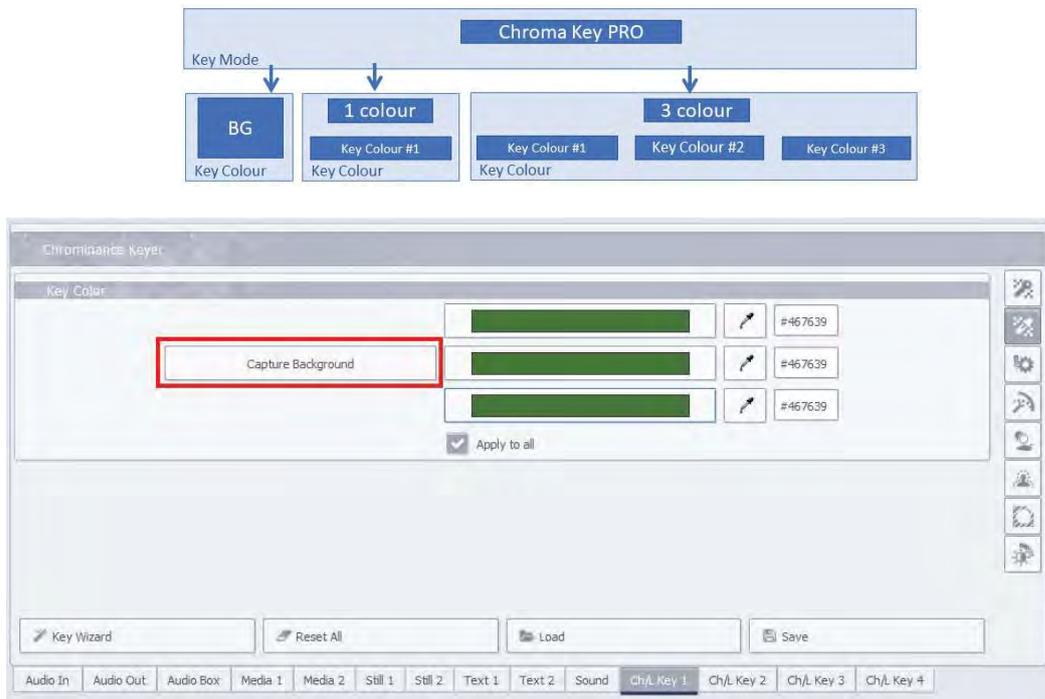
CAPTURE BACKGROUND - selecting this option automatically analyzes the image from the camera, determines the key color, and creates a background equalizing mask in order to obtain the best possible parameters of the chroma key.

NOTE: The analysis MUST be performed on an empty background (WITHOUT an on-screen talent or stage props in the green screen area). This mode is also ONLY suitable for TRACKLESS signals. It is also recommended to Reset ALL key parameters before start set up CAPTURE BACKGROUND. Only the green background should be in the field of view of the camera, so set the Garbage Mask before use this function.

To select this mode press the CAPTURE BACKGROUND buttom:

Before calling this function, set the camera and the lighting in the correct position. When it's done press "CAPTURE BACKGROUND". If you make any changes to the camera set-up or lighting, then the background will have to be captured once again.
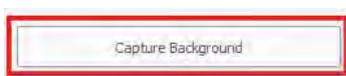
During the background analysis, the processing message appears for a short time.

Successively the key changes color to confirm that the mode is ready for operation. Consecutively, set the other key parameters described in the following sections.

The next pressing of the CAPTURE BACKGROUND buttom will erase the data buffers and disable this mode of operation.

NOTE: this parameter is set dynamically, which means that it is not saved in the session and must be set each time after loading the session.

CAPTURE BACKGROUND - how to setup:

1. Connect camera to the systems.
2. Go to chroma key 1 tab (right bottom bar)

3. Click option "Chroma key Pro" or Simple Key option.

4. Clean unnessesary things (like chairs/tables etc.) from green screen.

5. Go to section "Garbage Mask"

6. Using sliders "left/right" and "top/bottom" crop view of camera to green screen size.

7. Crop area around green screen

8. Go to section "Chromanice keyer" and click "Capture Background" to analyze image from the camera and obtain the best possible parameters of the chroma key.

9. Result after successful chroma key parameter set

10. To check result place back stage props

11. Remove garbage mask crop from scene if nessesary.
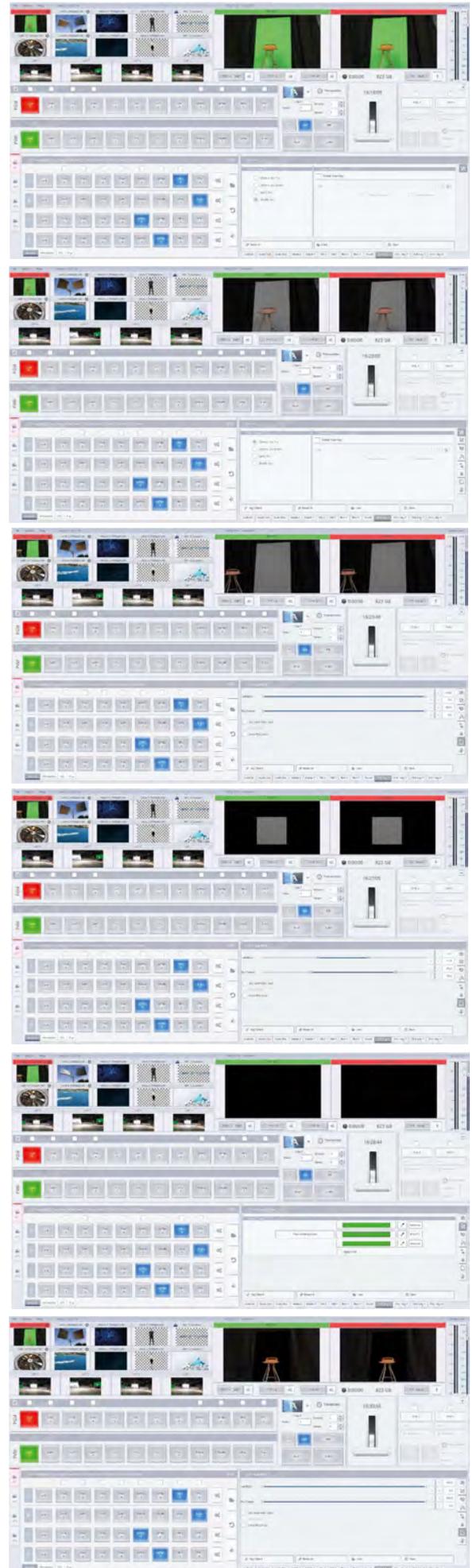
1 COLOR SELECTION - this mode is useful for both trackless and tracking, the mode allows you to set the key with one color selected from the background.
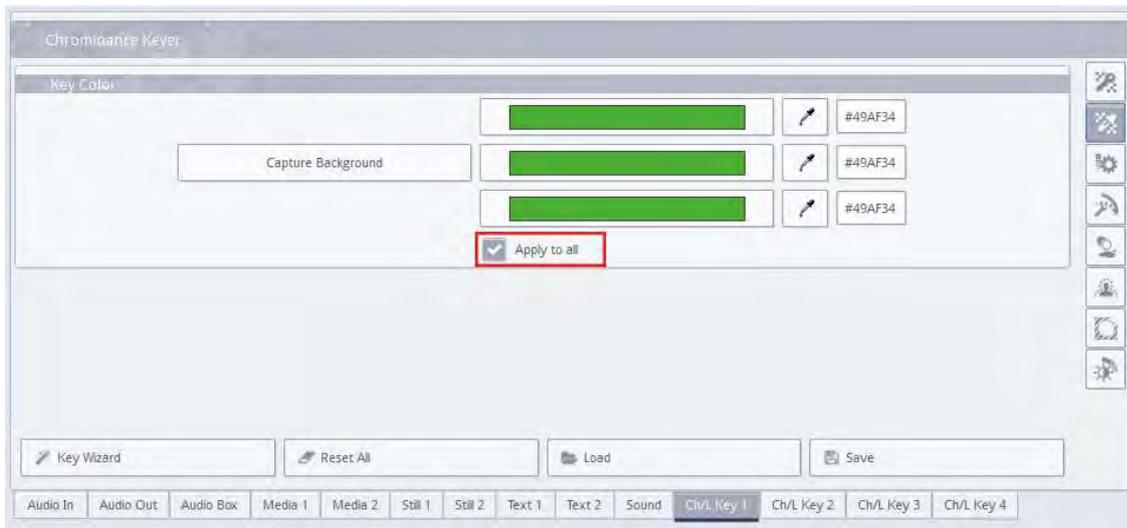
This mode is selected if the 'Apply to all' checkbox is selected.
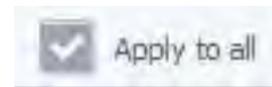
3 COLORS SELECTION - The mode allows you to pick three independent colors selected from the background. In the 3-point key mode, the influence of the parameters of each of the three colors on the individual pixels is calculated by linear interpolation.

This mode is selected if the checkbox 'Apply to all' is unchecked.

Choose a background color. Click on the button background color selection below the Mode button.

A window will appear, as shown below. Now you should choose background colors.

The option of selecting 3 keying colors increases keying efficiency and precision.

NOTE: If you want to use the selection for one color only, check **Apply to all**

MATTE CONTROL

Click Matte Control button to set the initial keying parameters. It is done with the Show Alpha Matte function which, when enabled, shows a mask's window in black and white. Parts of the mask's image for which the colors are closer to white will be opaque, and those closer to the dark - transparent.

MATTE CONTROL - Black/Withe - ONE COLOR MODE
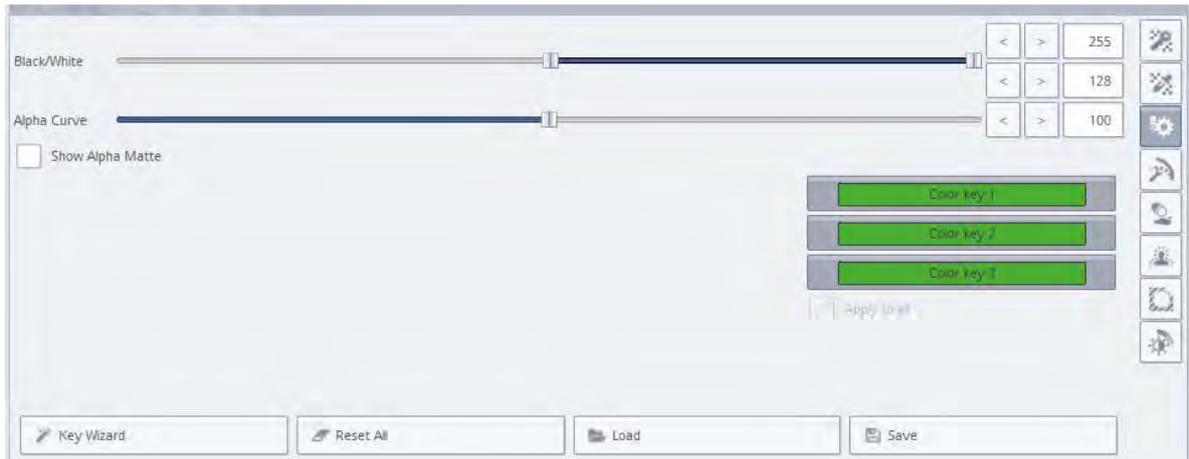
A view after clicking on the Show Alpha Matte icon.
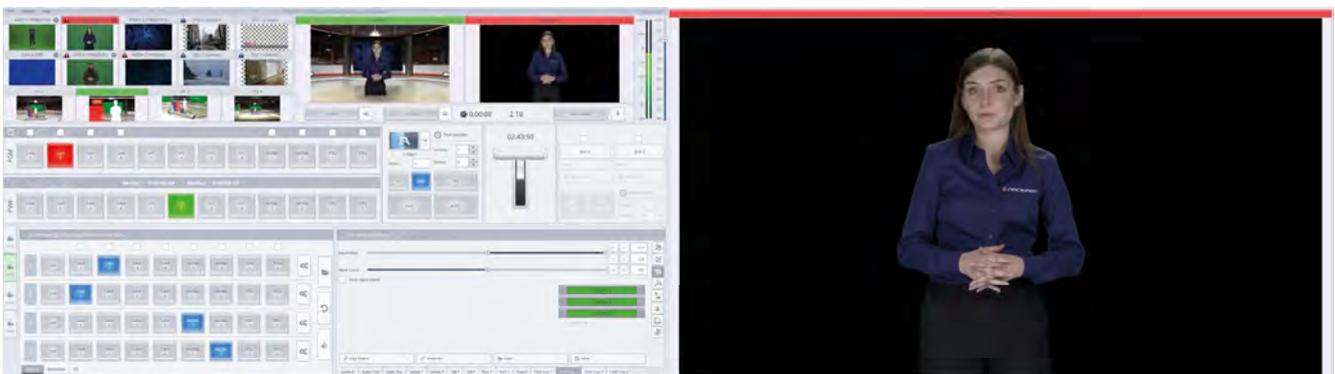
The expected result is getting the transparent part of the mask as consistent as possible. In order to achieve it, you have to move the markers on the Black/White slider up until the distribution of the RED COLOR mask in the background is as unifrom as possible. In order for the RED COLOR mask to be visible, when setting the Matte Control function, on the PGM bus select corresponding CAM 1-4 channel for which the key is being set for. For example, if the key is being set for CAM2, then we chose CAM 2 on the PGM bus, and by enabling Show Alpha Matte in the Ch / L Key2 tab we will be able to see RED coloured mask. The mask color in red will only be visible on the PGM output, not on the MultiViewer screen, nor 3D Editor / Producer window.

A view after the Black level correction:
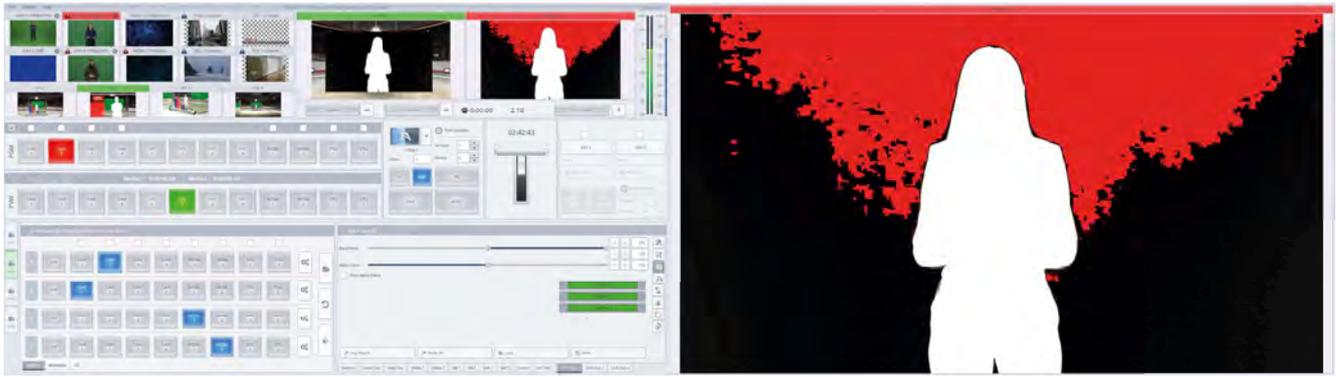
Moving the slider to the extreme positions will make the remaining objects lose their properties becoming opaque. Therefore, you have to carefully balance the extent to which you use this function, in order to reach a point where there are still some slight but noticeable differences in the distribution of the red and black background. The next step is to obtain a uniform distribution of red color on the objects that are to remain completely opaque. This non-uniformity may result from the fact that some of the object's colors may have color components close to the keyed color. In this case, you can make adjustments using the White slider's marker.

You can obtain a perfect distribution of a red color on the object by moving the slider towards the maximum value on the left.

NOTE: in many cases it is not necessary to set the ideal red color for talent throughout the area, because the differences may be completely invisible in production. That lets you set a better key for important elements of a talent, such as hair, edges or feet.

A view after the White level correction

In many cases, the option of White level setting is used together with the Black option, in order to obtain the most efficient settings possible of the black background - without losses in white objects and vice versa.

MATTE CONTROL - Alpha Curve

Between set Black and White sliders, what remains is an area with colours on the screen, and its' ratio to transparency is a linear function (a straight line).

The Alpha Curve function adjusts the slope of this straight line to add (or subtract) an additional range of colors to a range of non-transparent colors.

That way, the range of colors, that are similar to the background color on which the object is located, will not be cut out by the mask. Additionally, this action highlights the details of the object, i.e. hair tips or areas on the edges of the clothes.

MATTE CONTROL - Black/Withe & Alpha Curve and 3-COLOR MODE

If you have chosen the 3-color mode, you can also set independent values of Black/Withe & Alpha Curve for each of the colors.

Changing the settings of one of the three Black/Withe & Alpha Curve parameters is accomplished by pressing 1-3 colour buttons.

Selecting 'Apply to all' checkbox allows you to simultaneously change all Black/Withe & Alpha Curve parameters for all 3 color selections.

TOLERANCE CORRECTION

As was shown earlier, widening the scope with the White level function usually makes the plane, that formerly had a uniform black color, return to the light gray color scale.

In this case, to correct this gray, the two following functions from Tolerance Correction section are necessary.

Click on the button Tolerance Correction to open the tolerance settings window, as shown below:
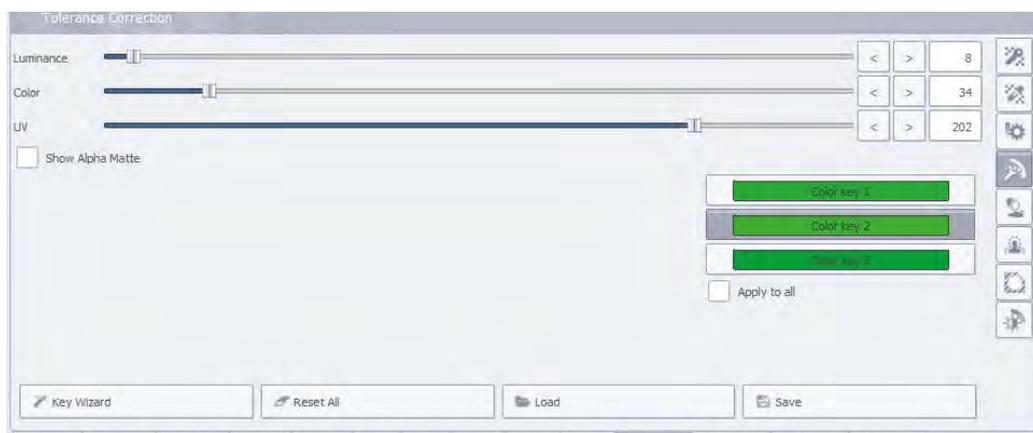
TOLERANCE CORRECTION - luminance

The first function - Luminance - improves the structure of the white mask's uniform color.

TOLERANCE CORRECTION - color

The second function - Color - means returning to a single structure of the black background.

TOLERANCE CORRECTION - uv

The third function is - UV - this function increases the tolerance for U and V color components, thanks to which we can strengthen less visible elements such as hair to make them more visible.

In particular, it improves visibility of an object, when there is a big difference in luminance between the object and the background. This feature is very useful in 3-color mode
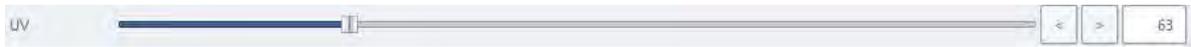
TOLERANCE CORRECTION - Luminance & Color & UV -THREE COLOR MODE

If you have chosen the 3-color mode, you can also set independent values of Luminance & Color & UV for each of the colours.

Changing the settings of one of the three Luminance & Color & UV parameters is accomplished by pressing one of the three color buttons.

Selecting 'Apply to all' checkbox allows you to simultaneously change all Luminance & Color & UV parameters for all 3 color selections.

In this case, semi-transparent objects, like glass or eyeglasses, become more distinct. Below you can see a view of an image 'before' correction and 'after' correction.

Color function also fulfills a different task. It allows you to eliminate unnatural contours when you disable Show Alpha Matte and return to the actual image. You can remove these contours by improving the limit value between the keyed color and the object.

Below you can see a view before and after the correction with Color function.

SPILL CORRECTION

Functions in the Spill Correction section eliminate reflection effect of the colour of the background being imposed on an object or a person standing on a green/ble screen. The picture below shows an impact of green color on the talent - view before the spill correction.

Click on the icon Spill Correction to open the spill correction window.

SPILL CORRECTION - despill color, despill coares

Despill Color and Despill Coarse functions are the functions used for preliminary elimination of unwanted color on the basis of RGB (red, green, blue) plane. Below, you can see a section of sliders for spill correction.

When you move the Despill Color slider to position 0 (to the left), the algorithm will automatically subtract the green color component, in the case when green is a keyed color (similarly blue when a blue background is used). Whereas moving it to a position 1000 (to the right) will cause adding color red with blue (when green is a keyed color) or red with green (in the case when a blue background was used) automatically by the algorithm.

You can control the value of the algorithm with Despill Coarse function. In the case of green background color, the Despill Coarse function entirely excludes a green component from the object in the RGB (red, green, blue) plane when it goes beyond a certain threshold, resulting in a shift of color to the purple (magenta) area. The picture below shows a view with a green component excluded.

SPILL CORRECTION - despill fine

The next function enables more accurate improvement of the correction described above.

When you use the Despill Fine function, the color of the keyed background is excluded, but this time on the basis of chrominance components. Below you can see the Despill Fine slider.

After using the Despill Coarse function, which is an initial correction, the next step is to operate on the precise values. In the case where the Despill Coarse function was set at a high level, any changes in Despill Fine function settings may be of little significance to the algorithm.

Picture below: impact of a background on an object - a view after the correction: Despill Fine.

EDGE CORRECTION

Edge Correction is an additional correction that improves keying quality.
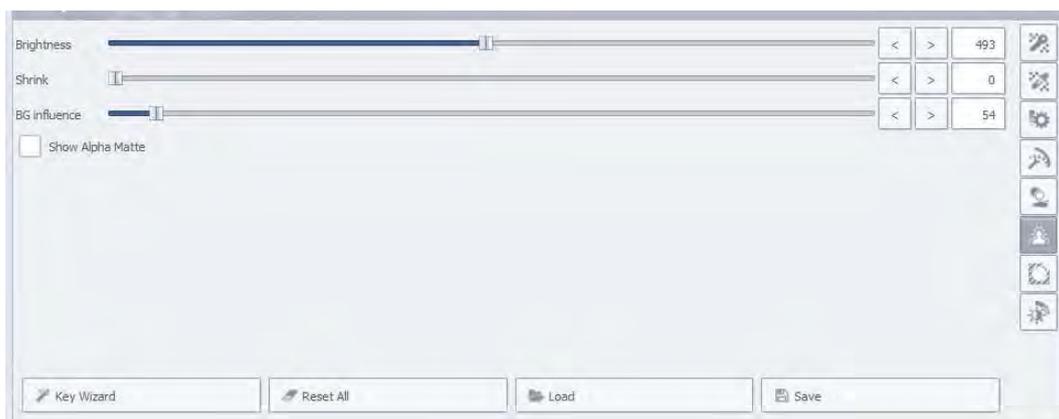
Click on the icon Edge Correction in order to open the window.

EDGE CORRECTION - brightness

The Brightness function is responsible for correction of the semi-transparent areas (like a correction of hair ends that should be darkened/brightened), affecting the image's natural effect.

EDGE CORRECTION - shrink

The Shrink function is responsible for reducing the object's contour by softening it.

This is especially important for certain types of cameras which produce a white line around the object's outline. It is possible to remove it with the Shrink function. You can also use it in the cases where keying is difficult in some places, due to the properties of the object's edges or lighting. Be careful not to trim the edges of the object too much, so that it doesn't look unnatural.

The picture below - a bar with functions: Brightness and Shrink

EDGE CORRECTION - BG Influence

Background influence supports the basic blending of the forground with the background. It is used when basic blending is not sufficiently natural. Use with caution, because in extreme cases it may cause a

talent to show through the background.
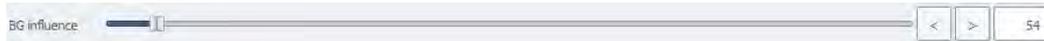
SETTING THE MASK'S AREA – GARBAGE MASK

Since version 3.1 of the software, we have 2 options for setting the mask. For trackless and object tracking that defines the shape of the mask in your studio.

Below we write both mask setting modes:

TRACKLESS - garbage mask

In Trackless mode, this is a function used to cut off (reduce) the area of the mask (in all possible directions: left, right, up, down).

The picture below - a window with sliders: Left/Right and Top/Bottom.
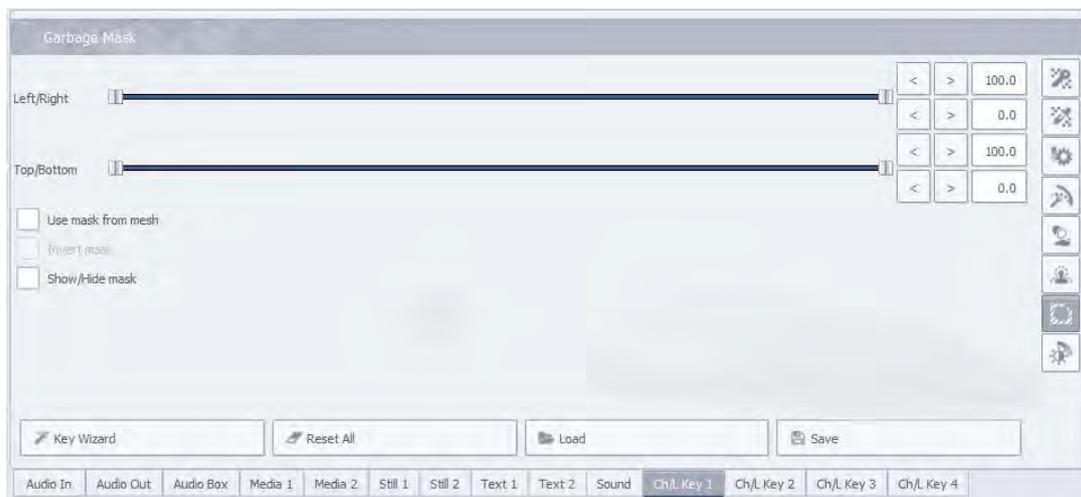
This function is used in the case where the view of the keyed background is not large enough to fill out the entire view from the camera image.

A view of the camera image area:

You can set the object in the keyed background's area by cutting off the remaining elements with Left/Right and Top/Bottom sliders.

The picture below - a view after the correction of the mask's area with the keying algorithm off.

Once chroma key is enabled, you get the following effect:

Attention! Please note that, in this case, the object can move only within the area of the cut off mask - otherwise the object will disappear.

Additionally, if you use the mask's area sliders, you can verify whether your previous settings were correct and whether they had any impact on the final appearance of the virtual background. By moving e.g. Left slider to its maximum, you should not encounter any noticeable noise, change in color or grayness of the background.

SETTING THE MASK'S AREA – OBJECTS GARBAGE MASK

TRACKING - garbage object mask

This mode is only available in training mode, you must have at least one PTZ camera connected to use it.In Tracking mode, this is a function used to cut off (reduce) the area of the mask (in 3D space).

In this mode, we define the shape and size of the garbage mask by creating a dedicated 3D object.

The 3D object that will act as an **3D Garbage Object Mask** should be designed in the real dimensions of your studio or in any shape depending on your project, i.e. the purpose of production.
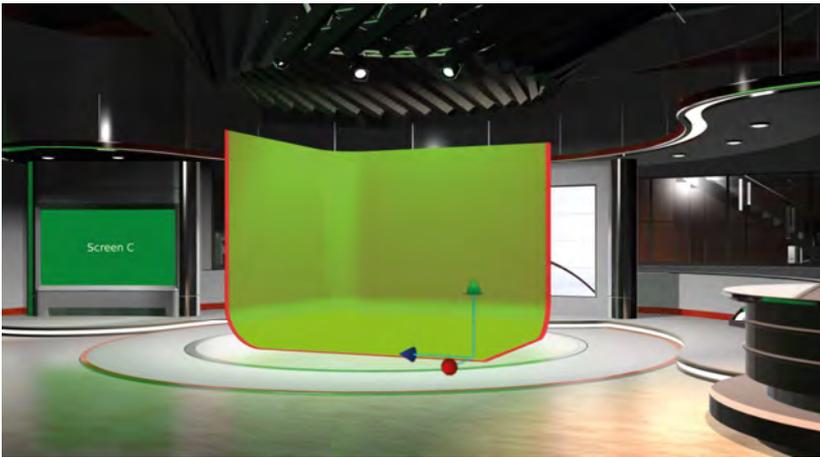
It can be created in any 3D program such as "Blender" or "3D Max", then we import it to our studio as a 3D object that will be added to your own object library.

You can also use garbage masks to create your 3D object, any 3D objects available in your studio, by modifying and adjusting or combining elements to the dimensions of your studio.

There may be multiple mask objects in your scene, they all form one object collection.
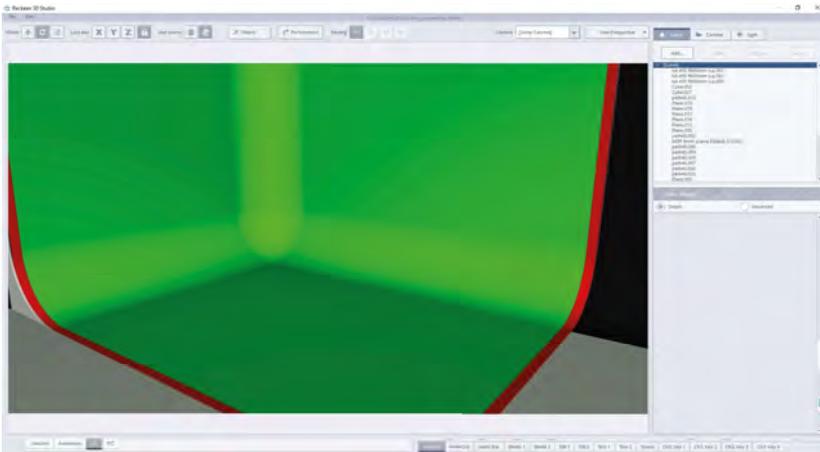
Place the mask object exactly where your physical studio is located if it fits well with your studio - you can use the entire physical space of your studio. Your studio can act as an element of virtual AR production.

TRACKING - marking objects garbage mask

Please open 3D editor , select scene tab. Below the object list of your scene is the part labeled Mask. Indicate the object on the list of objects, then mark the feature in the mask tab with the "Use as Garbage mask" option.

The selected any object becomes the Garbage Mask. The selection also makes such an object invisible in the scene during rendering. To see objects marked with the mask feature (invisible) you can use the Show/Hiden function in the Mask tab.

On the list of objects, all objects marked with the mask feature change the color of the object name to green.

TRACKING - marking objects garbage mask - chroma key

Giving properties to objects "Use as Garbage mask" in the list of objects in your scene does not cause them to be automatically assigned to the chromatic key. In order for a chromatic key to use them as its mask, you need to open the Ch/L Key1-Ch/L Key4 tab of the chromatic key by selecting the Garbage Mask subtab in that key. picture below:

Use the "Use mask from mesh" option, all active objects, i.e. marked in the 3D Studio Editor with the mask feature, will become a mask for your key.

There is also an "Invert mask" option which allows you to negate the mask. This option is useful for AR realizations of your productions.
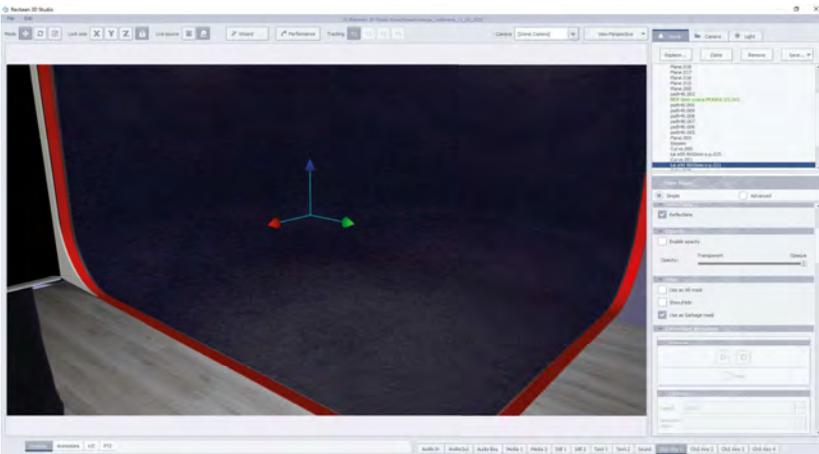
As in the 3D scene editor, there is a "Show/Hiden" option that allows you to preview invisible mask objects. This makes it possible to check the location of such objects.
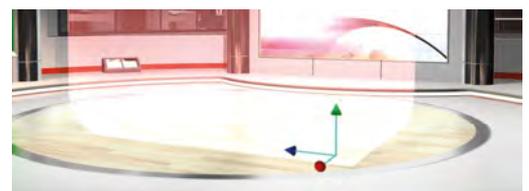
Note: You must remember to turn off the "Show/Hiden" function after finishing the key setting.

Note: you must perform this key mask selection operation independently for each channel you use in production from Ch /L Key1 to Ch/L Key 4.

Use the "Use mask from mesh" option in the chromatic key for active objects, i.e. marked in the 3D editor with a mask feature, they will become a mask for your key.

POST CORRECTION - INPUT SIGNAL AND CHROMA KEY

To enable this function click on the Post Correction icon. This function allows you to adjust the object (or a talent) to the lighting conditions of the virtual background. The post-correction, carried out with the sliders, will only concern the object (or the talent) and so it will have no effect on the virtual background nor the keying settings.

Icon: Enabled - check this box to enable or disable the Post Correction.

- Slider: Brightness - this feature allows you to bring additional brightness of the color into the talent's image.

- Slider: Contrast - this feature allows you to increase contrast between colors.

- Slider: Saturation - this feature allows you to increase color saturation.

- Color box: Ambient Color - this feature enables bringing the scene (ambient) color component into the talent's image.

- Slider: Intensity - this feature allows you to set the intensity of the ambient color.

The Post Correction functions are used to adjust the object (a talent - a figure of a presenter) to the background. This is possible by incorporating an additional component of a color already dominant in the virtual image/set. For example, when a background of a sunny beach is put behind the discussed above object (talent) in the studio, you should add a yellow color (dominant color of sand and sun that affect the object) as Ambient Color. When you click on the Ambient Color icon, a color wheel window, where you select the exact color and hue, will open.
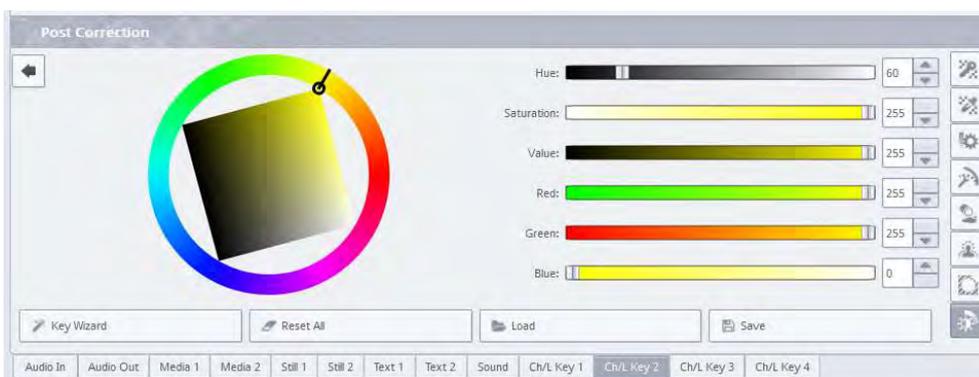
The color wheel shown in the picture above is based on RGB (Red, Green, Blue) model extended by Hue, Saturation, and Value.

The color can be set with the sliders available on the right side of the screen:

Hue - the hue parameter corresponding to the colors on the edge of the color wheel - from 0 (red), through 120 (green) and 240 (blue) to 360 (red), - by changing the value of the slider, you change the position of the dash marker on the wheel.

Saturation - the value of saturation parameter lays in a range of 0 (white) to 255 (100% full saturation), by moving the slider, you change the position of the black circle along one of the sides of the square.

Value - the brightness parameter that lays in the in the range of 0 (black) to 255 (100% bright color of a given hue and saturation), by moving the slider, you change the position of the circle along one of the sides of the square.

You can also set all of these values with a cursor. You just need to hook the cursor on the dash marker. Changing the marker's position on the wheel allows you to set the color by setting its Hue parameter. When you hook the cursor on the black circle, you can move this circle inside the square. This allows you to change all the remaining parameters. The current color will be visible in the middle of the black circle.

You can adjust the object to the conditions in the scene by setting the options of correction functions with the sliders. The figure of a talent will then gain a natural appearance.

After setting the key you can save all of your settings to a file on your hard drive by clicking on the icon: Save in the lower right corner of the window.

The Reckeen 3D Studio system has its own key files - *.recKey . If the lighting conditions, hardware, etc. in the studio remain unchanged, then going back to the production screen, you can load your key's settings from a file by clicking on the icon: Load.

Note: Please see chapter Key: Complex Control

Double post Correction - Input signal

From the software version V2.0 we enable independent correction of parameters before the chroma key, i.e. on the inputs themselves. Changes of these parameters on the input signal affect the input signal, and all parameters of the key setting and its behavior.
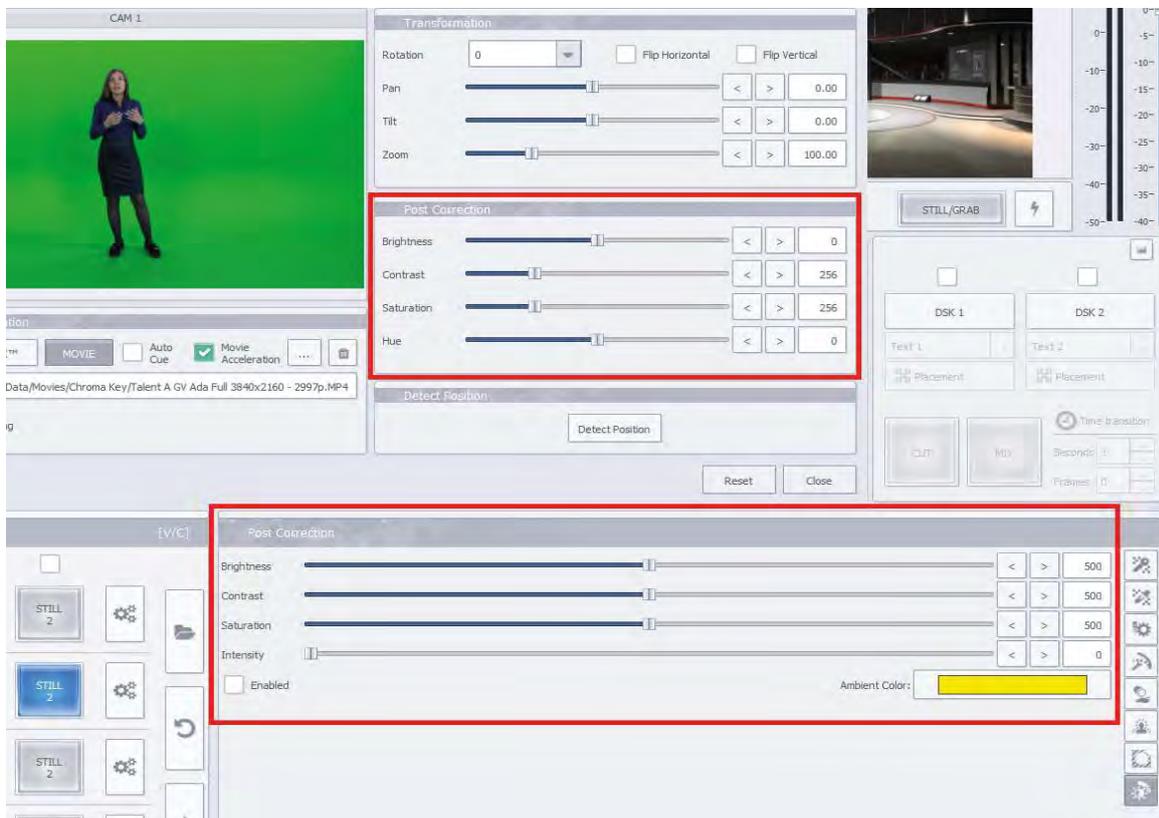
Therefore, at INPUT, these regulations should be made in exceptional circumstances.

CHROMA KEY WIZARD

You can access this function by clicking the Key Wizard icon at the bottom left side of the window.

The Key Wizard allows you to set the key with taking advantage of the instructions in the key wizard's
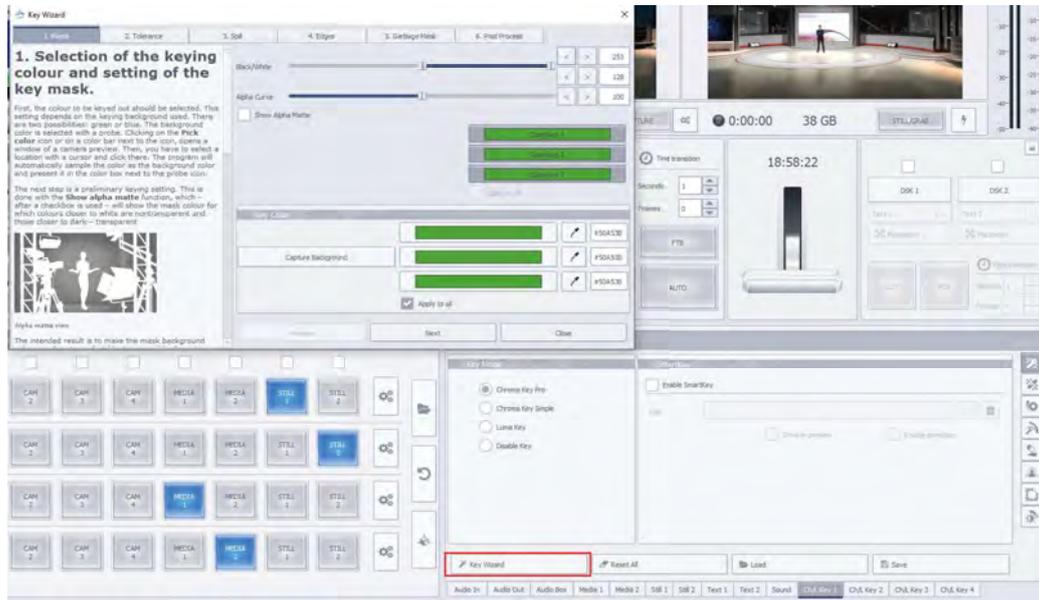
window. The Key Wizard will guide you through all the 6 steps of setting the key, suggesting which actions and when to perform.

SIMPLE CHROMA KEY MODE

You can use a simplified version of the key settings by checking this mode in the window.

When you click on the button Chrom Keyer Simple below the highlighted Mode button , a window with a
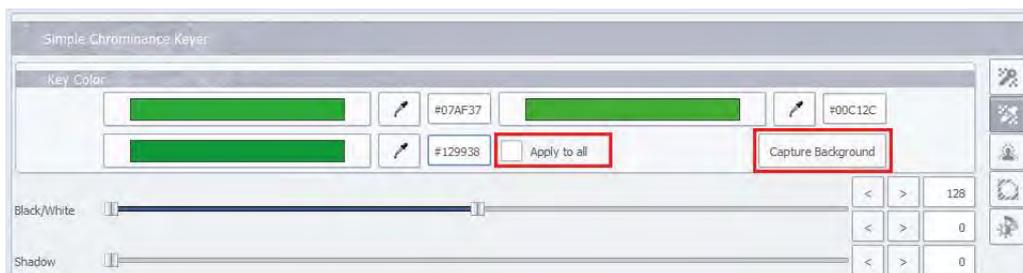
simplified key settings opens up. In this mode, you can also choose one of three ways to choose a keying color CAPTURE BACKGROUND, or ONE COLOR selection, or 3 COLORS selection:

the mode selection CAPTURE BACKGROUND or 1-COLOR or 3-COLORS rules are the same as described in the chapter above.

In 1 and 3-color mode, background color is selected with a picker. Clicking on the Pick color icon or on a color bar next to the icon, opens a window of a camera preview. Then, you have to select a location with a cursor and click there. The program will automatically sample the color as the background color and present it in the color box next to the picker icon.

Since the software version V1.9 we have introduced the option of selecting 3 keying colors, thanks to which the keying efficiency is increased. Choose three different areas from the lightest to intermediate to the darkest color.

NOTE: If you want to use the selection for one color only, check **Apply to all**
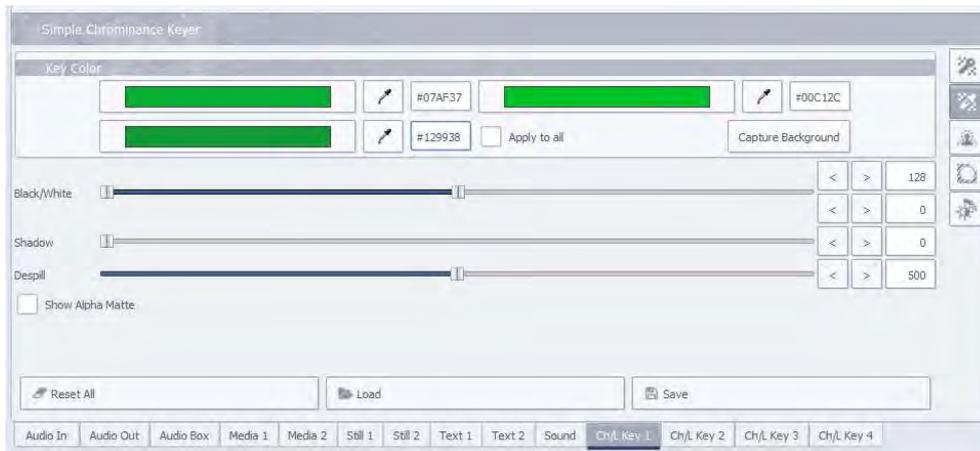
The remaining number of sliders is limited to three: Black/White slider, Shadow slider, and Despill slider.

The Shadow slider is available only in the simple version of the key. There is a possibility of creating a shadow of a presenter, especially visible around the feet of the character, on the basis of incident light in the Green/Blue Screen studio. First you have to set the lighting so that , to get the shadow of the presenter on the green screen in the studio (on the floor in the studio). Then you can place this shadow on the floor in the virtual studio with Shadow slider. You can boost this shadow with the Shadow function.

Just as in the precise key mode, also in the simple mode you can turn the mask on and off by checking the Show Alpha Matte option.

The only thing left to do is to set the talent's image post correction, just as with the precise key described earlier. All the other options are already automatically selected by the Reckeen 3D Studio system.

Also when you apply a simple key, you can save your settings to a *.recKey file using the Save function. Save icon is at the bottom right of the screen (as shown above).

LUMA KEY

The previously discussed key operating modes were based on a chroma keying. In most cases they will be sufficient for the user. But the Reckeen 3D Studio system also allows keying based on luminance. The picture below.
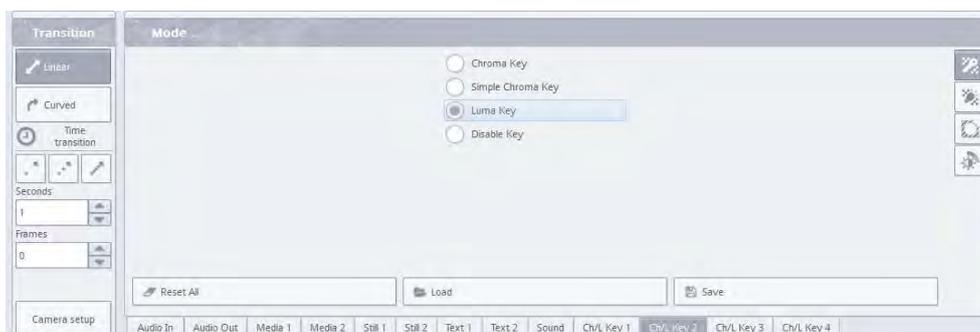
When you select this mode and click on the first icon, you will see the following functions in the window (picture below):

Box: Luma Color - clicking on the box allows you to select the keyed background color in the scope between white and black,

Icon: Show Alpha Matte - a feature that allows you to enable or disable a view of a mask, where the represented image is shown in a gray scale, where:

- black color is a completely transparent area,

- white color is a completely opaque area.

Slider: Cutoff - this is a function that allows widening the range of transparent colors by luminance similar to the luminance of the reference color (white or black).

Slider: Softness - a function that, taking the luminance into account, enables widening the transition scope between the range of colors completely transparent and those fully opaque.

As before, you can save your settings to a *.recKey file to load them again in the future.

Also as before you have the functions Garbage Mask available.

In the luminance key mode, you can go to the tab: Post Correction and, just as before, introduce the changes in the view of the object (talent). See the picture below.
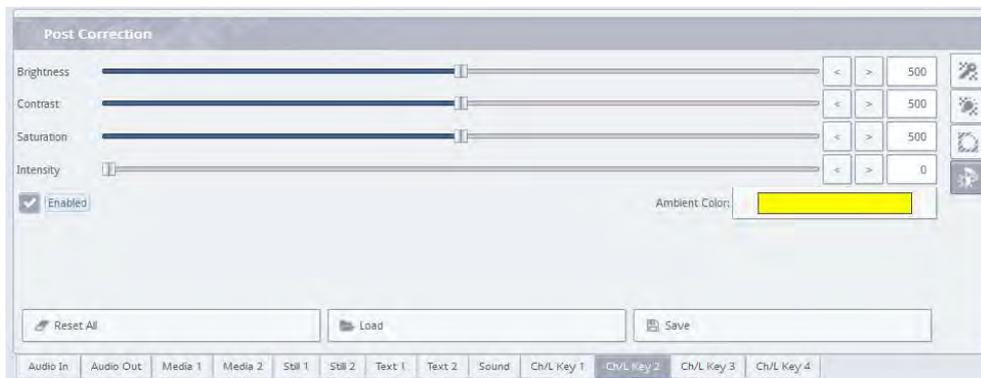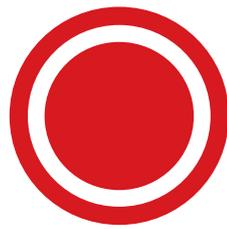
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SmartKey Feature & PIP

We are going to describe SmartKey feature in 2D, as well as 3D Productions.

SMARTKEY FEATURE & PIP IN LITE

Right now, there are no CAM input signals assigned but we can also use MOVIE files. Let's click on a gear symbol to open input configuration window. We can choose between a physical camera signal, NDI signal or a media file. We can use a video file from Reckeen's local disk.

On the right-hand side we can see image correction settings. In a similar way we are going to choose signals for other inputs. For the last input, we are choosing NDI signal. Picture below.
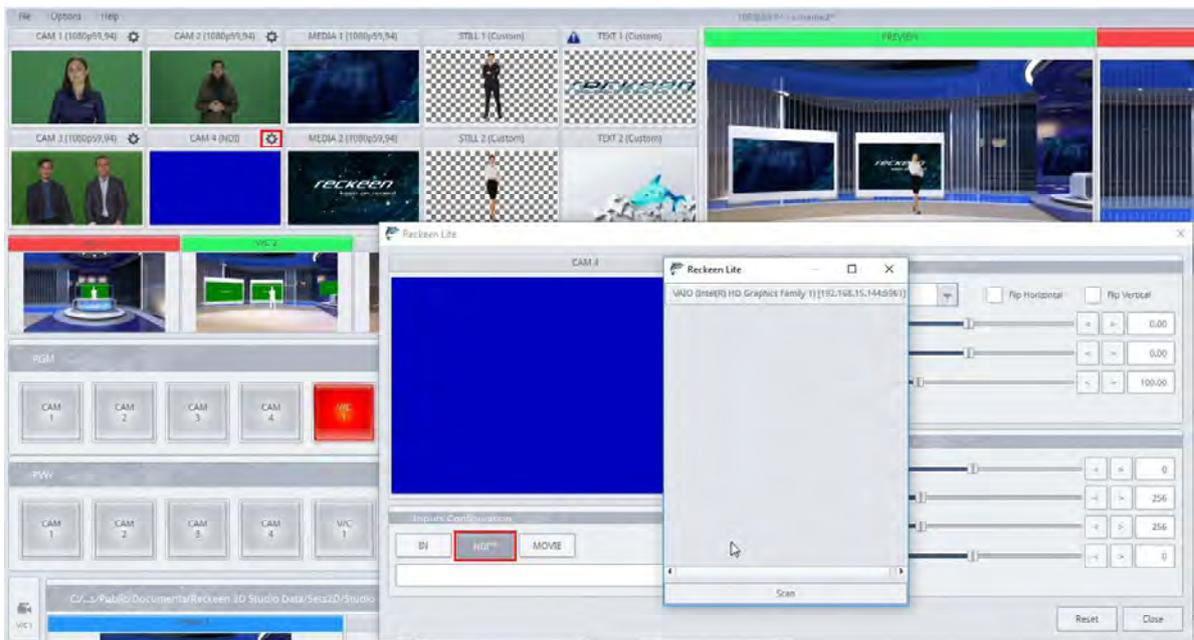
It will display a slideshow presentation with green background from a laptop via NDI. Picture below.

The Reckeen system has incorporated triggers to navigate between slideshows.

Such signals have to go through chroma keying, erasing green background color. When we use chroma key, the background is black, but in just a minute, we will be able to change that. Chroma Key on CAM 1. Picture below.

All the other signals also have to go through chroma keying process. Chroma Key on CAM 2. Picture below.

Chroma Key on CAM 3. Picture below.

Lastly, we need to remove green background from the slideshow presentation. Chroma Key on CAM 4. Picture below.

SmartKey sources can be used as content in a virtual studio, for example on virtual monitors or as PIP (picture in picture). In 2D Production, for every V/C we can upload a different project/scenography file. For V/C we are going to load a PIP projects. Press the INPUT button. Examples of such projects can be found on a local disk in a folder "PIP". Picture below.
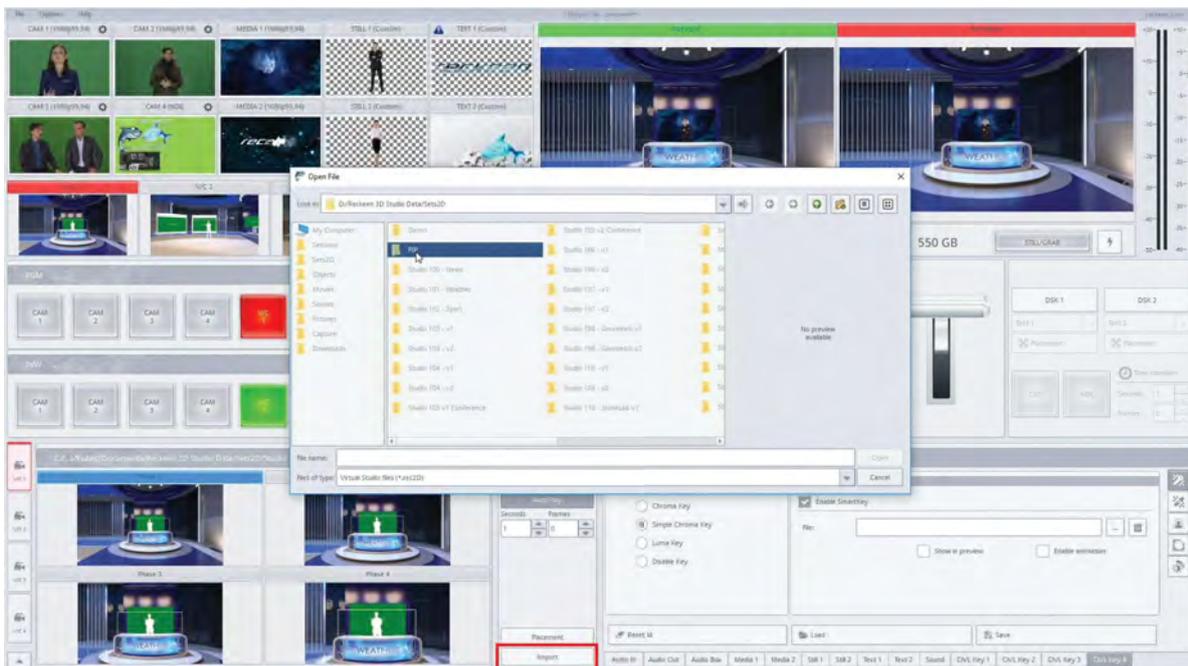
For V/C 1, we'll choose a project with 1 monitor. Picture below.
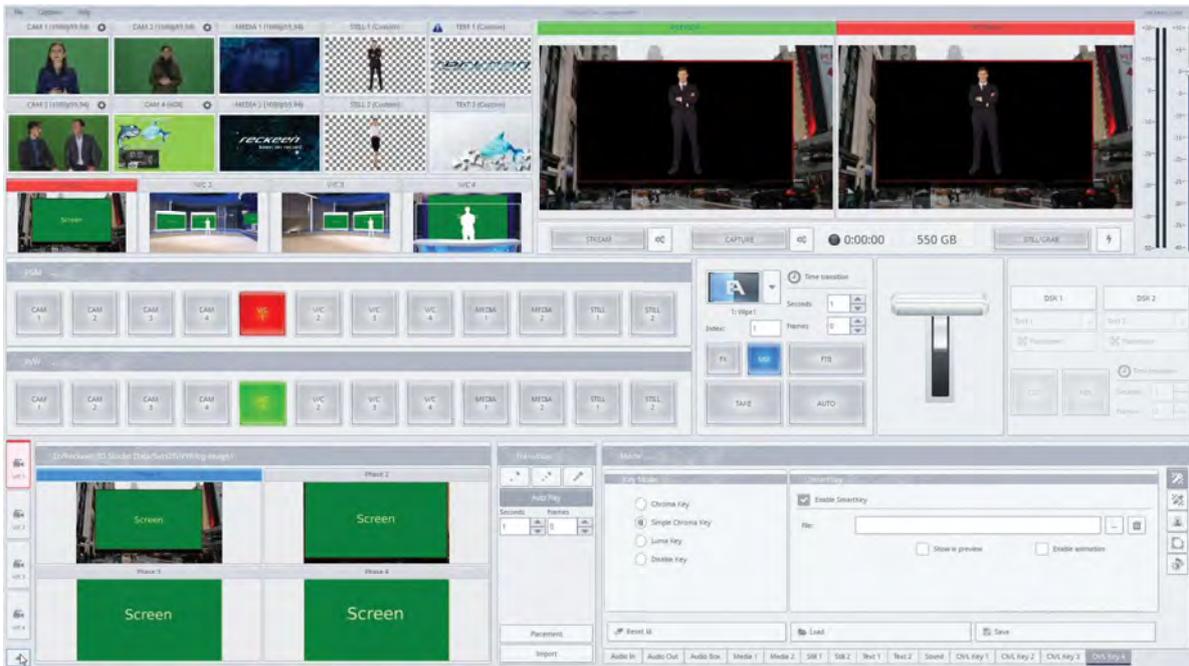
On a small mixer, in the bus A, we choose CAM1 as a monitor's source. For busses B, C and D we choose "OFF" option. Picture below.
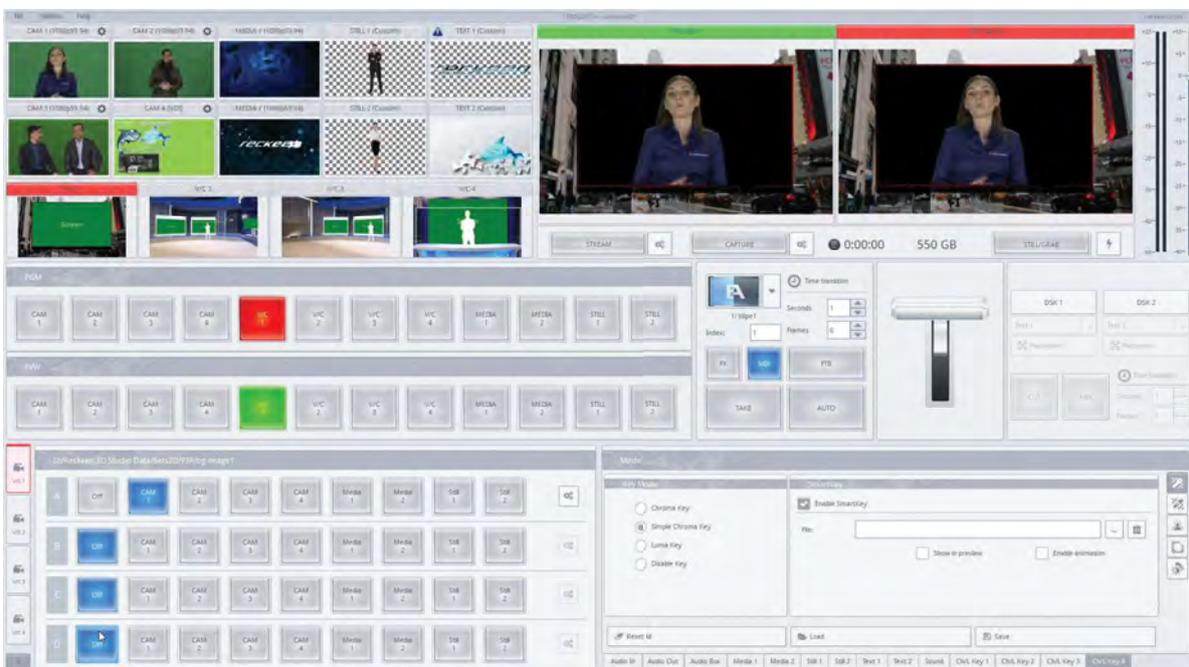
For V/C 2 we'll choose another project, this time with 2 monitors. Busses A and B will represent monitors' sources. We'll choose CAM1, and CAM2. Other busses remain OFF. Picture below.
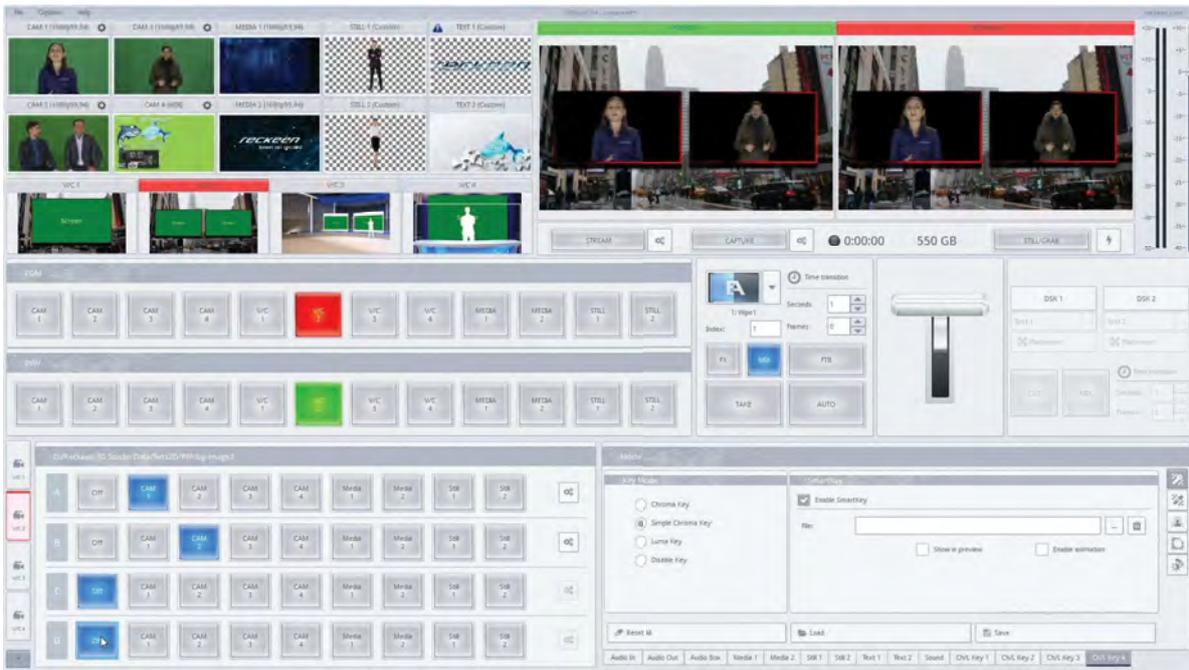
Similarly, we can set up V/C 3, for which we choose a project with 3 monitors.

Such projects can be created from scratch and on your own using 2D Editor – VSM. Just choose your background image or video, and on top add a monitor assigned to ABCD mixer index. In this case we've chosen sources from CAM 1, 2 and 3. Picture below.
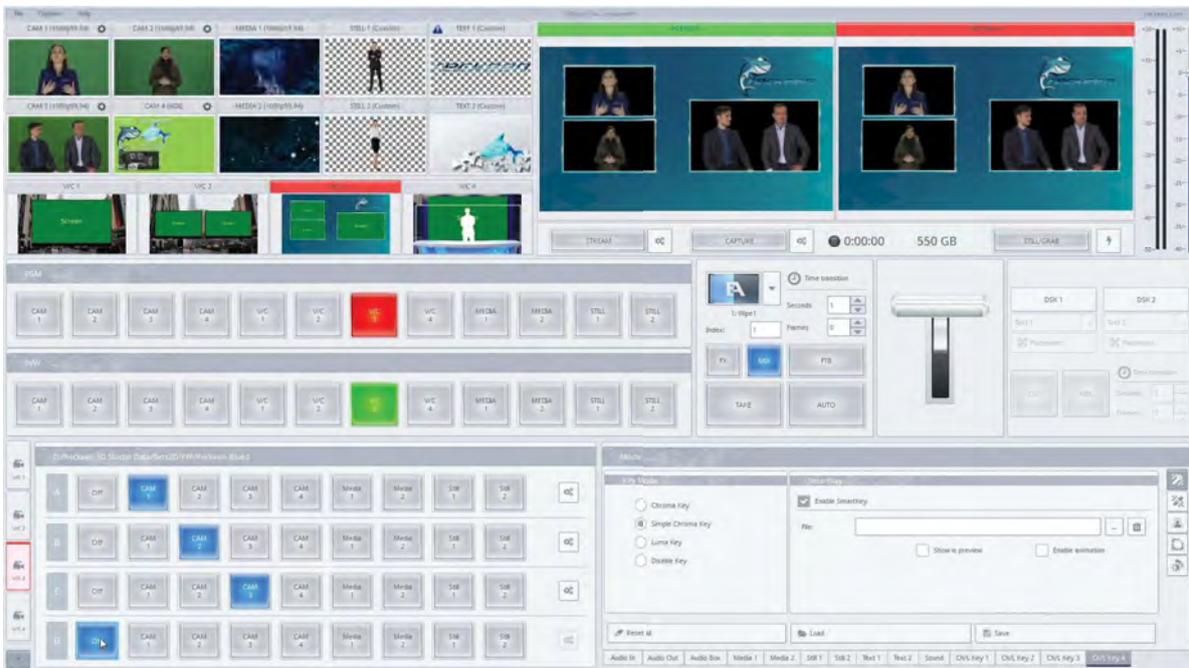
 For V/C 4, we'll upload a project or a virtual studio with a monitor. It's called WEATHER - C close up. As you can now see, for every V/C we can assign a different project with input sources. For V/C 4, we choose source C on ABCD mixer. And we'll assign to it CAM4. Picture below.
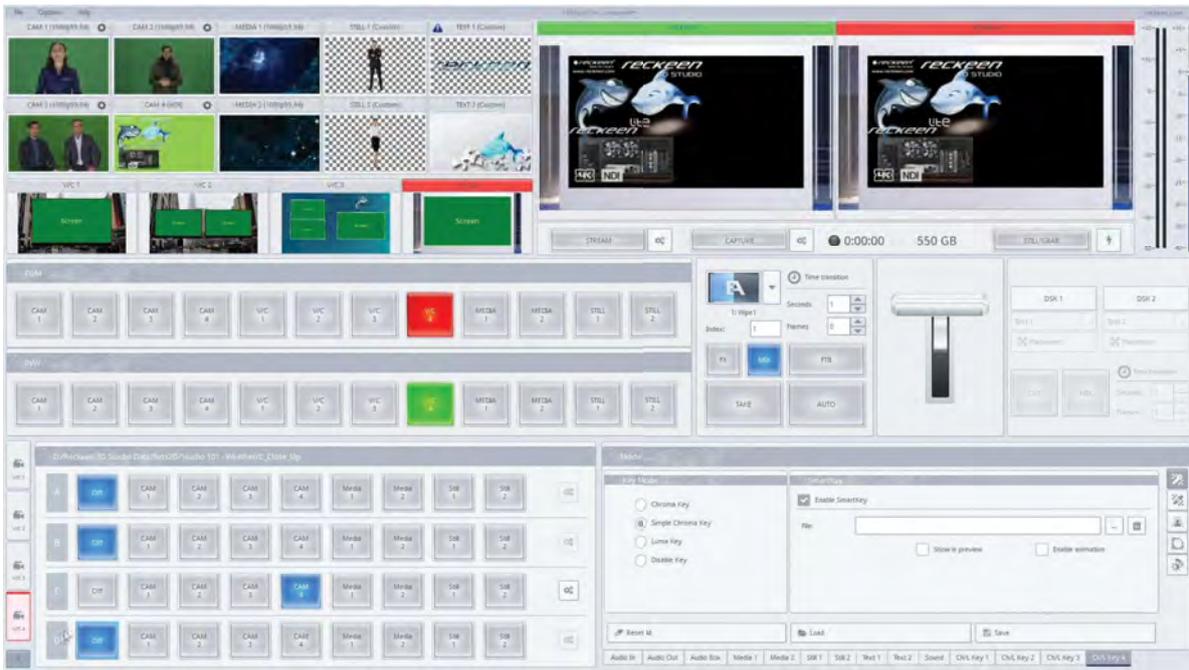
In 2D Production, virtual cameras' movements are performed using 4 pre-programmed phases. Picture below.
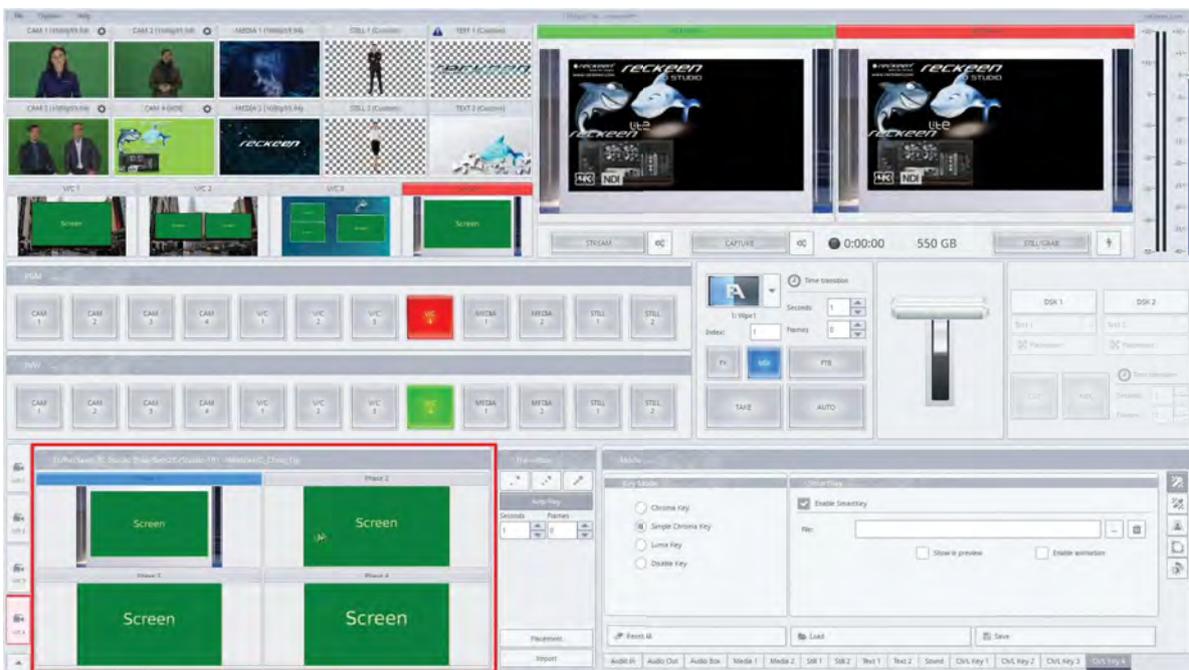
Their configuration can be changed in the camera editor, after clicking on PLACEMENT button. Using computer mouse, we can set up a position and zoom of a camera. Picture below.
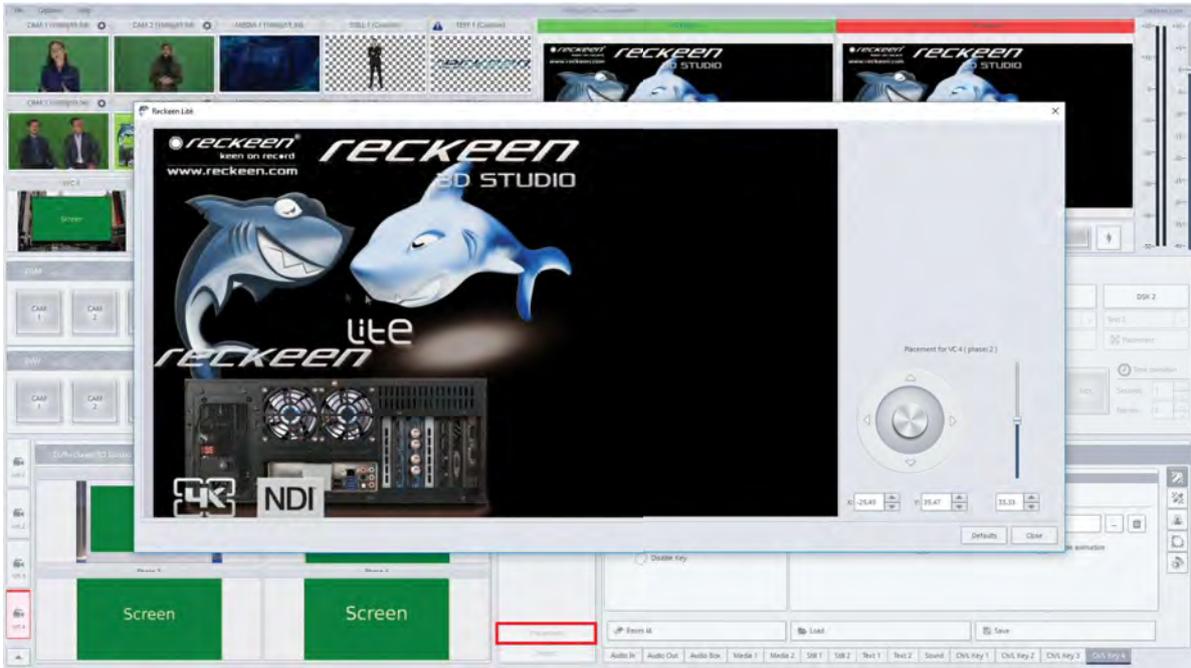
After clicking on one of the phases, you can see that a camera position is changing. We can set time of such transition.
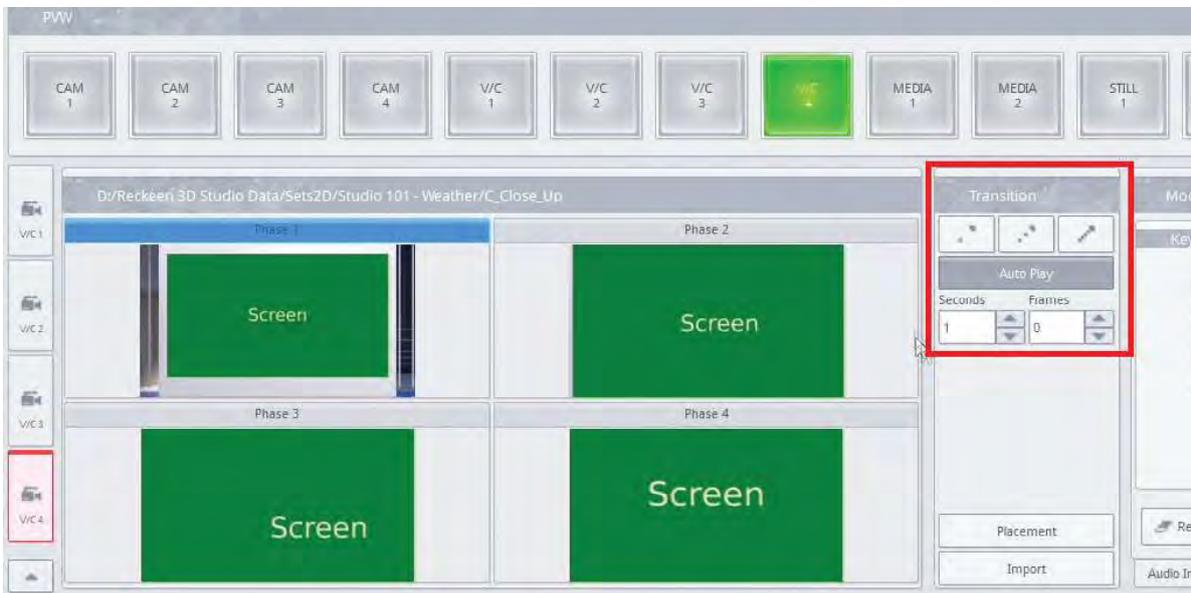
We can do that for each V/C. Right now, the backgrounds on the keyed signals from our inputs are black.

SmartKey function allows you to apply another layer such as a video file or graphics on our monitors.

The function applies background directly to our input signals, allowing us to create up to 4 keyed sources before we place them in a virtual studio. To do that, we need to press function "Enable SmartKey" in a "Ch/Key1" tab. Below we can click a button open media tray window. Picture below.
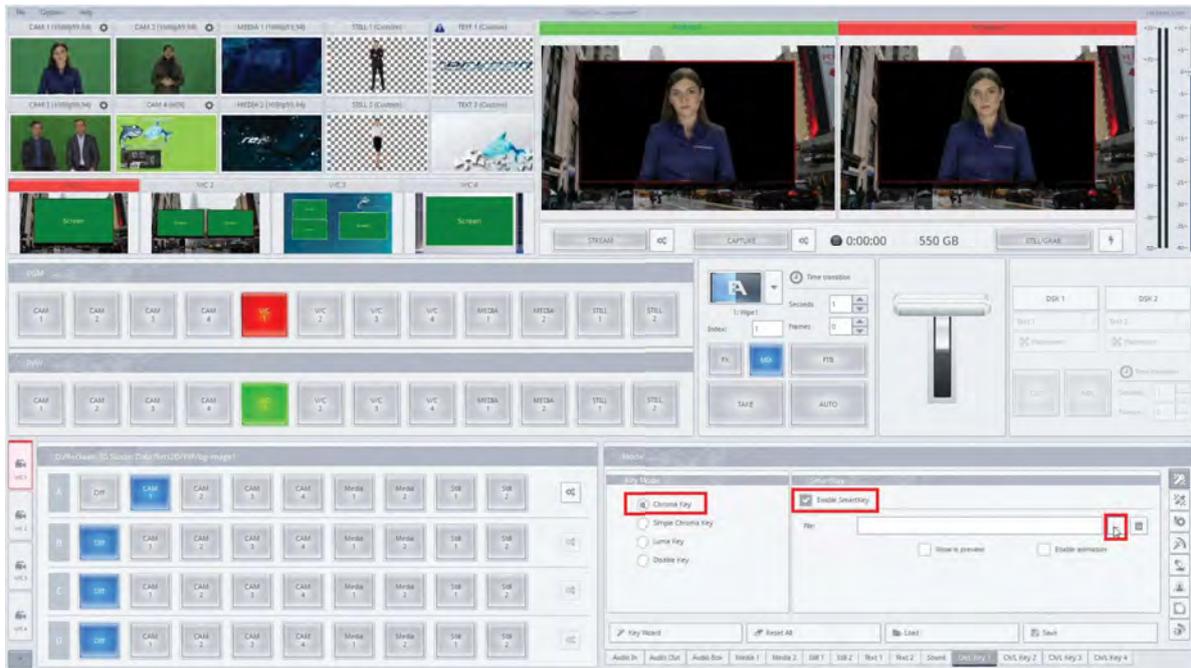
By double clicking on an empty space, a window pops out, from which we can choose a file we wish to use as a background. Free-to-use examples of video files can be found on a local disk in a folder "Movies". After adding a file to the media tray, click on the file once and the press "Select", or simply double click on a file. The length of a video file can be changed using the markers. Picture below.

Closing this window will automatically result playing the chosen file in a loop.
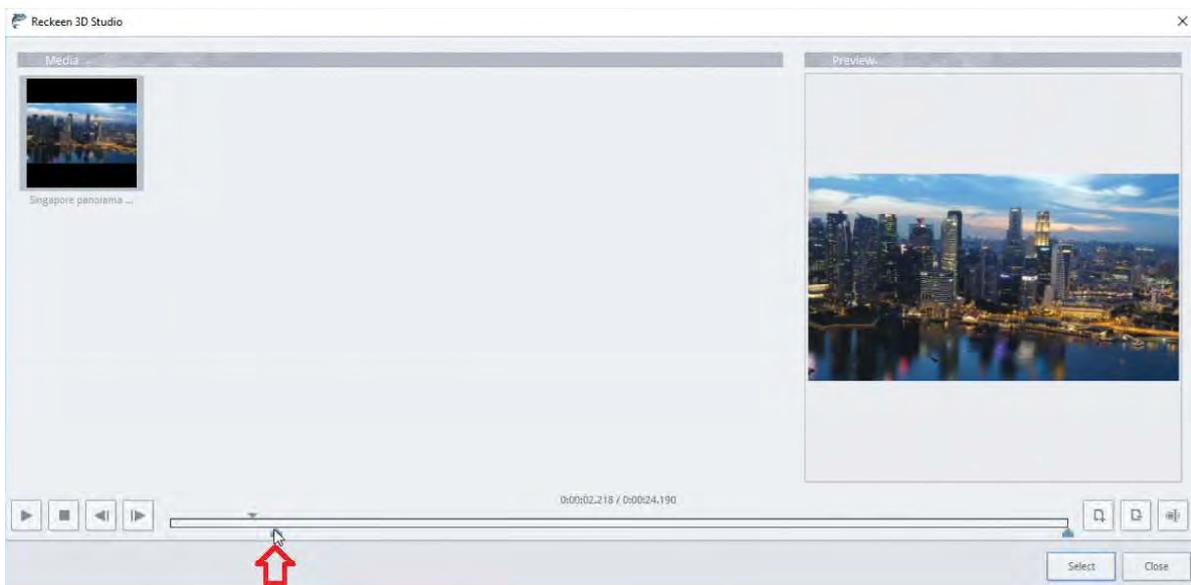
When choosing option "Show in preview", input's preview window will show the original camera source, together with chosen background file. Pictures below.
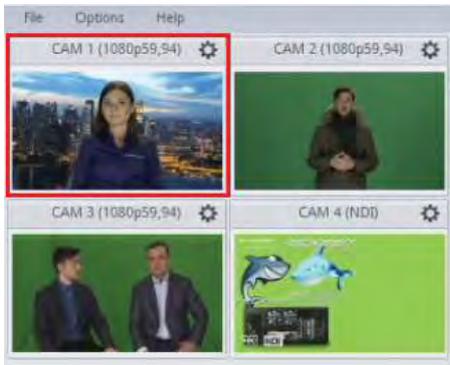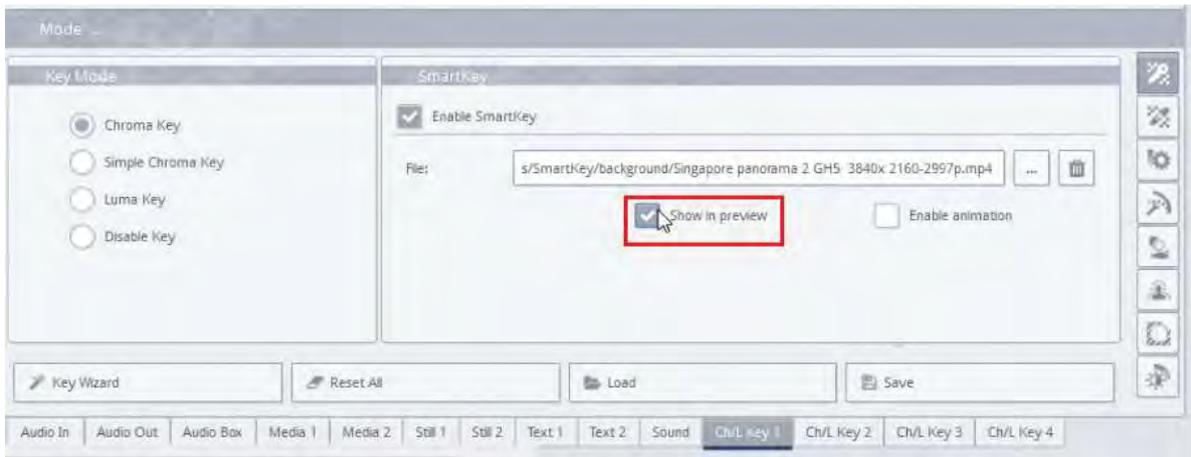
Extra fact: capture card in Reckeen 3DSPro has 4 additional SDI outputs dedicated for SmartKey.

Getting back to the subject. As mentioned before, we can also use graphics as a SmartKey background: jpeg, bmp, and png, files.

To create a more dynamic image, we can use animation function, by clicking "Enable animation". Picture below.
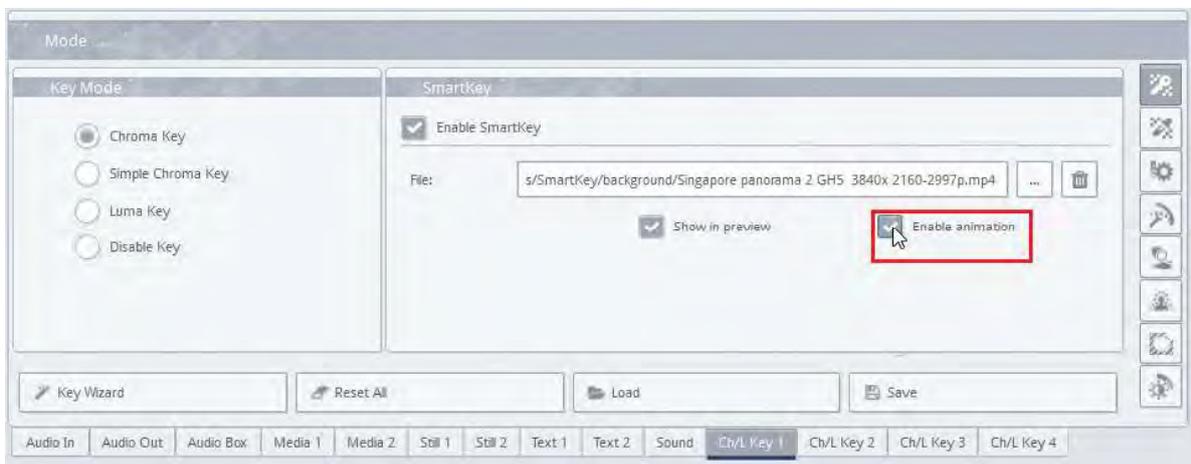
When this is on, the background image will slightly zoom in and will start moving from its one edge to another. This option can be turned on and off in any moment. Now we will add, in the same way, a background video for a source in a second monitor at V/C 2. We're enabling SmartKey in the second chroma key tab. When opening media tray, we will notice that it is common for all SmartKey inputs. We can choose a previously chosen file or a new one. Picture below.

In this case We'll also choose option "Show in preview".

NOTICE: If using Reckeen 3DSPro, this stream would also be transmitted as an extra SDI output.

SmartKey function is available for all kinds of input signals: NDI connection, physical input, and files.

For every SmartKey input we can set up different parameters of playback in media tray, even if we choose the same file for 2 different inputs. After closing that window, playback will automatically start from the beginning or from a place we set a marker indicator on that video.

This kind of configuration of four V/C allow creating a full PIP production containing presenters and videos, or graphics. Various transitions between Program and Preview are available, such as Take or Smooth. Picture below.
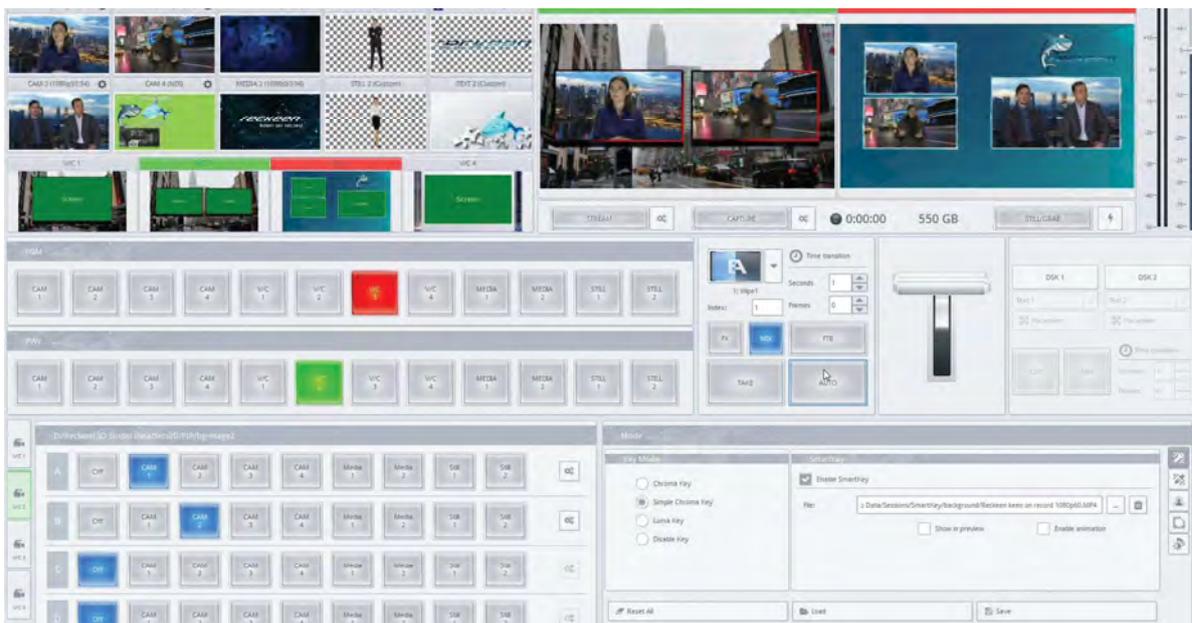
Configuration of V/C phases allow virtual camera movements such as pan, till and zoom.

NOTICE: For Reckeen 3DSPro, the capture card offers 4 extra SDI outputs dedicated for SmartKey, so each input placed on a chosen background can create a separate output. Picture below

SMARTKEY FEATURE & PIP IN 3D STUDIO

Configuration of SmartKey in 3D Production module is similar to 2D module. As inputs we've chosen 3 video sources and 1 NDI stream with Slideshow Presentation. Now, we'll load a ready set design. Files with sets' designs can be found on a local disk in DEMO SESSIONS folder. Picture below.

The set we've chosen contains 4 objects of 3D monitors, 1 object of animated 3D monitor, and a SkyMap background of mountains. If pre-saved designs don't match our needs, we can create a set design from scratch in a built-in 3D Wizard Editor. Using ABCD mixer, we can assign signal sources to each virtual monitor in a set. We use CAM inputs. Picture below.
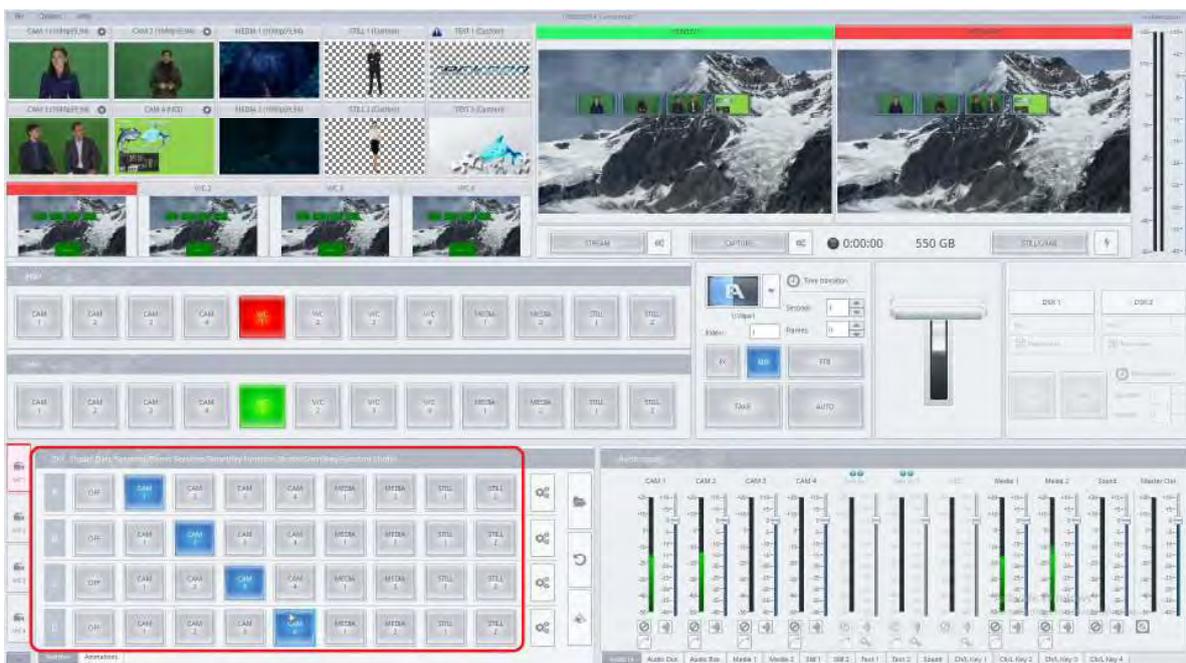
Each input has to be keyed. Virtual monitors present signals from CAM1 to CAM4. Each one now shows keyed signal on a black background. Picture below.
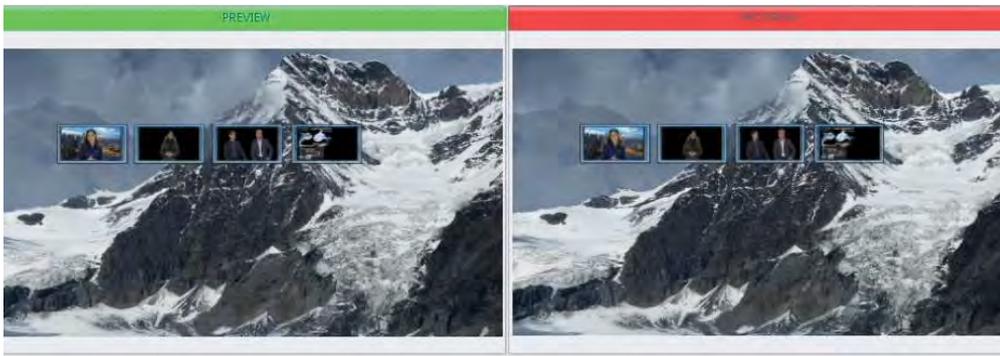
In a "Ch/Key 1" tab we are going to turn "Enable SmartKey" for CAM. Picture below.
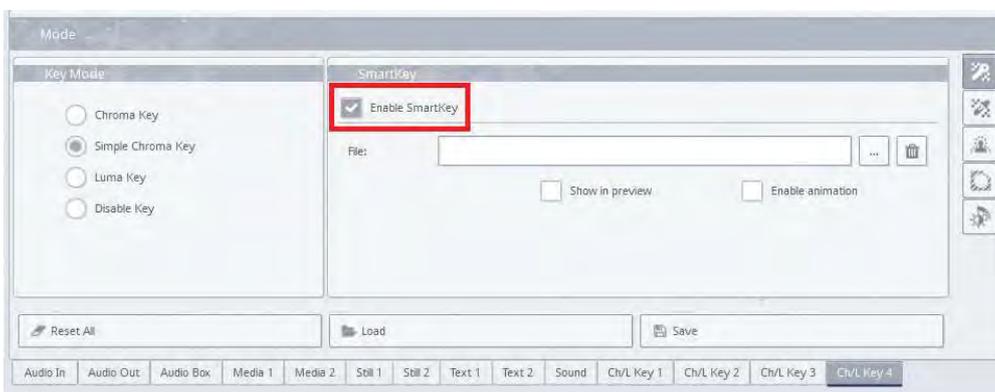
We are opening Media Tray. And now we need to choose a background file for that inputs signal. When loading the files, we can choose multiple files at once.
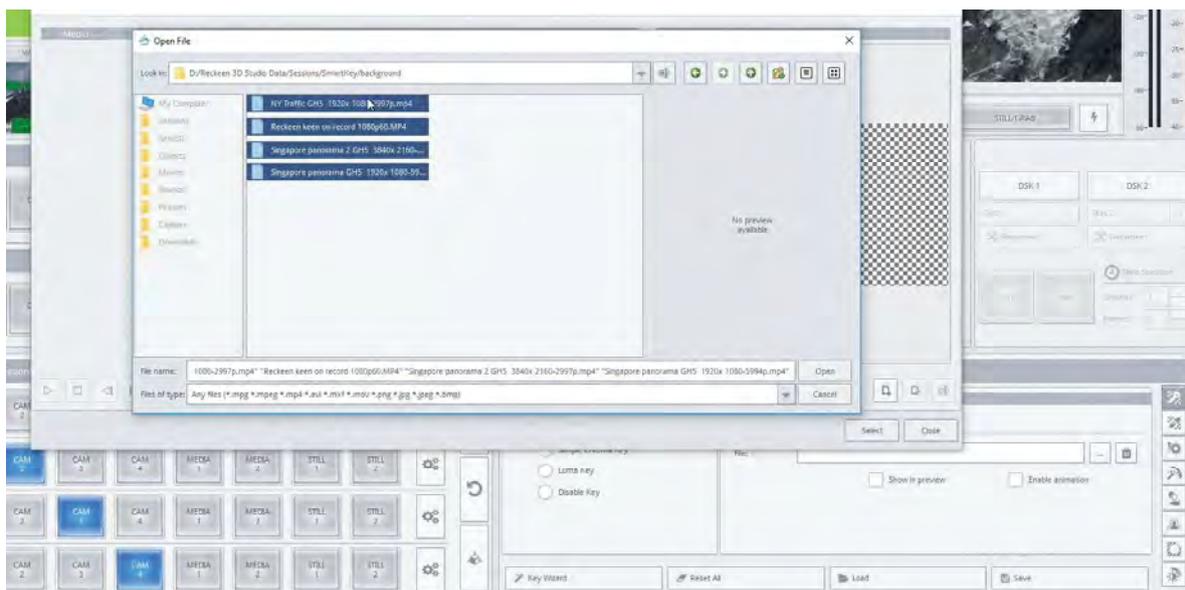
 Previews of chosen files now show in SmartKey Media Tray. Picture below.

By double clicking we can choose the desired file. We can choose playback start and finish marks on the video.
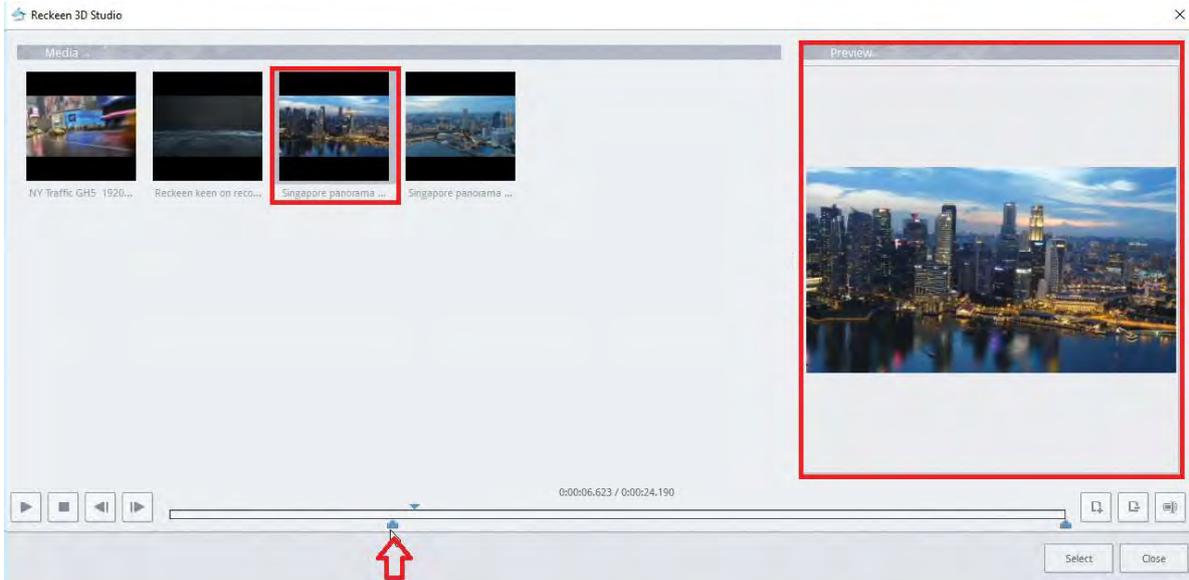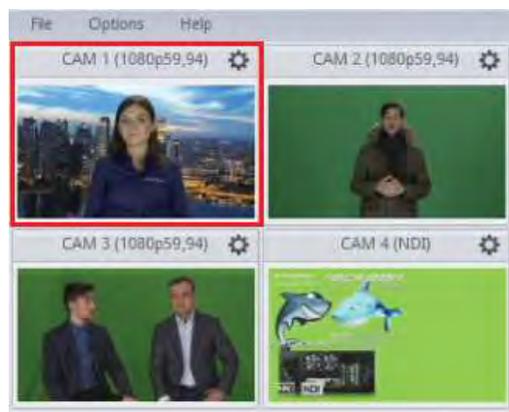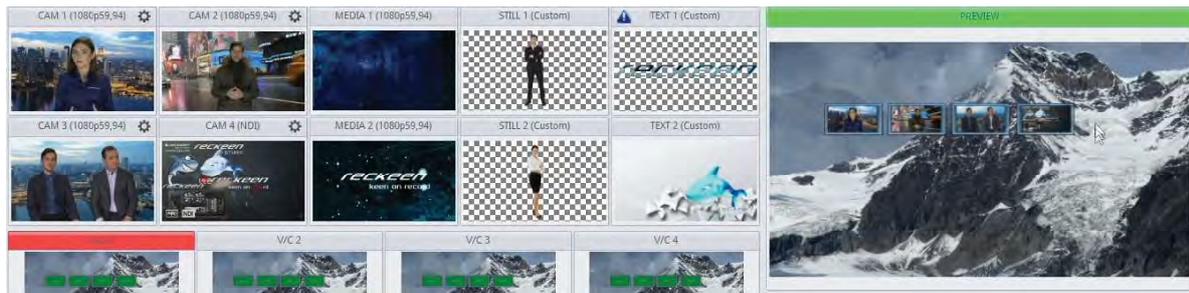
In a "Camera setup" window we can set up shots for each V/C. Open "Camera Setup" Picture below.
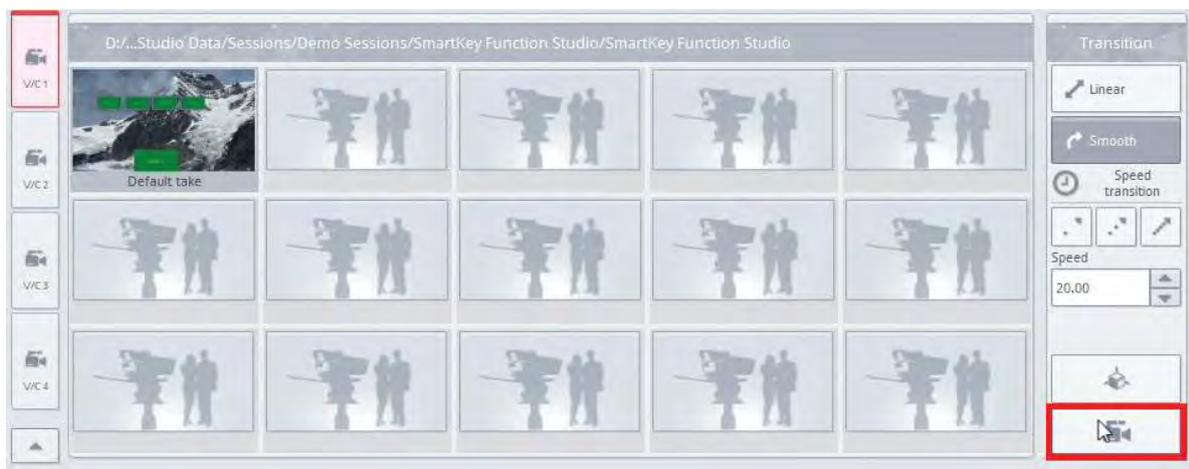
We can create a shot by moving an image to a desired frame using a computer mouse. By blocking Y and Z axes, it's only possible to move a camera on X axis. Picture below.

We're creating a CLONE of the shot, and moving the virtual camera to the next monitor.

We're creating a CLONE of the shot, and moving the virtual camera to the next monitor. Next shot will display monitor number 3. Picture below.
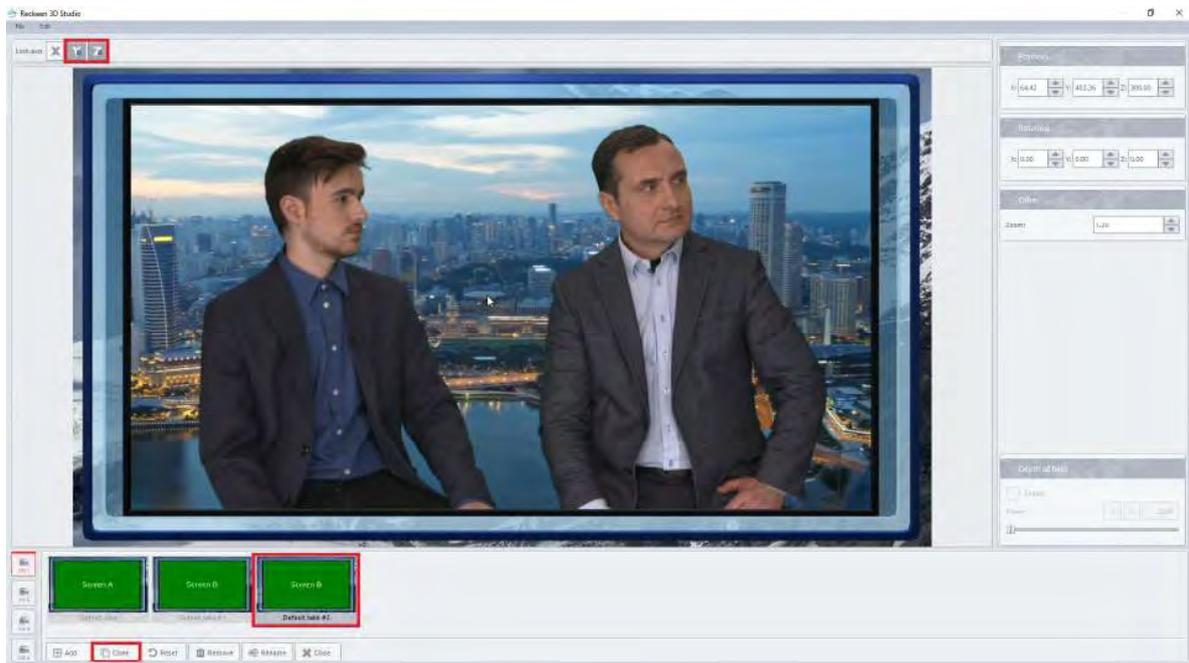
Next shot will display monitor number 4. This way, We can create a virtual camera slider effect. Picture below.

Next shot we're going to make will move the virtual camera through 3D scenery.

First, we need to unlock Y and Z axes. Below the 4 monitors we will soon see another monitor, which will appear when we switch to V/C2. Picture below.
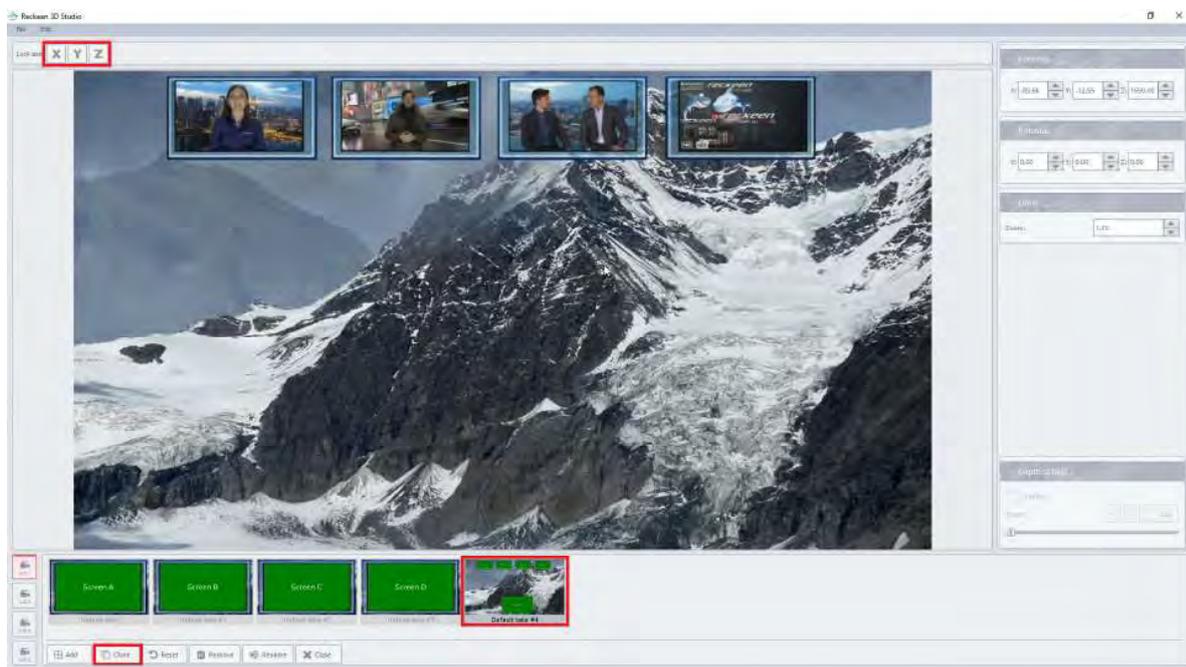
For each V/C we can set up to 15 different shots.

An advantage of 3D over 2D system is a possibility to set up virtual cameras in any position and angle in relation to monitors. We can create any kind of camera movements between the shots. We can show one, or multiple monitors. We can create any kind of composition. Movements between shots can be programmed to last a specific amount of time. Picture below.

After finalizing the configuration for every V/C, we can begin a production. We can now easily move from one point to another in a 3D setting. Create effective slides and presentations. Picture below.
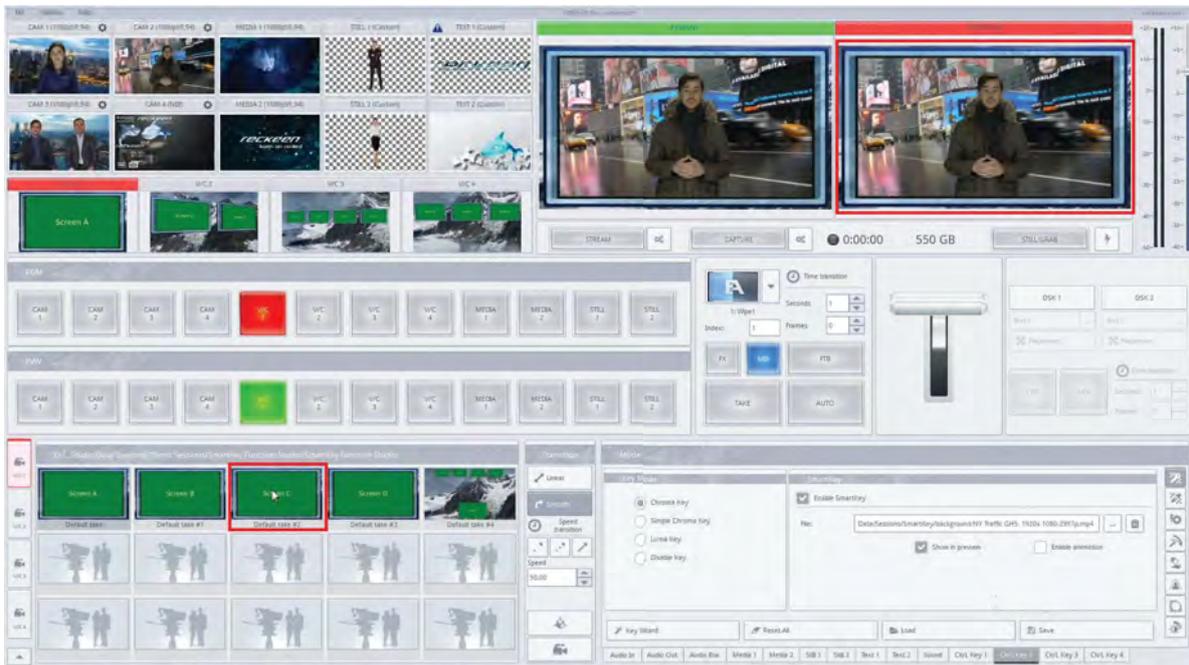
3D production allows animating objects, for example virtual monitors. We can manage animations through a built-in animation control panel. The screen appears at the bottom and rotates around its axis. Picture below.
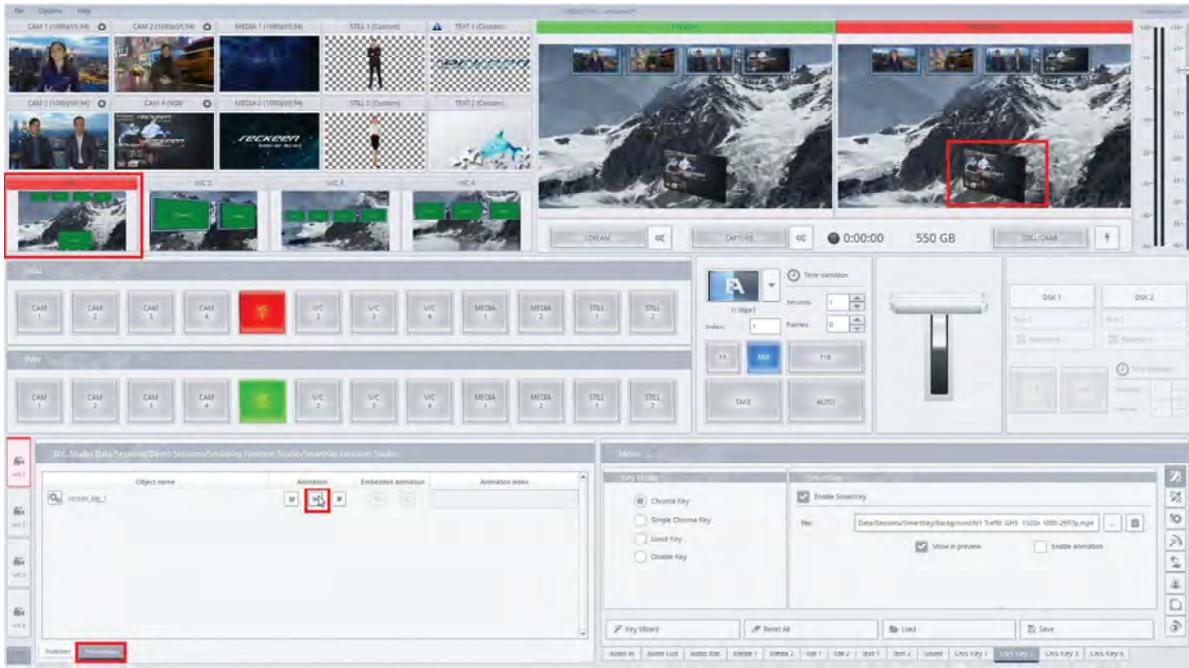
TRIGGERS OF SMARTKEY- GENERAL RESET

One of triggers is General Reset, it has options related to smartkey, picture below:
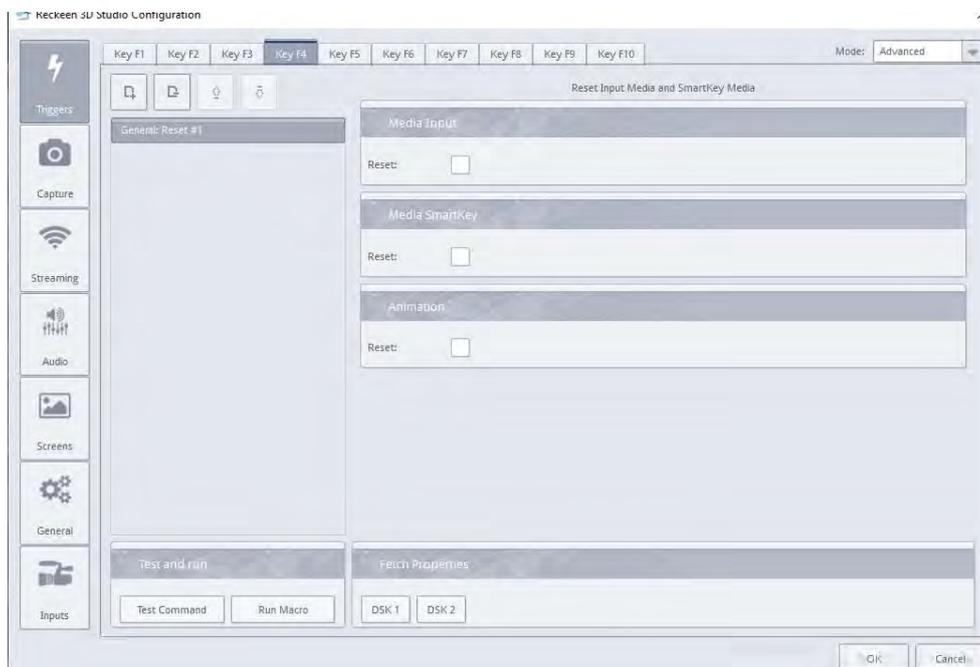
because smartkey processes are multi-threaded, GENERAL RESET - Smartkey options allows you to play smartky files from the beginning, the function also has the ability to synchronize smartkey files with inputs files or phases of animation.

To get it you need to call GENERAL RESET with the option below shown:
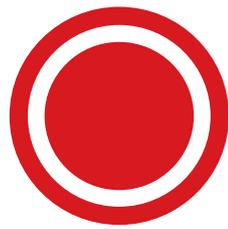
Capture function

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The Reckeen 3D Studio system uses Intel Quick Sync Video technology, built into some of the Intel processors. This allows for hardware acceleration of a video stream encoding.

Capture function allows you to use the Reckeen 3D Studio system as a Video Recorder. It allows you to record the signal broadcasted by the system on the internal hard drive. The produced program on the air can simultaneously be saved to a file on the disk in *.mp4 format (codec H.264) or *.mpeg format (codec MPEG-2). The resolution and frame rate is chosen depending on the mode, in which the system output operates. On the right side of the Capture button, you can see an icon with gears for configuration of this function, a light indicating the recording, a recording timer (hours/minutes/seconds) and the amount of free disk space (in GB). When you start recording, the red light lights up and the Capture button is highlighted.

The Reckeen 3D Studio system supports the following image formats (codecs):
- H.264 video / AAC audio
- MPEG-2 video / mp3 Layer 2 audio

The list of formats supported by the aforementioned codecs:
- 2160p 60 / 59,97 / 50 / 25
- 2160p 30 / 29,97 / 25
- 1080i 60 / 59.94 / 50
- 1080p 60 / 59.94 / 50 / 30 / 29.97 / 25
- 720p 60 / 59.94 / 50

4K RECORDING

When you are recording in 4k format, a different bitrate is needed to obtain a recording quality similar to one in HD format. When the user is going to work in FULL HD resolution and sets a Custom slider (defined by the user) to the codec's maximum value, e.g. 25000 kbps, afterwards saves such settings in a session file and loads such a session in 4k format, then the slider will also be set to the maximum value, but this time equal to 45000 kbps for the 4k format.

Using the 4k format you cannot record a file with MPEG codec. In the case of operating the Reckeen system with 2160p format, the H.264 video / AAC audio codec is available.

By clicking on the icon Configure Capturing (with gears, on the right side of the icon Capture) , a window with Capture function configuration opens up.
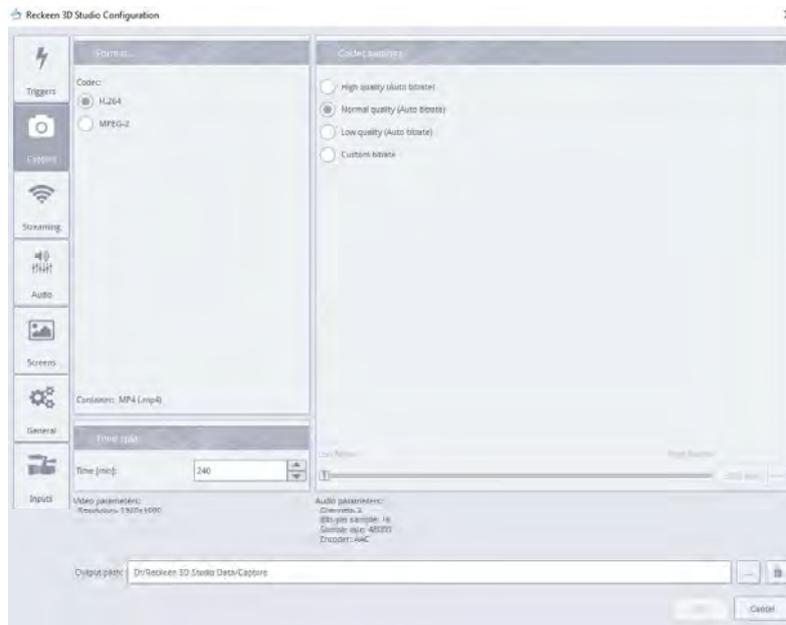
Now, in the Format box, you can choose the type of the codec. The size of the files recorded on the hard drive can be controlled by the choice of compression. You can choose low, medium or high quality, or a quality defined by the user. In the first three cases, the system will automatically adjust the bitrate. Selecting a bitrate field allows you to set the desired value of the recorded file's bitrate. In addition, it is possible to specify the location of the recorded file on your hard drive.

When all the parameters are set, close this window. To start recording simply click the Capture button, which will then change its color. To stop the recording, press the Capture button again. After recording is finished, a shortcut to the recorded video file will be added to tab 5 of Media 1 and Media 2 tray. Picture below.

RECORDING - FILE SPLITTING ON CAPTURE

There is a dialog in the CONFIGURATION / CAPTURE configuration window where you can specify the time of splitting files during capture. The time can be set from 15 minutes to 240 minutes.

RECORDING - PAUSE

One of the recording functions is to pause recording. This function is revealed after pressing the CAPTURE key, in the place of the setting gear icon the PAUSE will appea.

Pressing the Pause key stops recording, which is indicated by the red backlight, photo below:

Pressing the Pause key again resumes recording, picture below:
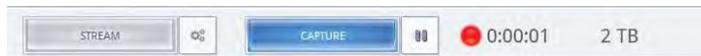
NOTE: The Mute function for Capture - when Capture is started, and the audio will be muted - see Audio OUT tab for Capture a message about no audio will appear:
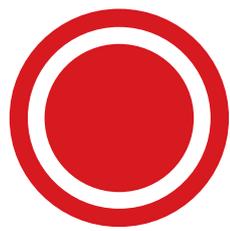
FX

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OUTPUT TRANSITION

The Reckeen system's production module comes with the main mixer that has buttons corresponding to full-screen views of the virtual studio V/C (from 1 to 4), video content or graphic materials. Program channel is used for full-screen display of live material ready to be streamed to the end user. Preview channel serves as an aid in production and in preparation of materials before displaying them on the air. Two methods for changing these channels have been described so far, one via TAKE function - immediately - and the other via AUTO with MIX function, which means smoothly. The following section introduces a new function called AUTO FX, that is special effects. The Reckeen system has a large database of ready-to-use effects divided into appropriate categories.

To select the desired effect, select FX button instead of MIX button in the Production module window, it will then light up in blue as in the image below.

In fact, when you press AUTO button, you can execute a default transition effect displayed in the thumbnail above. The effect is depicted with two letters. Capital letter A represents a full-screen view before the start of transition, while capital letter B stands for the view after the transition is completed. To make identification of the effect easier, the thumbnails have been created for the moment the transition is half-way through. This effect can be seen when the transition's T-bar is located half-way up its value.

In such moment, in the Program channel you can see a reflection of the currently set effect, e.g. Wipe 1. The image below.

After hovering the cursor over the thumbnail, the thumbnail's animation starts showing an example of how the switch between the main mixer's PROGRAM and PREVIEW channels will look like.

The effect's reference number is displayed below the thumbnail, and its name comes after a colon. Each group of effects has its appropriate individual number range assigned. For example, WIPE effects start at 1, while SLIDE effects go from 100 and so on.

Here, you can also set a transition time between channel A and B using controls in TIME TRANSITION section. A transition time can be adjusted in seconds from 0 to 99 or in image frames that depend on the output format.

You can change the currently selected effect in several ways. The first one is by pressing a downward arrow which results in opening a new window.
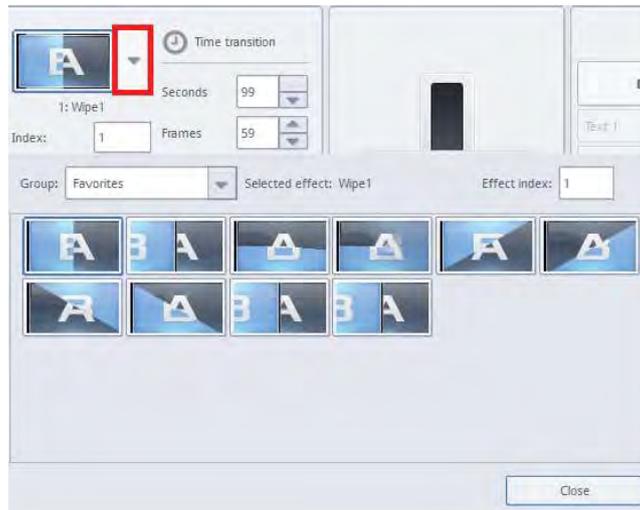
After pressing the button, a new window opens showing the available database of transition effects. The last selected category opens as a first one. By default, this is FAVORITES category. You can find 10 items there that can be modified by assigning other effects at any time. As mentioned earlier, when you hover the mouse cursor over any thumbnail, an animation will start showing how the transition will behave, but not only that. After a while, a tooltip appears with a number and, after a colon, a name of the effect. With a single click of the left mouse button you select an effect which will immediately replace the one in the Production module. All you need now is to press CLOSE button and close the window. Another way to choose an effect is simply to double click on the effect's icon. The window will close automatically then. The image below shows the effects window.
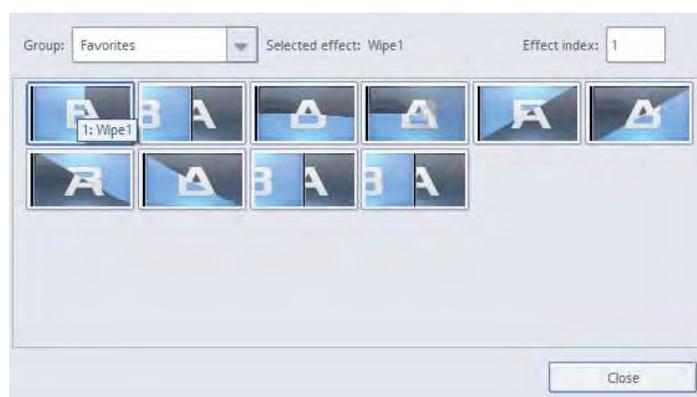
Each effect has its own unique number, which can also be used for selecting the effect without the need to search the list. You need to enter the appropriate number (e.g. 258) in the EFFECT INDEX control field, and press Enter to confirm the choice. Entering a value "000258" will confirm selection of the effect with a number 258.

In the Group drop-down list you can find a database of categories corresponding to individual effects (WIPES, SLIDES, ALPHA WIPES, ALPHA SLIDES, etc.). To select an effect, just press the left mouse button. To add the selected effect to FAVORITES group, you have to bring up a menu with a right-click and indicate a target position in the category.

In the Reckeen 3D Studio system, you can adjust the following input channels:
- Cam 1 Input, the signal received from the first card input,
- Cam 2 Input, the signal received from the second card input,
- Cam 3 Input, the signal received from the third card input,
- Cam 4 Input, the signal received from the fourth card input,
- Line In 1 (XLR); the signal received from the front audio panel,
- Line In 2 (Jack 6,3 mm); the signal received from the front audio panel,
- MIC – signal from microphone (Jack 6,3mm) the signal received from the front audio panel,
- Media 1 - input channel of video files played back by a virtual player supported by a media tray - Media 1 tab
- Media 2 - input channel of video files played back by a virtual player supported by a media tray - Media 2 tab
- Sound - input channel coming from sound files played back by a virtual player and being placed in the Sound tab,
- Master Out - adjusting the main signal level for audio output. For better operation, the Master Out indicator is also included in the audio input tab.

EFFECT'S TRIGGER

For your convenience, we have prepared a special trigger which allows you to choose your favorite effect without the need to search the database. Going to OPTIONS and CONFIGURATION menus, you come across TRIGGERS tab. It is possible to program 10 keys in the advanced mode there, e.g. F1 key. In the settings' parameters you have to select whether a transition should be carried out in MIX mode (smoothly) or with FX effects. Choose a category of your interest and indicate a specific effect in the fields below. The image below shows an example of a programmed Trigger.

You have to remember that this function's purpose is to set a given effect in the Production module. After its execution, a corresponding effect's thumbnail appears in the Production module, ready for use. In order to program both selection of the effect and immediately calling upon this transition effect, a second function under the name OUTPUT TRANSITION AUTO has to be added to the list. As a parameter, time of transition should be given, in seconds or in frames that depend on the system's output format. The example is shown in the image below.

10 favorite buttons can be programmed this way. Then, by pressing one of them in the Production module, you can execute a transition between the Preview and the Program channel. Such programmed Trigger can be stored in the Production module's session file.

VKEY-100 CONTROL PANEL

We have prepared suitable buttons on the Vkey-100 keyboard. Their purpose is to indicate the transition's type. It is possible to perform a transition in several ways using the Vkey-100 keyboard.

- Manually using a T-bar handle.

- By pressing TAKE button - starting an immediate transition.
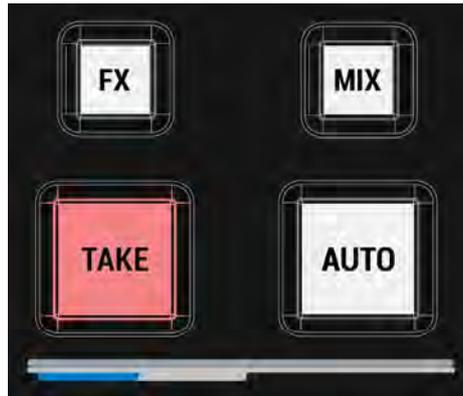
- By pressing AUTO button having MIX option button selected - starting a smooth transition with a programmed time.
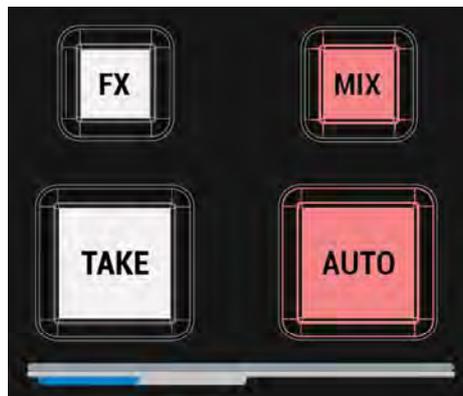
- By pressing AUTO button having FX option button selected - starting a smooth transition with a programmed time and an effect selected in the Production module.
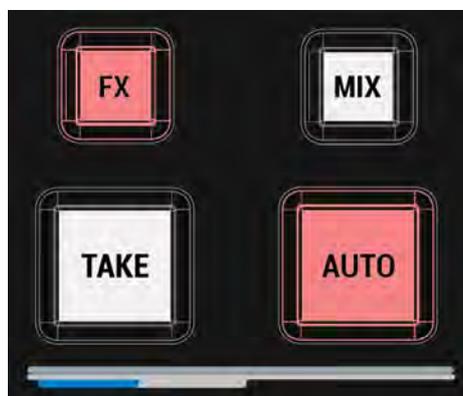
If you press and hold FX button, 10 keys will light up in the PREVIEW section of the Vkey-100 keyboard. If, at the same time, you press one of those buttons, an effect from FAVORITES category will be selected.

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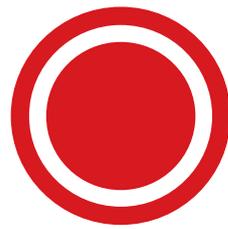
Still Grab function

This function enables capturing single frames from the PROGRAM screen image, with a possibility to save them to a file in PNG format.

Depending on your vision mixer's (Production switcher's) settings, it is possible to capture frames from both live broadcast of the program and the media sent to the broadcasting output.

Captured frames can be used as a material to create programs. Still/Grab will not only save the captured frame to a file on a disc, but it will also add it (or rather a shortcut to the file) to Still 1 and Still 2 media tray. With that, a captured frame is immediately ready to be used. You can use it directly on the vision or as one of the sources. (Below, you can see a picture with captured video frames: the system writes date and time in the name of the file and puts files shortcuts in tab 5)
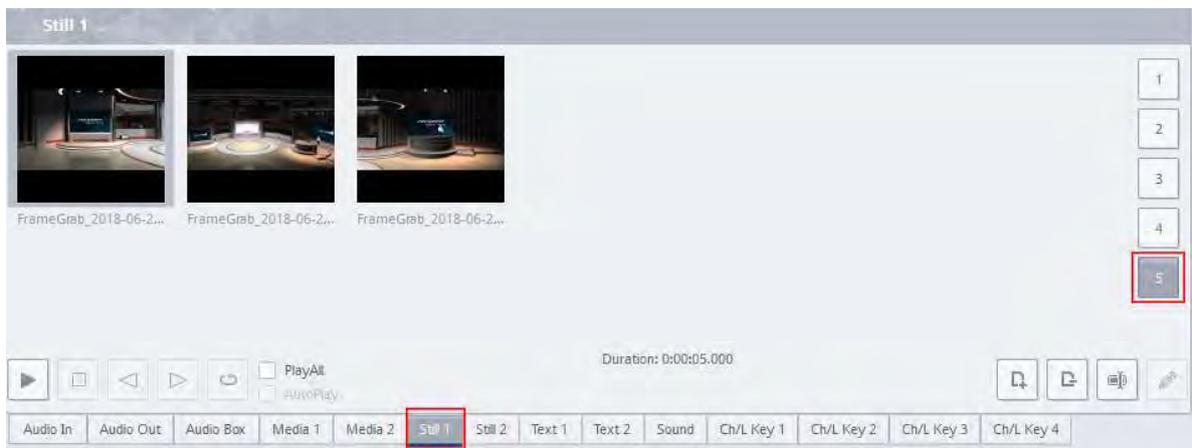
28
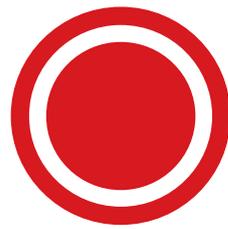
Video program Streaming function

Streaming function allows you to send a broadcast signal over the Internet in the form of a data stream. With this feature, the program realized live immediately reaches all its viewers, even at distant locations in the world. The Reckeen 3D Studio system is a crucial link for this type of projects, as apart from creating a broadcast signal, it makes it available in the form of a data stream. With an appropriate software you can upload the stream to a server that supports streaming. The server allows you to make the signal available to many viewers simultaneously. Watching such broadcast is possible on any device with a web browser, e.g. a PC or a tablet.

To carry out an internet broadcast you need to:

- have a source signal - it is provided by the 3D Production module,

- convert the signal to a format suitable to the capabilities of your Internet connection,

- broadcast it on the web by clicking the Stream button, as shown above.

To configure the streaming, open the configuration window with the Configure Streaming gear icon located next to the STREAM button. Then, set the data stream's video and audio parameters. With that done, you can enter the individual address and the key you had obtained after registering at the chosen service enabling streaming, that is, allowing multiple users to view the material simultaneously.

Before you start streaming your program with the Reckeen3D system, you should check your internet connection. There are two basic definitions in the specification of an Internet connection, that is download speed (receiving the data) and upload speed (sending the data). You need to have an Internet connection with an appropriately high upload parameter, which on the market is usually much lower or at maximum at the same height as the download parameter.

Different suppliers, such as Ustream and YouTube, usually provide the parameters recommended to work with the system on their websites. But you have to take care of the state of your connection. Typically, if you want a video of an acceptable quality, the minimum recommended speed of sending the data (upload) is approximately 2 Mb/s.

In our application, we used the parameters 'bitrate' and 'resolution', that together define the quality of the broadcast image. The higher the bitrate set in the Reckeen3D system, the faster the Internet will be required. This Internet connection should be used only for streaming. In the case of a shared connection, other users may interfere with your transmission.

To find out whether your connection is sufficient, it is recommended to do a couple of tries before you start streaming your live image.

First, launch 3D PRODUCTION module in the Reckeen3D, then click on Options and then on Configuration and Streaming. Before you start your first broadcast, you should test all the Audio and Video Settings to check with which maximum quality you can stream using your Internet connection. Streaming bitrate cannot exceed the available bandwidth of transmission. What's more, it should not be even close to that value. After checking, you should better add further 20% bandwidth as a safety margin. For example, when you have an internet connection with the upload parameter of 2.5 Mb/s, it is recommended to set the bitrate to 2000 kbps and so on.

Providers make available on their websites the proper tools for testing the Internet connection. You can easily find them by typing in the search engine: 'Ustream's Network Test Tool'.

Remember that not all the connections are of the same quality and condition. For example, a wire

connection is much better and more stable than a WIFI connection, which is more prone to fluctuations in quality and can be easily interrupted. When you have a shared connection, other users can disrupt the broadcast.

For those less experienced, we recommend contacting the IT department of their company, as it may be necessary to open the network ports needed for broadcast (port 1935).

NOTE: The Mute function for Streaming - when STREAMING is started, and the audio will be muted - see Audio OUT tab for Streaming a message about no audio will appear:
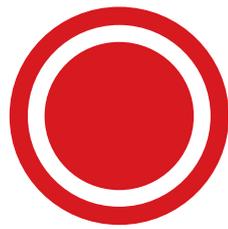
Streaming on Ustream platform

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Create an account on Ustream platform using the SIGN UP button. Picture below
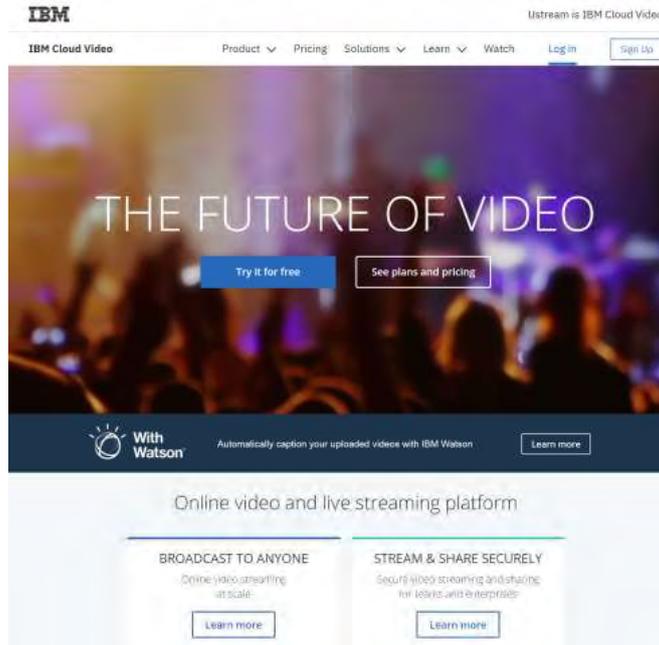
In the following steps, you should provide some basic data necessary for the registration process.

Once you have set up your account you can login to it

First, on the drop-down list, click on the dashboard option.
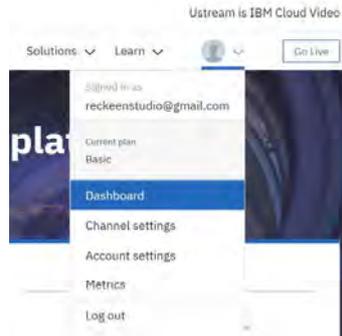
Then, in the Create channel tab, set your own channel name.
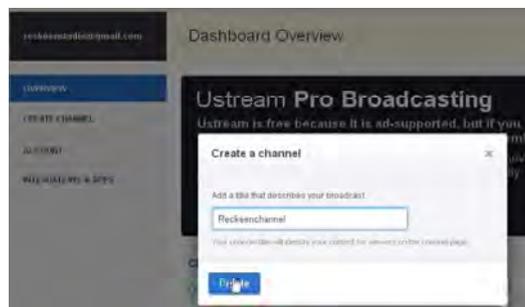
The name of the channel, will be available to the user, i.e. this name will be commonly used as a link.
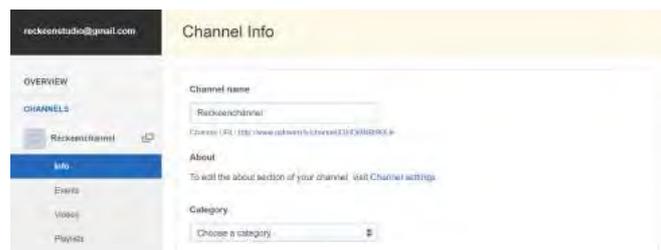
Now, your streaming channel has been successfully created. You can go back to the Reckeen3D system. In Reckeen3D, start the 3D Production module, click on Options and then on Configuration and Streaming.

Select Ustream platform from the drop-down menu and click on the Open the website icon beside it. Picture below.

Log into the account you've created earlier, and then select Channel Settings from the drop down list. See the picture below.
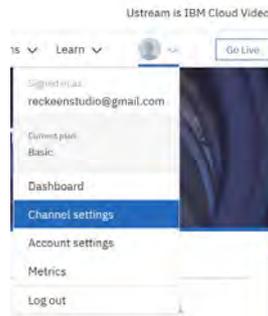
Select the Broadcast Settings tab from the drop-down list. Then click on the View icon in the Encoder settings section. The picture below.
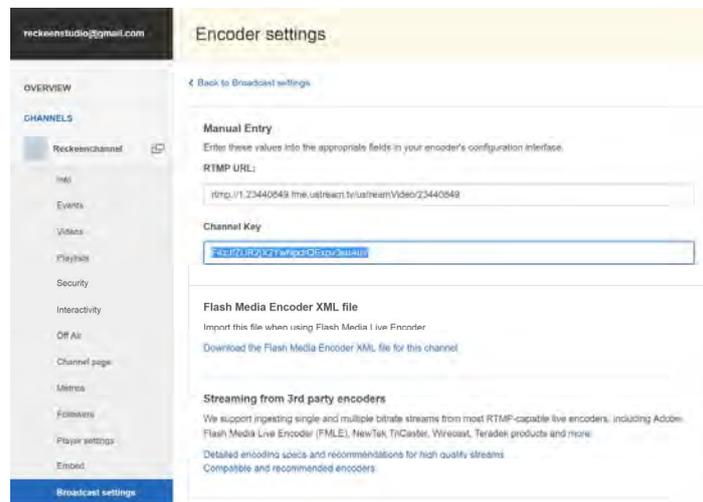
A window: Encoder settings is displayed then. There is some data to be copied to your Reckeen3D system in the Manual Entry section.

You should copy and paste the RTMP URL and Channel Key for fields: Address and Stream.

But in Ustream platform you don't have to do this way. Ustream website provides a ready XML File with the data. To download this file, click on the link in the Flash Media Encoder XML File section, as shown below. After clicking a link on the page, save the settings file on your hard drive. Choose the location for the file in the Save file window.

Now, open the Reckeen3D Configuration window and go to the Streaming tab. Click on Import FMLE profile and open the previously saved file from the chosen location. The fields Address and Stream in the Reckeen3D Configuration window will be then filled automatically with the data from the file. Confirm by clicking on the Ok button.

Now, you can start streaming by clicking on the Stream icon located on the production screen. When a need arises, you can always load the streaming settings from a file by clicking on the Import FMLE profile. To be able to watch your production live on the Internet, you just have to provide a user with a link Channel URL . The Link is located in section Channel info under Channel name . Picture below.

Clicking on this link will open a website address along with a player's window where you can watch this production.
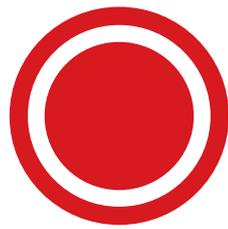
Streaming on Facebook

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It suffice that such a service supports RTMP protocol. Those are ; Ustream.tv, Youtube.com or Facebook.

Log into your account. You have two options. The first one is to stream on Facebook via your user account, that is using a regular post. A video window will appear in it, just as usual, when users exchange information or videos. The second option is to create your own Facebook page with its unique name.

If you choose the first option, you need only to have a Facebook user account.

In the case of the second option, you have to log into your user account and create a page.

Select Pages tab from the management tabs on the left side of the screen.

Click Create Pages button to create a page.

Choose a category and enter the page's name. The page is created after you press Get Started button.
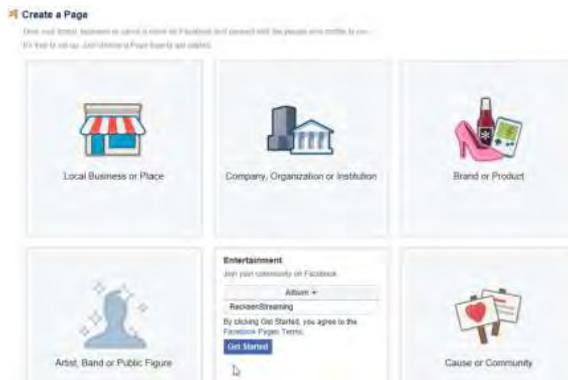
You have created a site. Now you start to stream on Facebook.
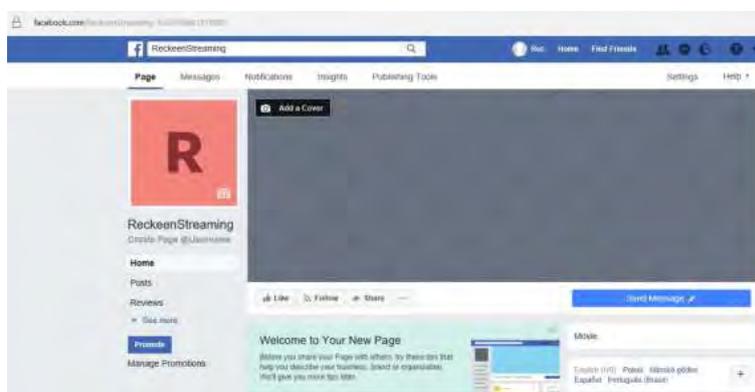
First, launch the Production module in the Reckeen system - 3D Production or LITE Production.

Press streaming Configuration button. From the available services, choose Facebook.
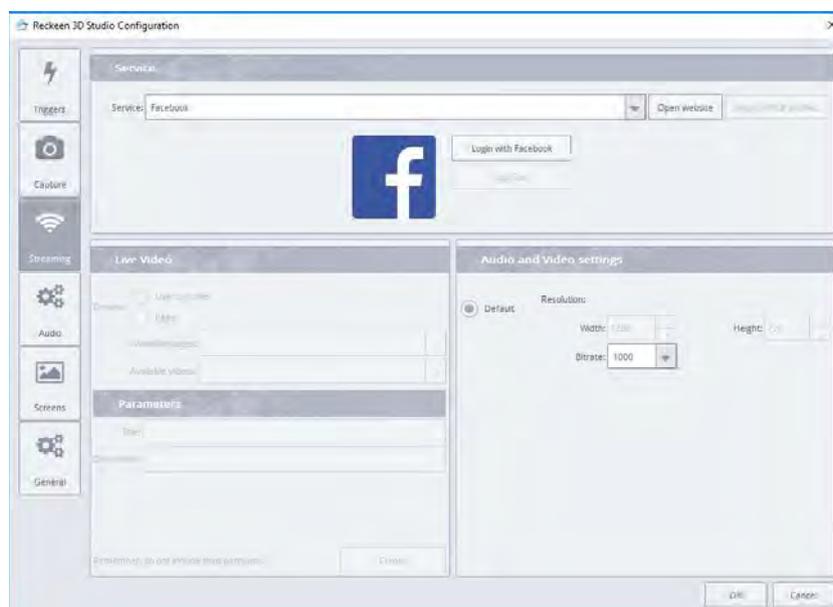
Then, log into your user account. Enter your e-mail address and password.
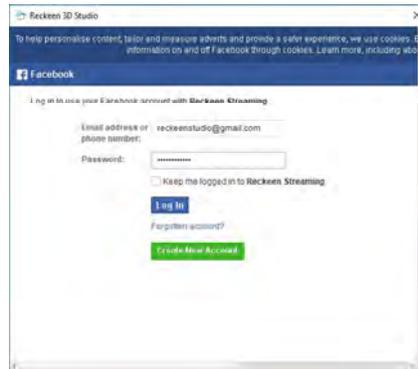
In order to be able to stream on Facebook, you have to accept the terms and conditions. The first one states that Facebook will get your profile information, such as name, photo, age, gender, language, country and such. Press Continue button.

The streaming content will be shown on the user's account.

Facebook now asks you, to whom this streaming should be visible to - whether it's a public video show, a friend's show or just for the account's owner.
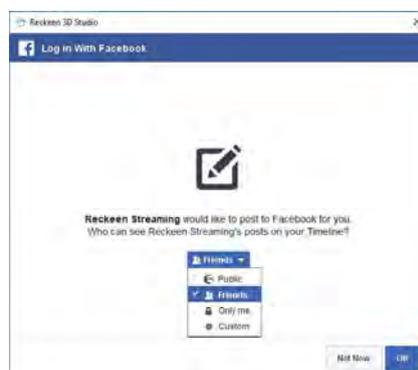
If you created a page, the Facebook will ask you about a possibility of adding streaming there, so that other users could view the video and have a chance to like it or comment on it.
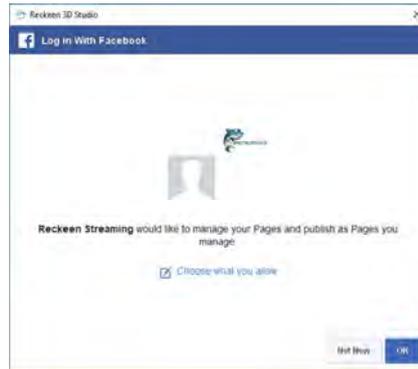
Choose what you allow.

Accept the terms and conditions. You are now logged in.

As mentioned earlier, there are two streaming options. Streaming to a user account - so you choose a user account. If you have video channels created, choose one of them. If not, you can create a new channel. In the Parameters window, type in a title and a brief description. If everything is filled in correctly, press Create button.
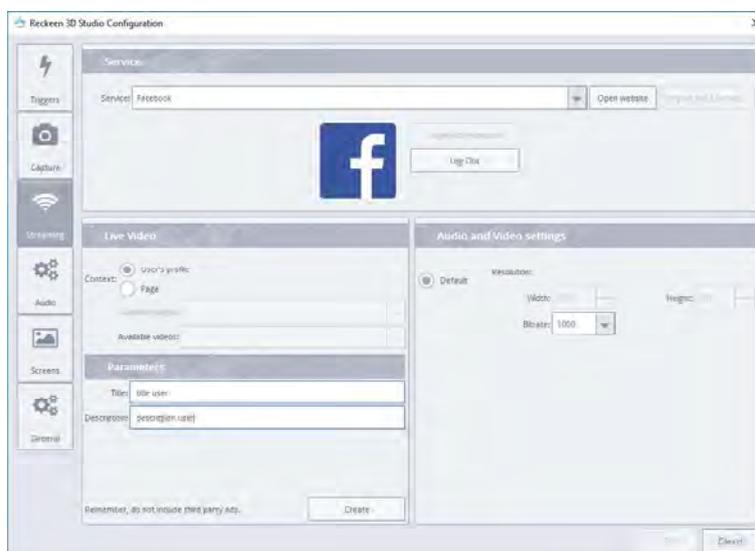
You can see the added video stream on Available Videos drop-down list. Click on it and click OK.
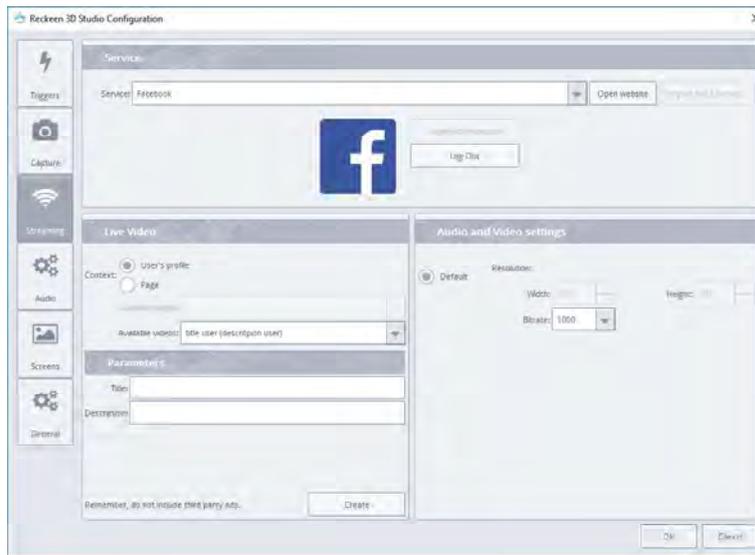
The settings are ready. Now, all you need is Stream button on the Production screen, to send the video to your Facebook channel. You've started streaming the video. Other users can view the image from your Program output in your post.

Press Stream button once again to stop streaming. After pressing this button the second time, it is not possible to continue with the last video. You have to choose another one or create a new one.

Now, the second option - streaming to your Facebook page. Select Page in the Live Video> Context area. Choose available pages from the drop-down list. Write a title and a brief description. Press Create button.
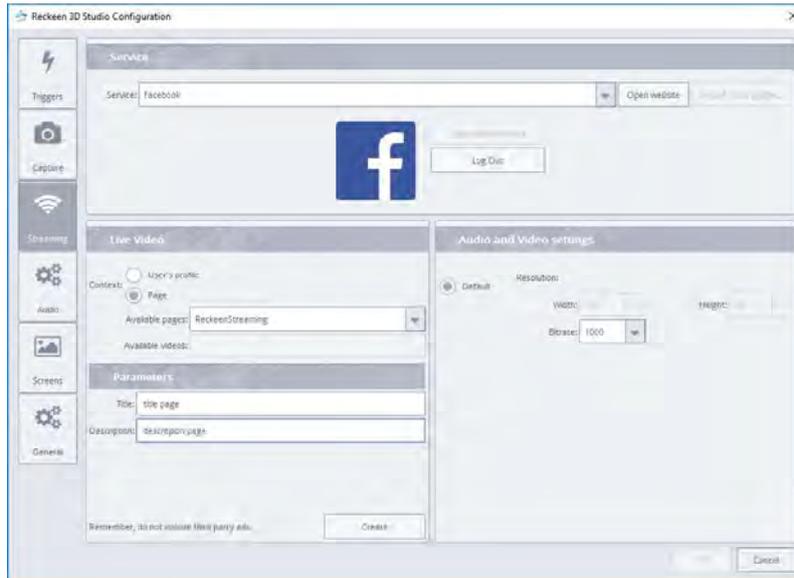
You can see the name of the created page and the available video. After pressing OK button, you can stream, this time to your own page, where a new post with the streamed video will be created.

Press Stream button once again to stop streaming.
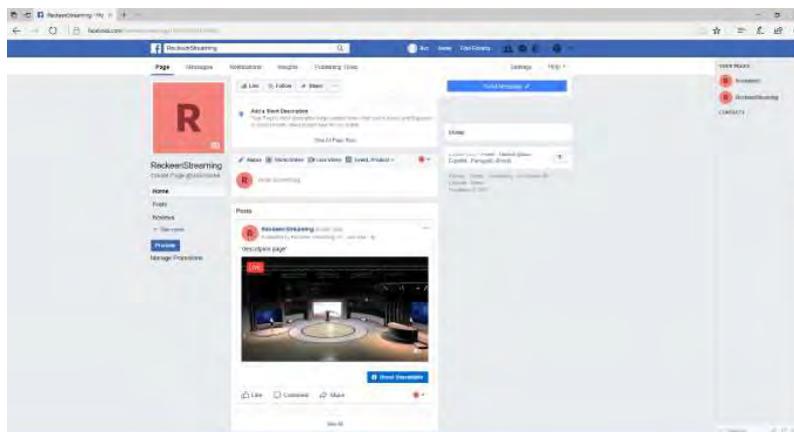
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Streaming on YouTube platform
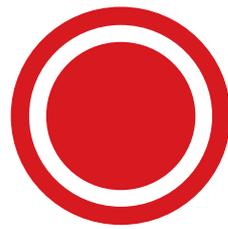
To conduct the streaming on the YouTube platform you should follow these steps:

1. To create Streaming on youtube in the Reckeen system, you need to start the browser on your pc or laptop next to it (Youtube suggests a Chrome browser, so install it) and then launch the website.

www.youtube.com

2. In the upper right corner, select "Sign In" logging options
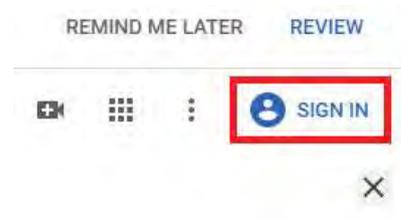
3. Enter the YouTube account login details.
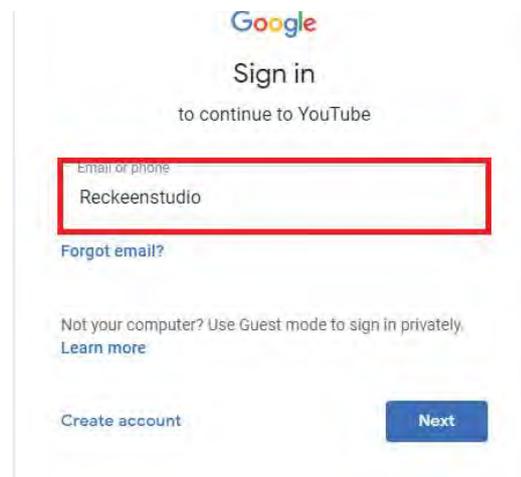
4. After logging in, select the camera sign in the upper right corner, thanks to which a menu will appear and there select the option "Go live"
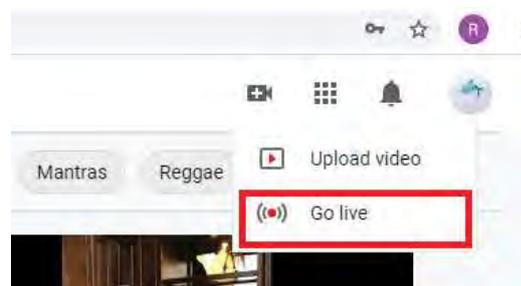
5. Enter the channel name, determine whether the stream will be public or private and check below whether the material is suitable for displaying to children.
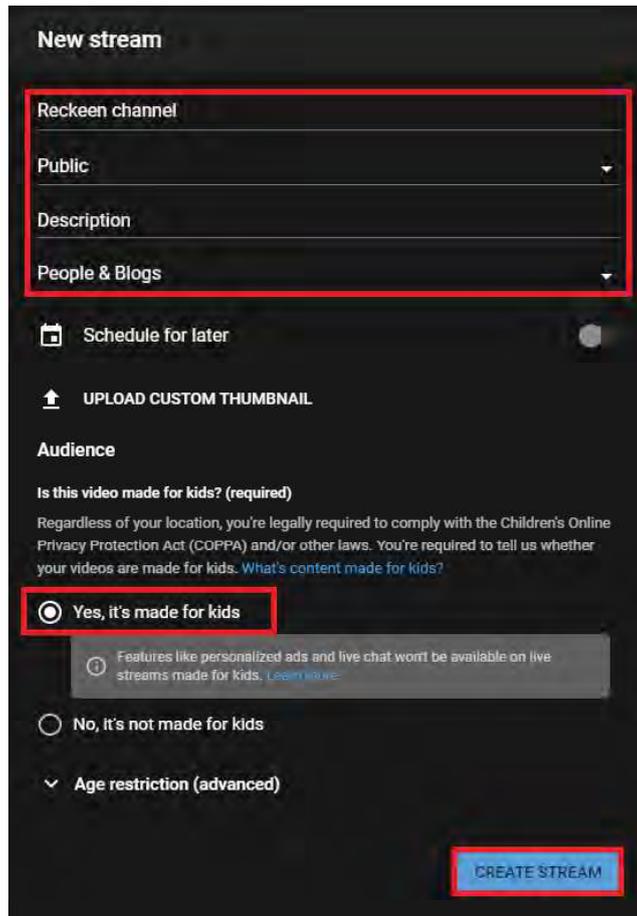
6. To create a stream, select the blue "Create Stream" button.

7. Start the Reckeen System and go to the streaming settings
(settings sprocket or Option / Configuration / Streaming menu. Select "Youtube" from the "service" field.
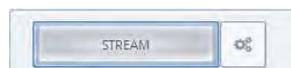
After creating the channel, the address and stream data will be created, which should be rewritten to the streaming setting window in Reckeen.
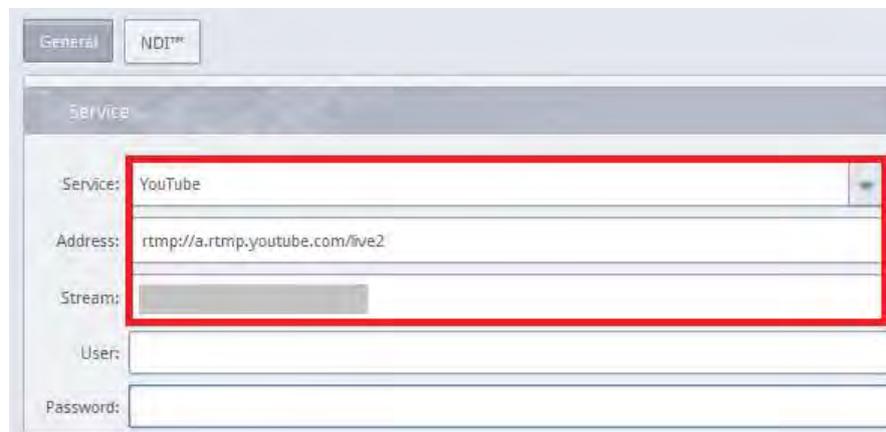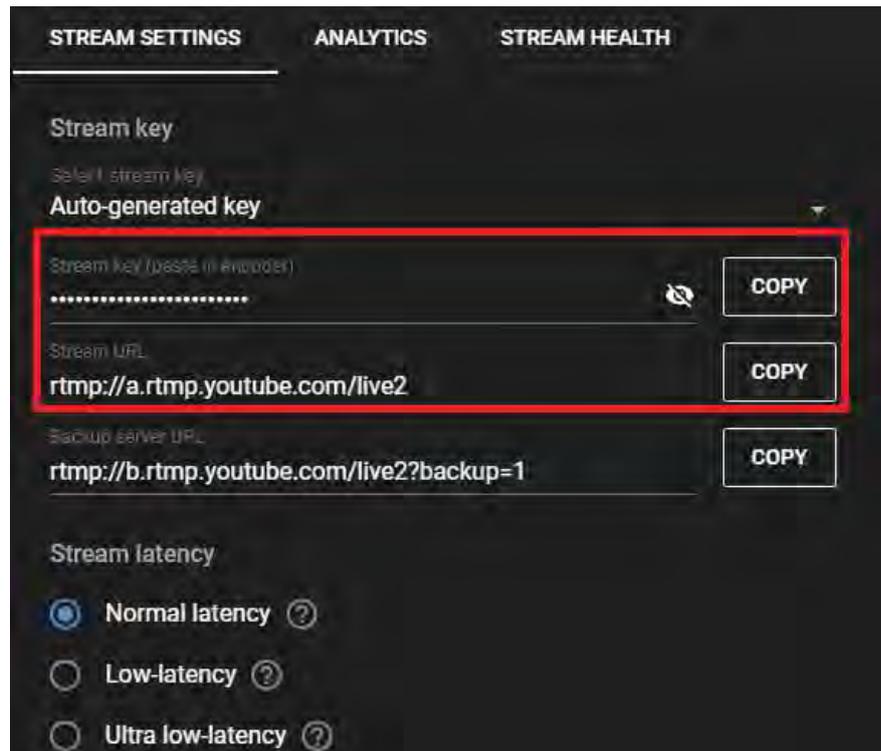
8. After closing the configuration window, you can start streaming in the Reckeen system. At the beginning, it is suggested to send a full-screen image, e.g. with a logo, before the target content, because you still need to start sending live data in the YouTube channel.
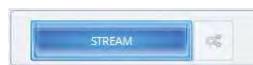
9. At the moment in the channel configuration window, wait for the data stream. We will be informed about it below the preview window.
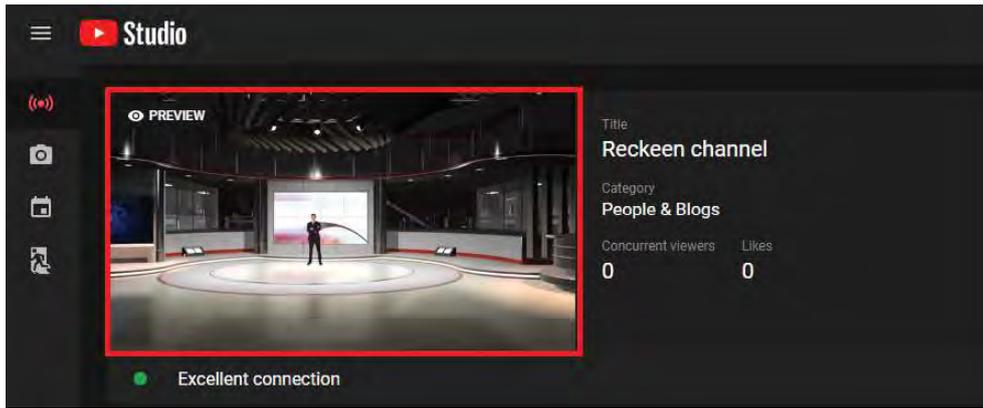
10. If the connection does not display errors, you can start live broadcasting by pressing the button in the upper right corner of "Go Live". Only then the image will be displayed to the target users.
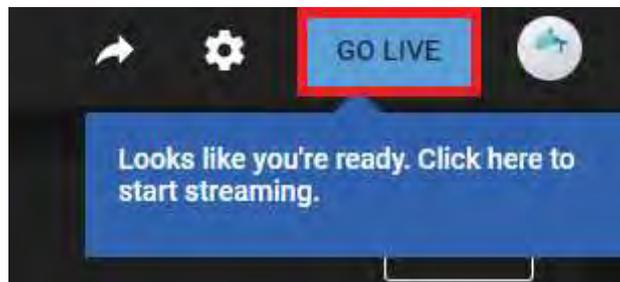
11. If we want to share the stream with target users, click on the share arrow, then websites with appropriate links will be displayed.
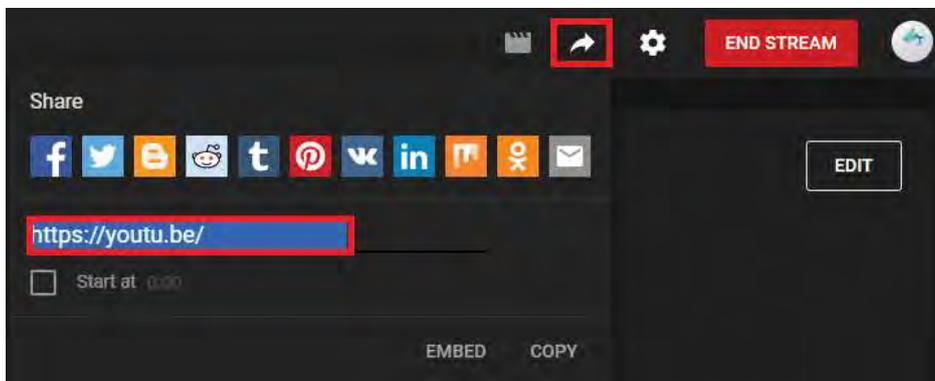
12. Streaming ends after pressing the "END STREAM" button. The stream can be resumed again. We will be asked about this after recreating the YT channel. You can also create a new stream, but then the data, i.e. address and stream will be different and you should move them back to the stream window.

13. In the Reckeen application we finish sending data after pressing the "Stream" button
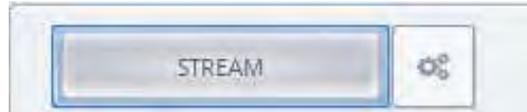
14. In case you want to continue streaming at another time, you can save the YouTube settings to a file.
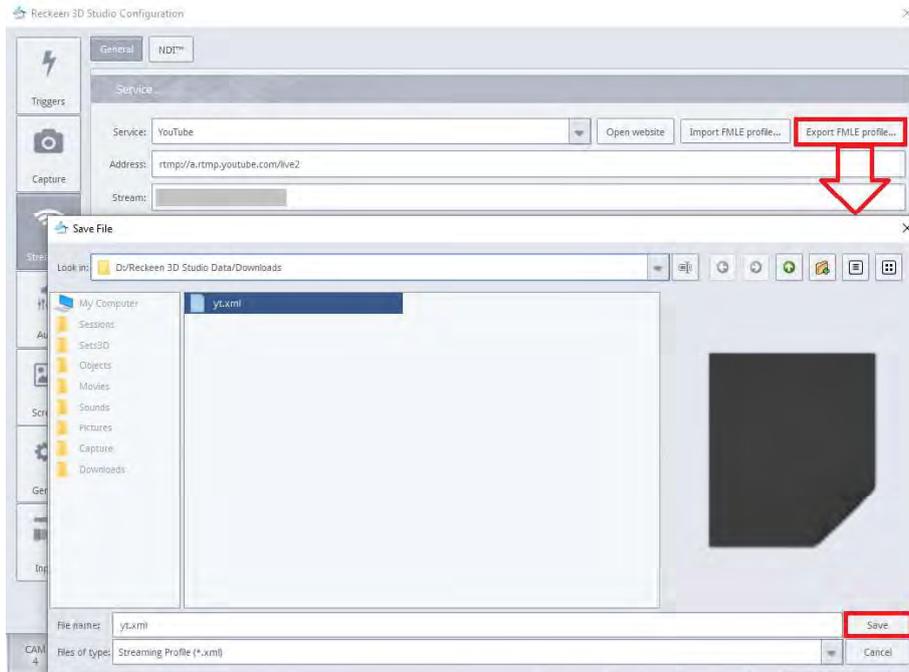
Note:

In practice, customers often have 2 streaming links. The first link for testing, then another link while actually streaming.

Therefore, we provide a way to ensure that after the first test streaming is finished, we can start the second streaming immediately, without having to restart the reckeen application, just provide another address rtmp.

One link:

on some websites it is possible to get one link containing "Address:" and after "/" also "Stream:".
You can also configure your streaming connection in this way, picture below:
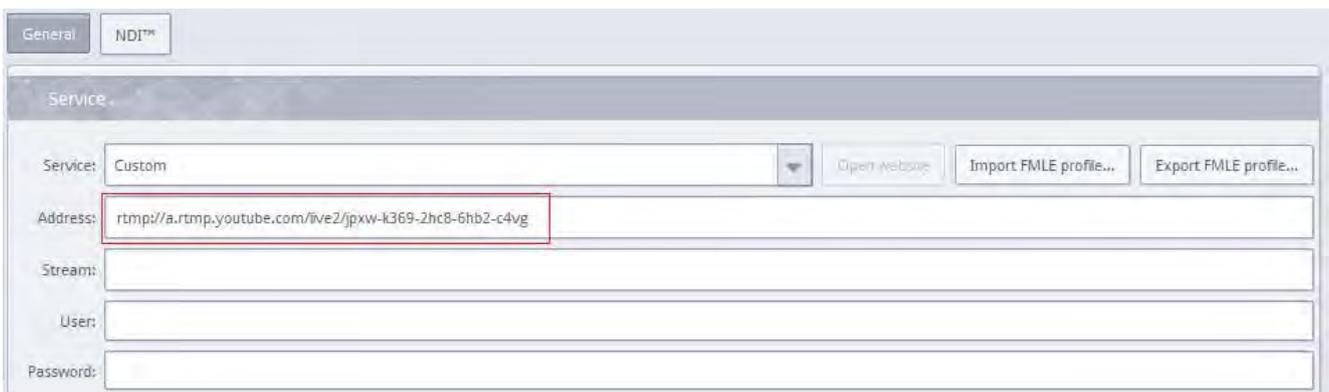
32
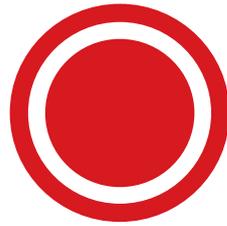
NDI Standard

NDI, that is Network Device Interface. It is a standard that enables network communication by sending and receiving high quality and low-delay audio and video signal. NewTek's innovative Network Device Interface technology, is a royalty free standard enabling IP video workflows across Ethernet networks and represents the most prolific IP-based workflow in the industry. NDI is a trademark of NewTek, Inc.

Such a foundation makes reliable operation in a live production environment possible. The Reckeen system allows you to broadcast a stream from PROGRAM channel to the network. To do this, we have to go to the settings pressing a 'gear' button located next to STREAM button.

In the GENERAL tab, we can set parameters for streaming to a server supporting RMTP protocol, for example to the Facebook. Picture below.
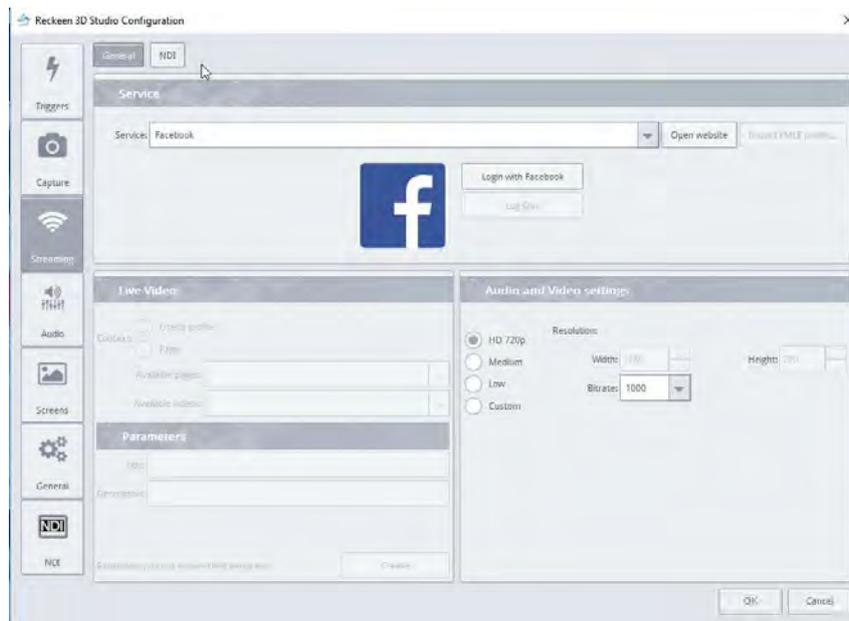
This makes it possible to watch PROGRAM output all over the world via a browser.

When we press STREAM-NDI tab, we will be able to broadcast a video signal, but this time across LAN. Picture below.

Next to the STREAM-NDI key there is a gear that leads to the configuration window where we can enter the name of the NDI Stream. Access to this configuration is also possible from the panel Configuration / Streaming
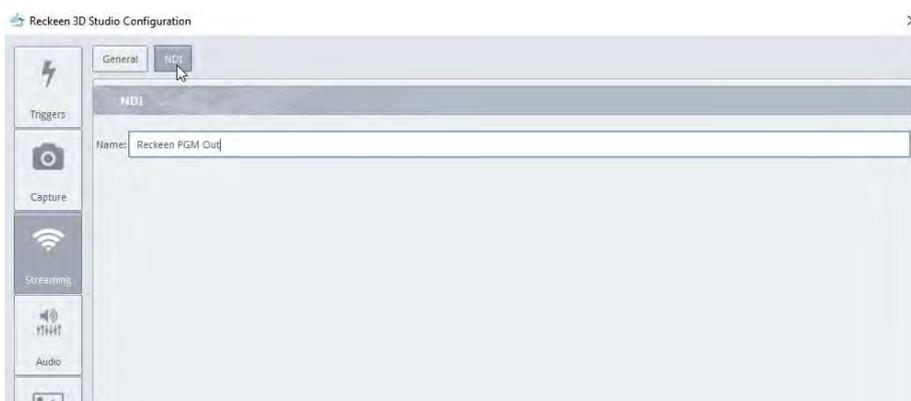
It connects computers in a specific area, for example a school or an office, that is computers connected within a local structure. We enter the stream's unique name, STUDIO NEWS for example, in a box at left.

We press OK to accept. In the moment we press STREAM button, a transmission of audio and VIDEO streams will begin. We stop streaming by pressing the button again.

In the situation when we stop sending the NDI signal and change the name of the stream, after the transmission resumes, the application will not refresh this stream. The receiver have to refresh search and connect ones again to the transmitter with new name.

Now, we will show you on an example how to receive a particular NDI signal. We go to menu OPTIONS and CONFIGURATION. In the last position, we can see Input tab. Picture below.
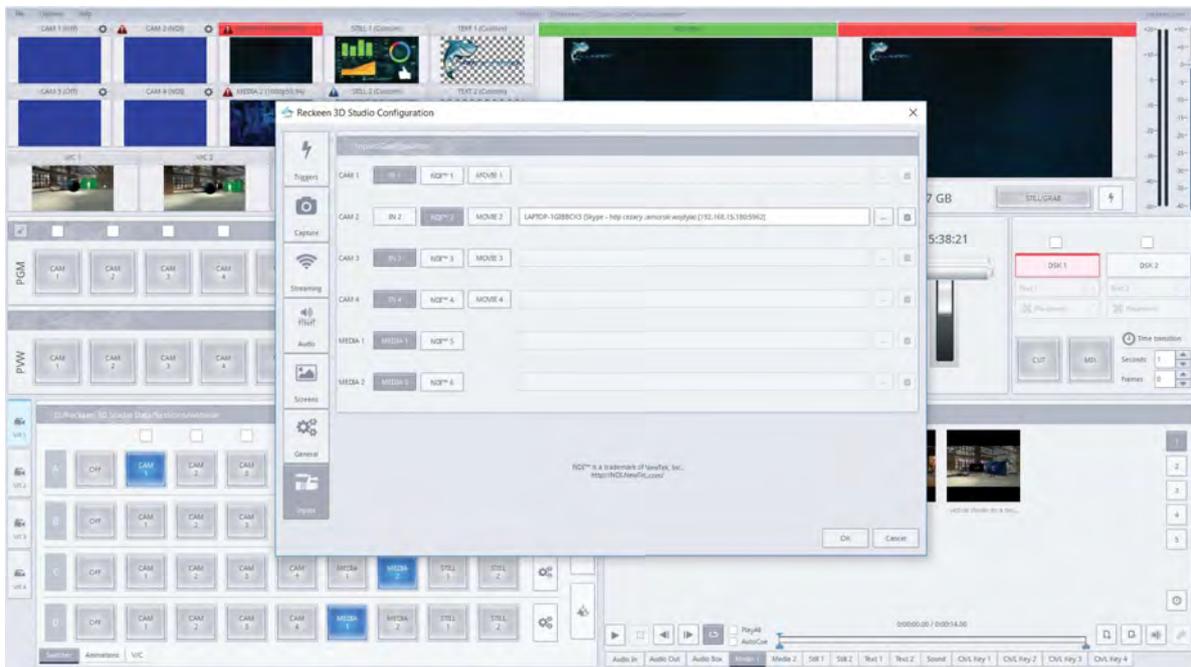
We can also indicate the input as NDI source in the INPUTS, photo below: You can find out more about this in the chapter **Inputs, their configuration and correction feature.**
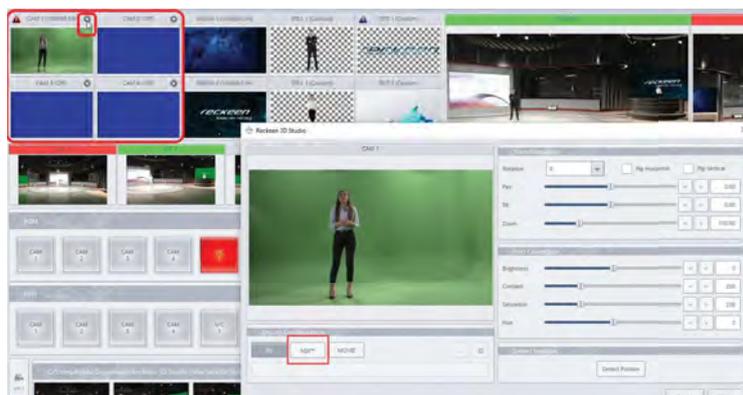
In the Reckeen system, it is possible to replace the physical input of the camera or video stream from the

tray with the NDI signal.

We will choose CAMERA 4 input and press NDI button. On the right, a button with three dots appears. After pressing it, a window shows up in which we can choose NDI stream. Picture below.
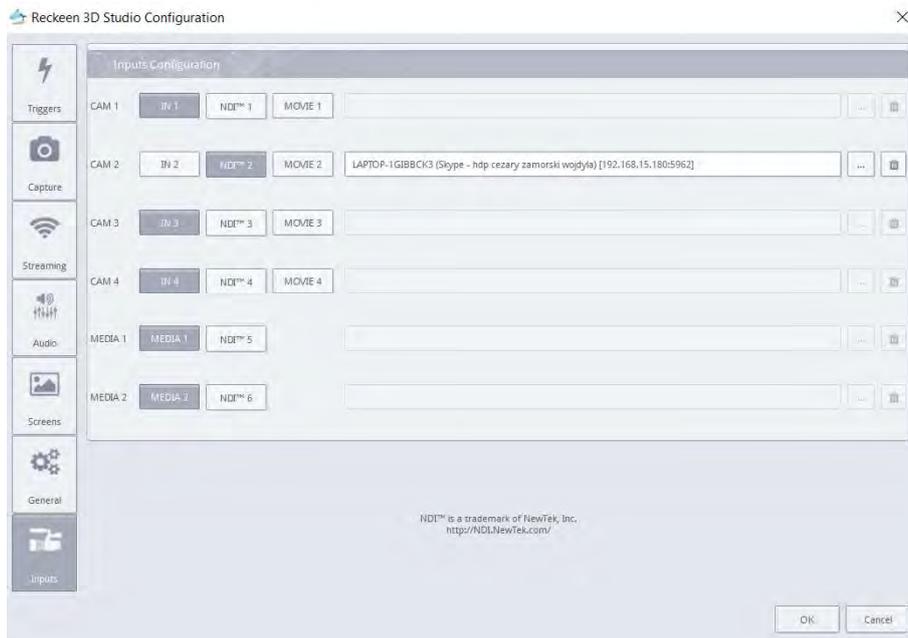
On the list we can find a description that contains a computer's name and further in brackets, a name entered in the STREAMING window and a computer's IP address.

 We will go back to the Inputs settings in the CONFIGURATION window. If the NDI source including active key option for the given input. Now the input can be subjected to a keying procedure in the RECKEEN system.

We can use in the same way chroma or luma key algorithm as if it was an input connected to the Reckeen Card via HDMI or SDI.

To distinguish whether a given input originates from the Reckeen Card or from the NDI stream, there is an 'NDI' caption on the input bar. Next to the caption, the input's video format appears.

NDI input supports two channels, left and right . In the mixer's AUDIO INPUT tab, all functions, such as MUTE, SOLO or volume level slider, work in the same way as in the case of a physical HDMI or SDI input. The sound level in the case of NDI input is treated in the same way as in the case of MEDIA. The 0dB level on the indicator means the maximum value of the sound level to be accepted. Above this value, the signal is distorted. Therefore, when we broadcast an NDI stream from the Reckeen system, this value can not be exceeded.

NDI APPLICATION EXAMPLE - EXCHANGES CONTENTS BETWEEN RECKEEN SYSTEMS

we can send any content between two or more RECKEEN systems. Using PGM buttons of the main mixer, a user on the second computer can send: A full-screen view from a camera connected to the system, any video file, graphic file, as well as studio's view.

With V/C 1 to V/C 4 buttons, we will control a view of our studio loaded into the system, setting the appropriate camera shots, whereas a signal from another machine containing a view of another studio will be sent to CAM 4 button with the use of NDI.

This provides an opportunity to build a structure of a large-format TV station. Picture below.
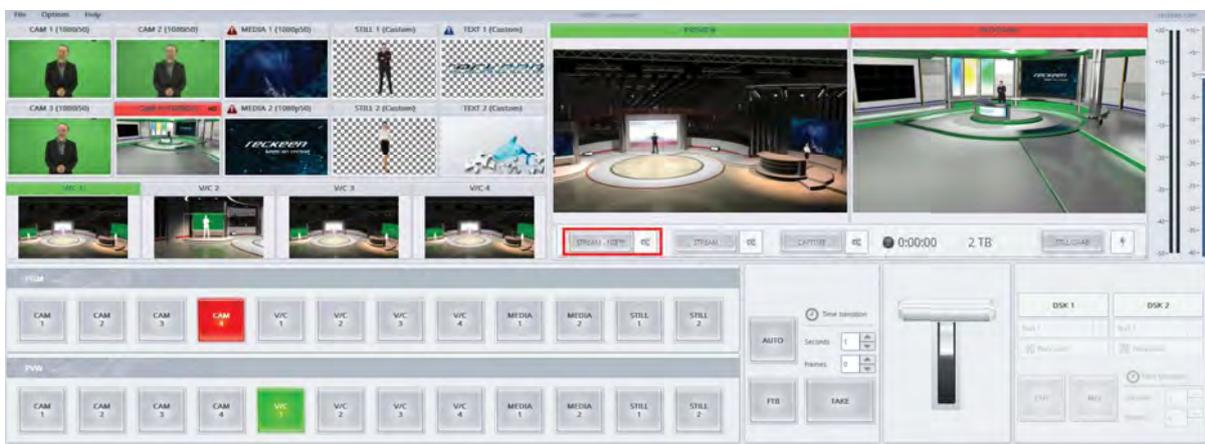
NDI APPLICATION EXAMPLE - SKYPE & TEAMS
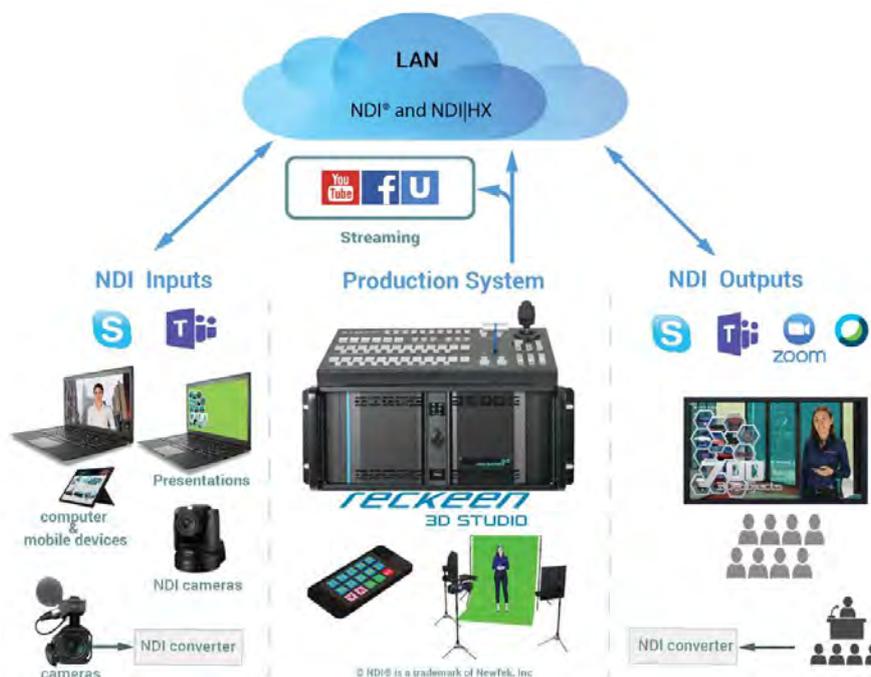
Connecting a Skype group chat to the RECKEEN system

Skype account which will host the chat, should have its application installed on a device different than RECKEEN's computer. That host device should be in the same local subnetwork as the RECKEEN system.

It's preferred that every user that we want to connect with via chat has access to a good quality internet speed.

Skype configuration and inputs

1. After installing Skype on a host device, we should turn on "Allow NDI usage"

a. On Skype application click 3 dots:

b. Choose Settings.
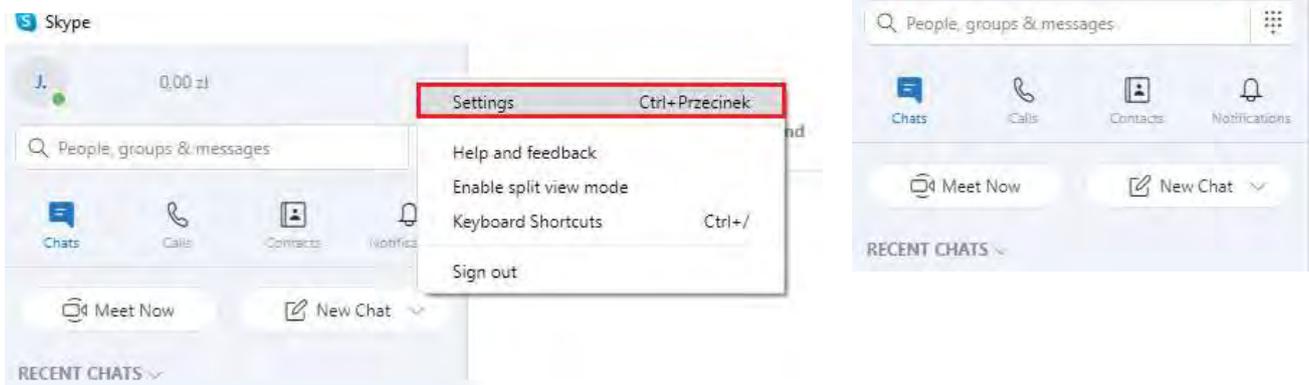
c. Then Calling.

d. And Advanced next.
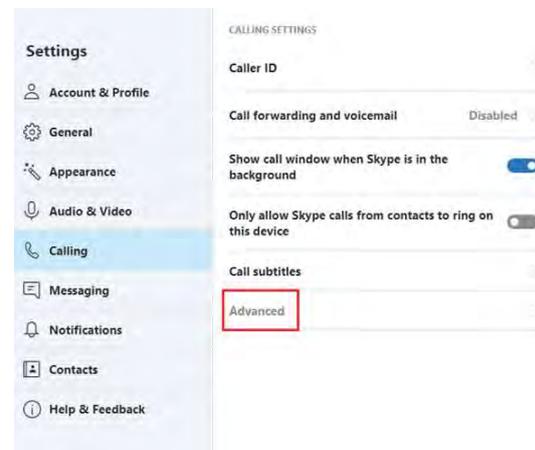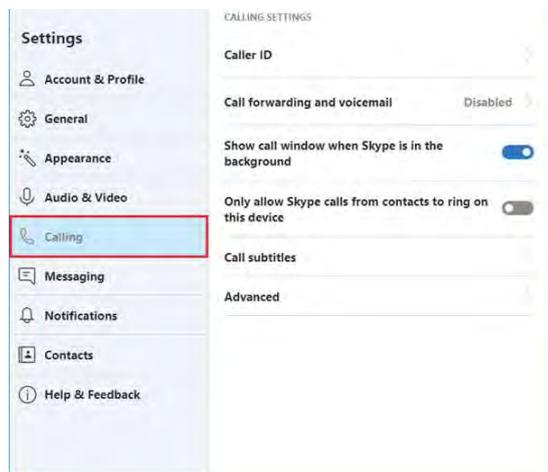
e. Now we need to enable "Allow NDI usage".
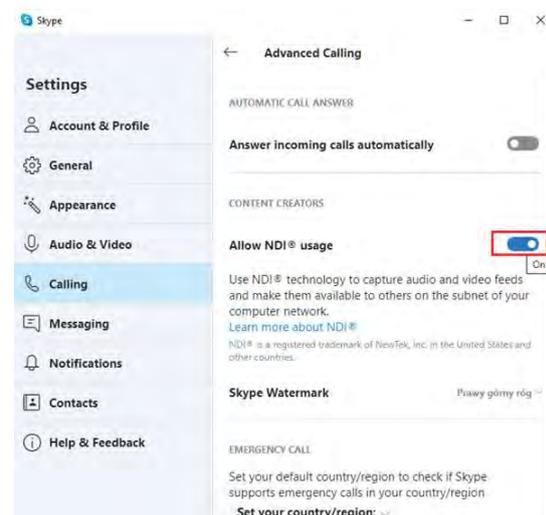
2. Next step is to create a new group chat. Click on "New Chat", and next "New Group Chat". Name the chat, and click on the arrow.
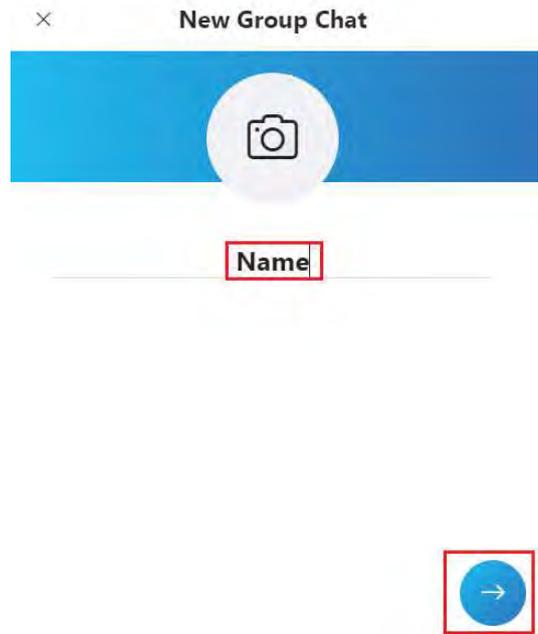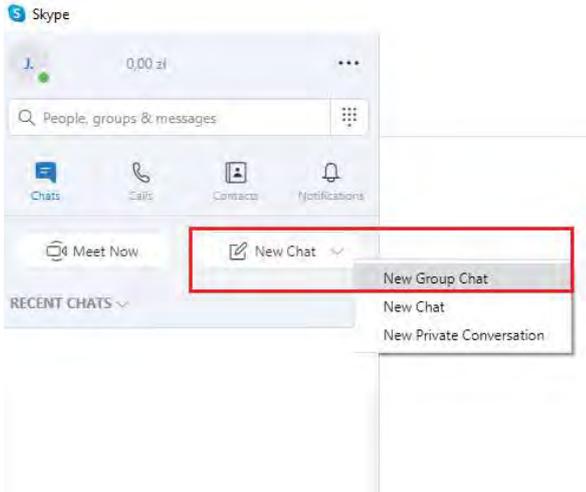
3. Choose users you want in this group chat, and when you finish click "Done"

4. Call the group.
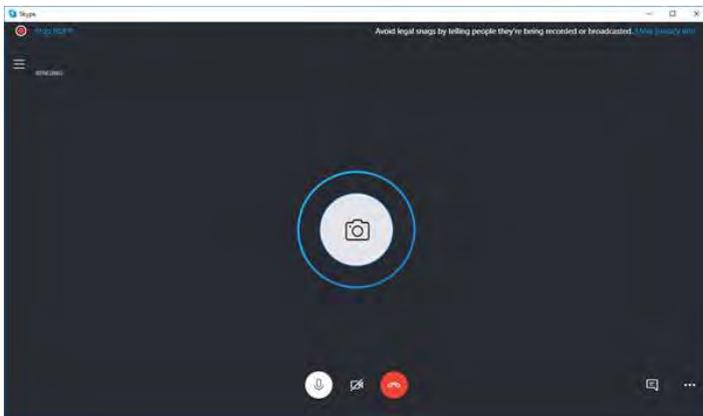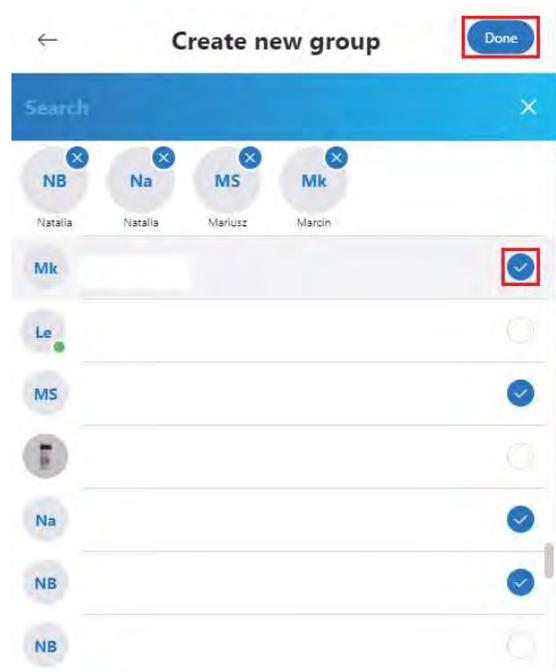
5. At that point, it's recommended to disable "Blur my Background" option. It's also possible to turn it off in Skype settings.

6.   Turn RECKEEN SYSTEM on, and go to settings of CAM input of your choice.
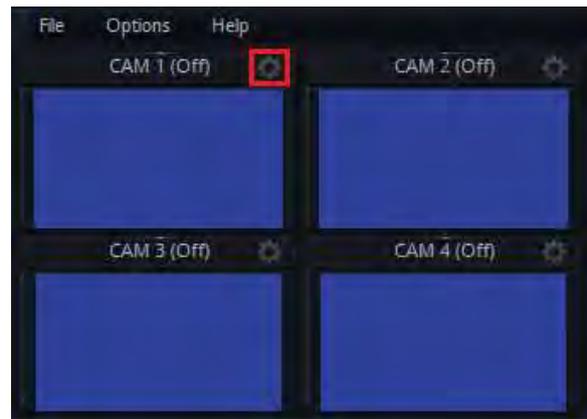
7.   In the settings' window, choose NDI as an Input Configuration. That way streams from teleconference participants' cameras and audio devices will be visible and audible in the RECKEEN system.
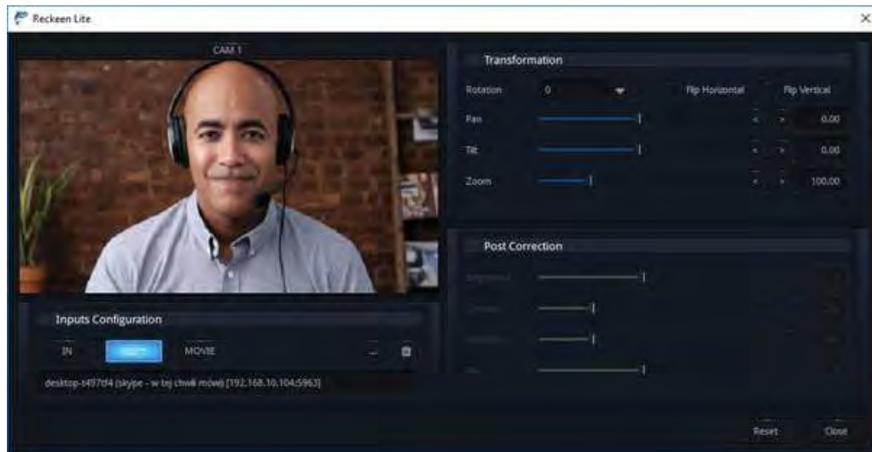
After closing settings' window, in a chosen CAM window a view from Skype's group chat cameras will show. If more than one user in connected at a time, then the one that talked the most recently will be visible in the window.

OUTPUT configuration

In order for other members of the group chat to receive a video signal from RECKEEN's virtual studio (view from PROGRAM window), we need to go through OUTPUT configuration.

1.   Download **NDI Tools** here: **https://ndi.tv/tools/**

2.   Click **"I accept the agreement"**.
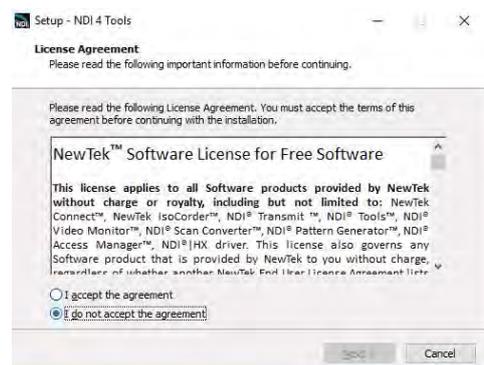
3. Click "**Next**" or choose a different folder.
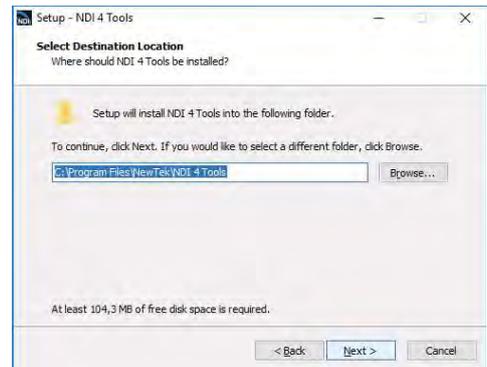
4. Disable unnecessary components, such as **Adobe CC plugin** and **Test pattern generator.**
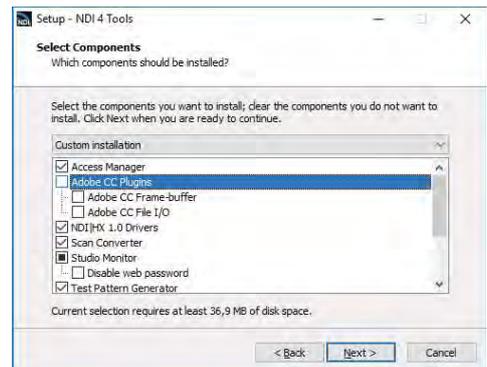
5. Enable **Virtual Input** component.
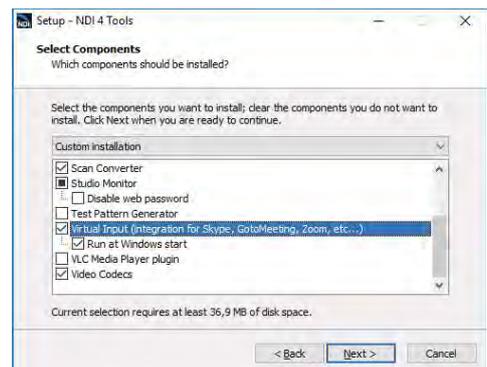
6. Select **Start Menu Folder** or leave the default one by clicking "**Next**".

7. Now click "**Install**"
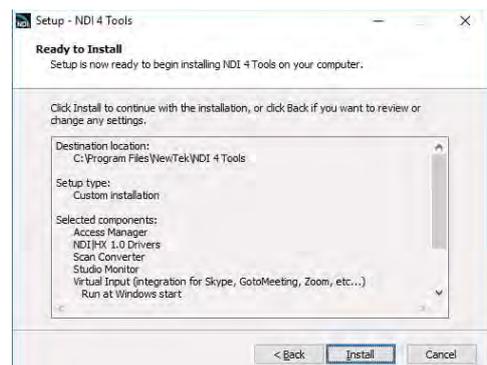
8. Unclick shown options and then click "**Finish**".

9. Go to a location of NDI Tools installation. Then click **NDI Virtual Input.exe**
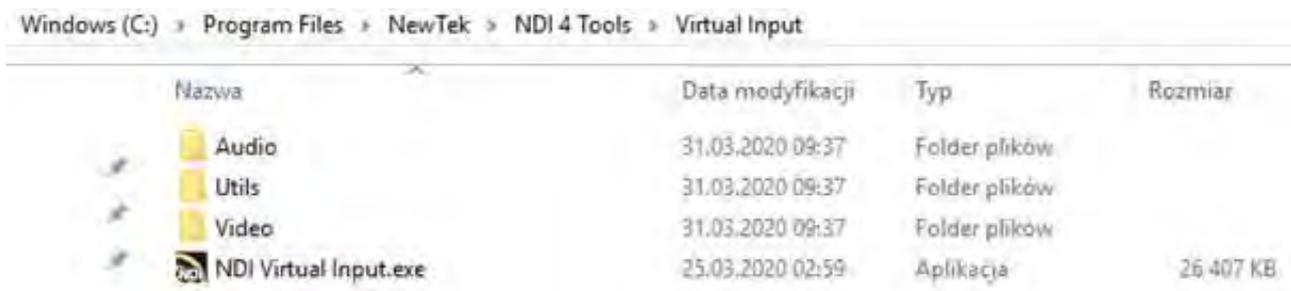
At the bottom bar an "**NDI Virtual Input**" icon should appear.
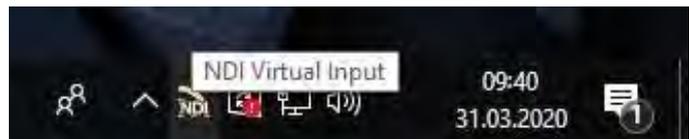
10. Go to Skype settings and choose "**NewTek NDI Video**" as a camera source.
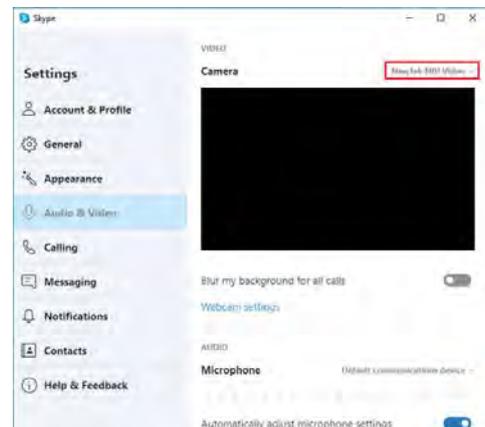
11. In RECKEEN application go to **Options** / Configuration, and then **Streaming** tab. Choose **NDI** and name the channel.

12. Click **STREAM,** which will begin broadcasting PROGRAM view via NDI.

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13. On the hosting device find NDI icon, and using right mouse click, click on the name of the channel that you have named.
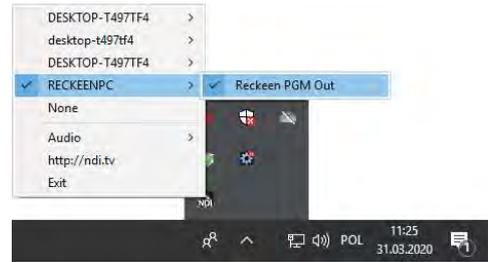
14. In **Audio & Video** tab in Skype settings, choose correct stream type.
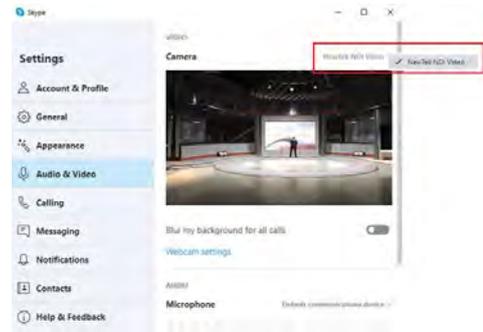
15. Initiate the call to the group chat. Make sure to disable "**Blur the background**".
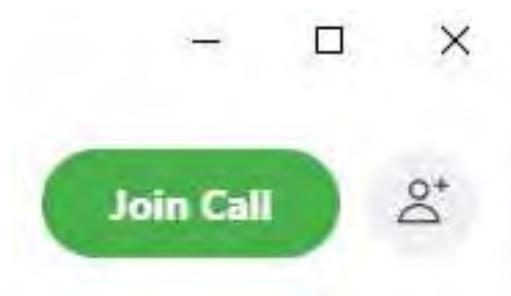
16. Enable camera signal by clicking on the camera icon. The view of the stream from the RECKEEN system should appear on the Skype screen of the hosting device.
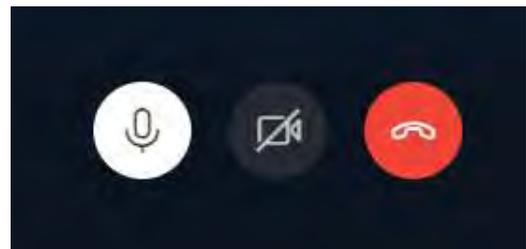
This way we send the PROGRAM signal from RECKEEN to Skype teleconference participants.

TIP: make sure that all group chat participants have their audio and camera enabled in Skype, and that their speakers work correctly.

NDI SOURCES AND PERFORMANCE

NDI performance is hardware related, it depends on the version of the Reckeen system and the external LAN switch.

In the currently produced systems, the 3D studio & Lite version includes a 2.5G port and there is no possibility of hardware expansion here. For more demanding applications, we recommend the 3DSproX8 system, which includes 10G and 1G LAN port as standard, this version can be expanded by adding an additional PCIe card, in such an expansion slot you can install another card with 10G LAN ports or, which is more justified, a 1G multi-port LAN card .

The table below shows LAN port configurations and NDI performance:

Number of ports of Gbps ports via standard RJ-45 cables				NDI		
	1Gbps	2,5Gbps	10Gbps	FullHD	4k P30	4k P60
3D Studio 12G & Lite	0	1	0	4	2	1
3DSPro X8	1 to 5*	0	1	6	4	2
* optiona 4 x POE 1Gbps ports as addtinal PCIe cards.						

Connecting multiple NDI signals through an external LAN switch
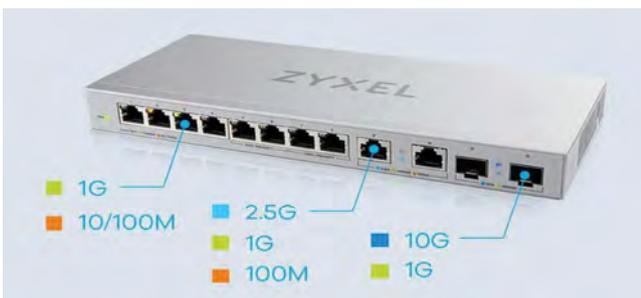
Connecting multiple NDI signals through an external LAN switch is one of the simplest and cheapest solutions. However, depending on your system, you need to take care of a LAN switch that will support your 2.5G or 10G LAN standart. Connecting the 2.5G signal to the 10G port will cause that in most devices it will be slowed down to 1G only.

For the system in the 3D Studio 12G and Lite version, a switch is required that supports at least one 2.5G port and many 1G ports

NOTE: Branded Ethernet / LAN cables guarantee the highest possible signal transfer while maintaining transmission precision. Make sure you select the appropriate cable category for 2.5 or 10G in at least CAT6 STP class.

3DSPRO X8 including Hyper-Fast 10Gbps Networking - The next-gen 10G port deliver incredible speeds of up to 10Gbps, perfect for ultra-busy networks and bandwidth-intensive tasks in your studio.

We recommend using an external LAN switch that supports the 10G standard

10G is easy to Use, No Setup Needed - Simply plug it in, connect your devices, and that's it! No software or setup is needed, and there are 10G signal quality most of LAN swicher is LEDs to confirm your cables are working correctly.

This gives your studio network the bandwidth to cope easily with even the most data-intensive tasks, such as backing up to a NAS or transferring huge files or NDI signals or tracking PTZ connetions. Most of 10G LAN swicher has also 4 or 8 Gigabit Ethernet ports for the ultimate versatility.
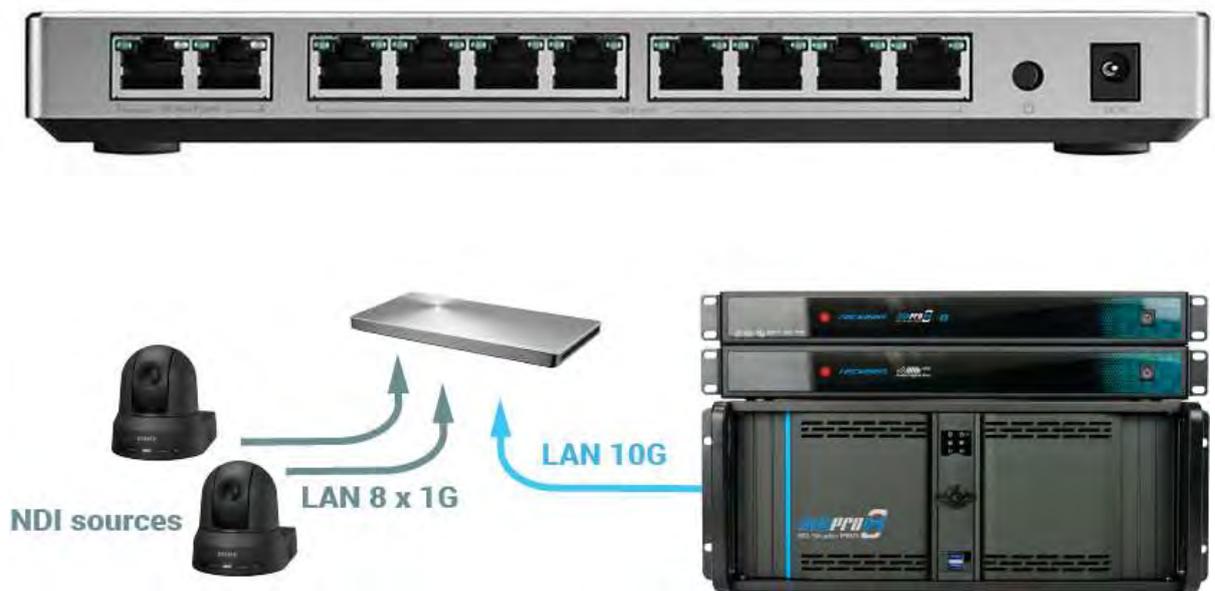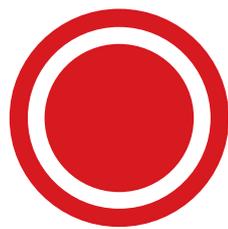
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Slideshow Controller 1.2

The Reckeen Slideshow Controller V1.2 is software program under the Windows system that you can install on a laptop, the purpose of which is to take over the laptop keyboard, this program simulates pressing any key and thus can control any application that is installed. e.g. programs such as NewBlue™ TITLERS or any CG or with any program for conducting presentations, e.g. Power Ponit, or teleprompter as well as any other program that has programmed shortcuts.

Data exchange between Reckeen 3D Studio and Reckeen Slideshow Controller V1.2 takes place via a LAN.

Now we will describe the installation and programming of triggers in 3D Studio as well as sample applications and applications.

Using shown method, we can program and control any trigger from a Reckeen studio, using a mobile app. On a laptop, which is connected to the same network as other devices, we will run a slideshow presentation. The presentation will be shown on a virtual monitor inside a 3D Studio.

On a laptop, we first need to install "Reckeen Slideshow Controller V1.2" application, which can be downloaded from our website www.reckeen.com, from a "Downloads" tab. Below laptop screen, presentation file and file with "Reckeen Slideshow Controller" program.
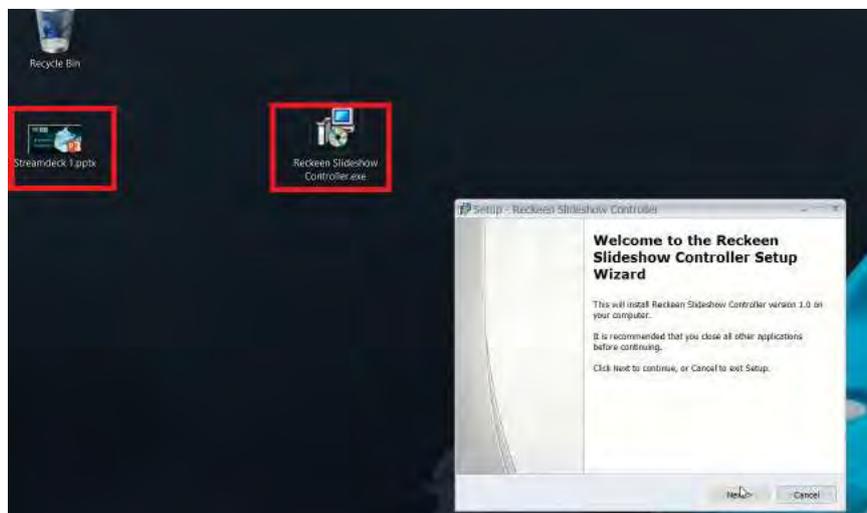
Let's run the file, then allow the app to make changes by clicking "Yes" and follow the installation process.

Let's create a desktop shortcut.
   When we run the application Windows Firewall will ask about access to public and private networks. Tick both boxes, and then click "Allow Access". Picture below.

In the window we can see the IP address that the laptop is connected to. Picture below.

We can now close the window. The application will still be active and running in the system's tray in the bottom right corner, next to a clock.

TRIGGERS FOR REMOTE CONTROL

We can configure dedicated triggers in the Reckeen's system. Let's run 3D Production on Reckeen's software. From the bar on the top we choose "Option" and then "Configuration". Picture below.
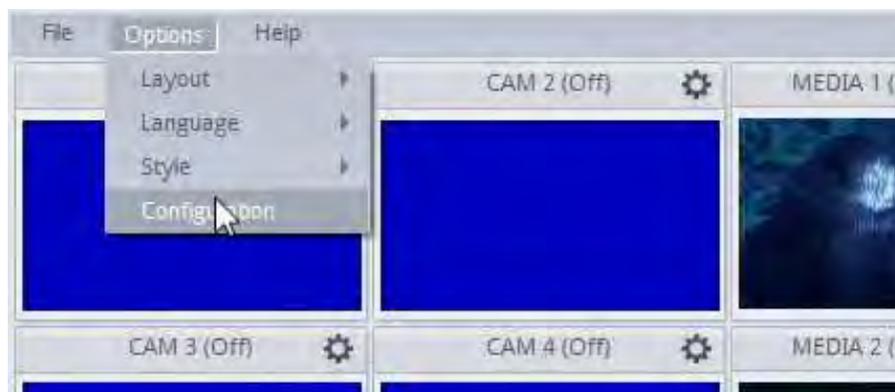
We go to Trigger tab, and choose Key F1. We also choose "Advanced" mode on the right-hand side of the window. From the list of triggers we choose "Remote Control: send command" and click "Add". Picture below.
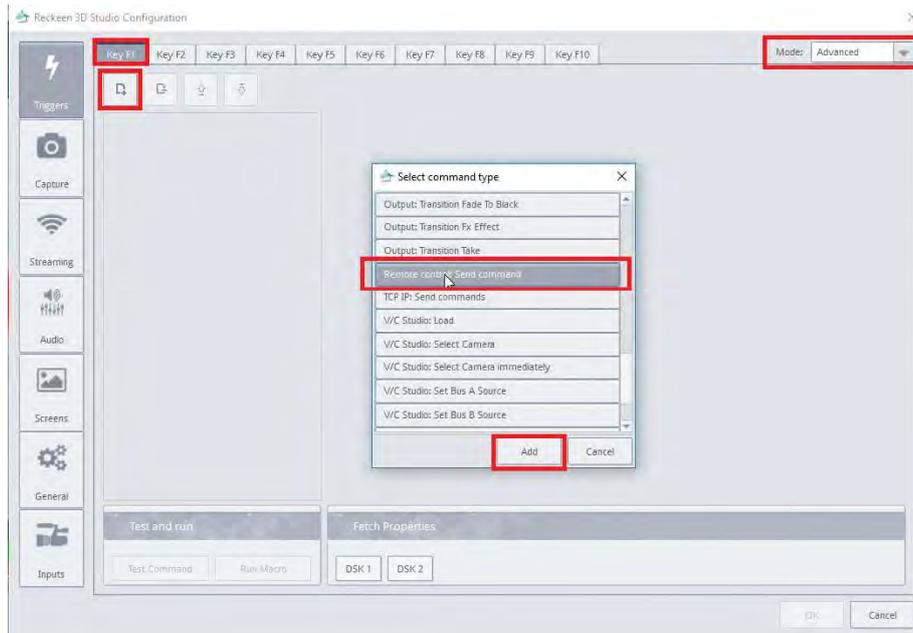
Using "Find" button we search for an IP address that matches our laptop's. We choose the correct IP and double click on it. Picture below.
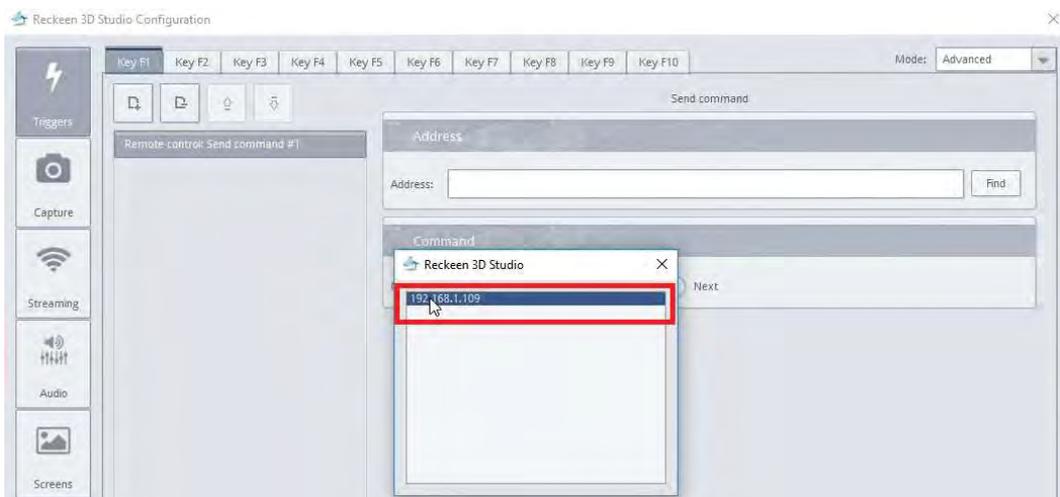
And then we assign command. I'm choosing "Previous". Picture below.
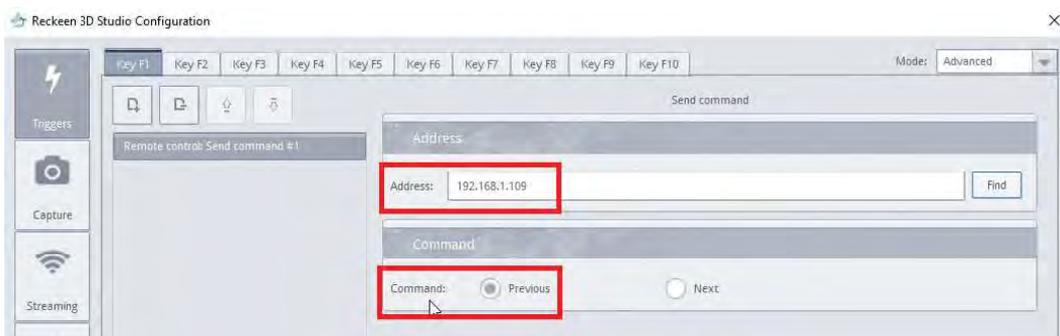
Now we need to set F2 trigger, in a similar way as we did for Key F1. We choose Advanced mode, and then from the trigger list - "Remote Control: send command". We search again for the correct IP address. And we double click on the IP. This time we set command "Next". Picture below.
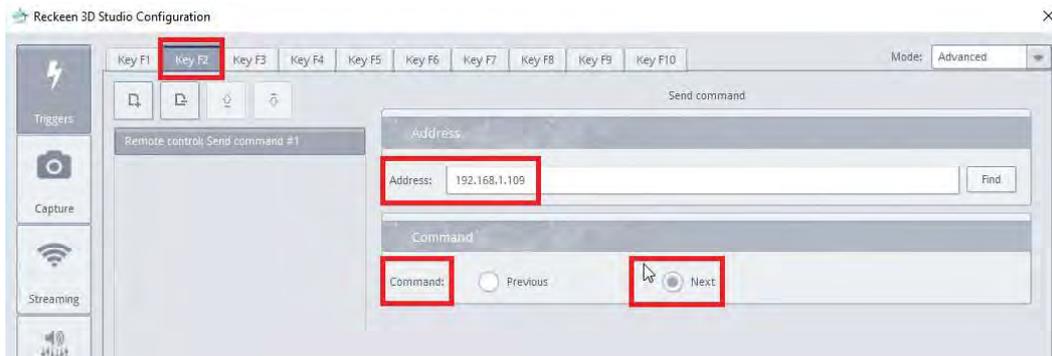
"Next" and "Previous" commands correspond to pressing the cursors on the lapotopa keyboard, which are most often used to select the next pages of the presentation or the previous pages.

In the current version of the program it is also possible to send any key combination see below, just select "Custom", then press the desired key combination. This combination will be remembered and sent to the Reckeen Slideshow Controller application after calling this trigger.
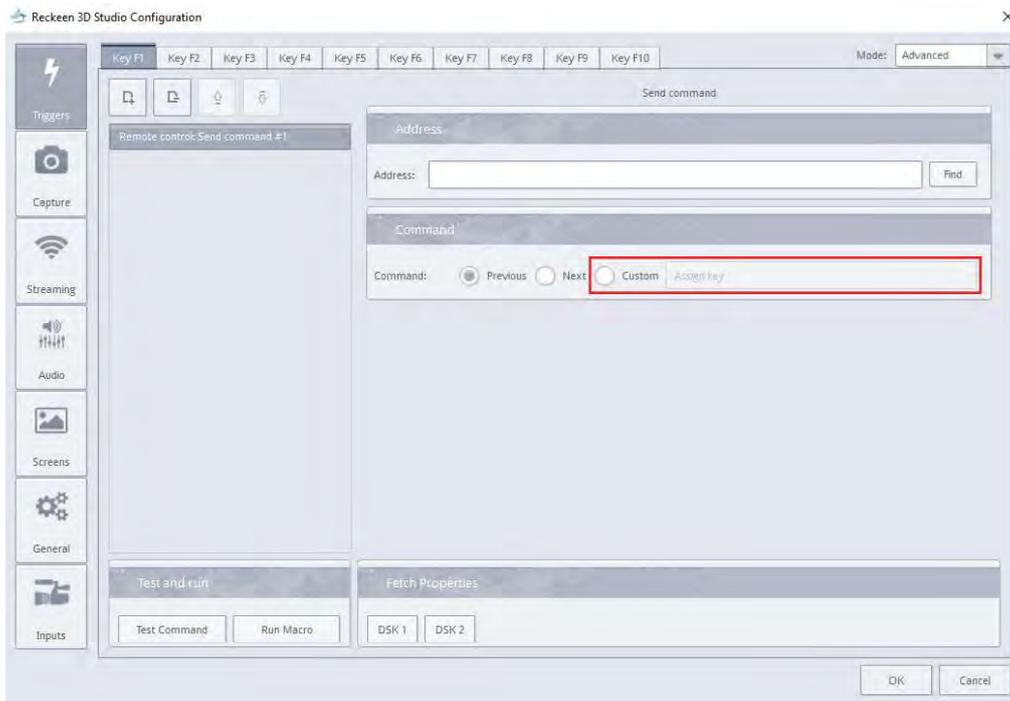
From 1.2 versio support - direct command support F1-F10,

SLIDESHOW CONTROLLER APPLICATION EXAMPLE

We're going to show a configuration of Reckeen's system with an app called Stream Deck Mobile by Elgato used to control content from an external source as application example.

The purpose of this example is to show the system configuration for remote control of Reckeen 3D Studio using the application installed on the phone. figure below:

We have to open Elgato's website: www.elgato.com. The company has an app for iPhones, which we have to install on our device. Let's choose the Stream Deck Mobile section.

Next, we need to go to "Downloads" section to install "Stream Deck for Windows" application on the Reckeen's PC station. When it's done, let's run the file, and follow steps in the window. We need to allow the app to make changes on our PC. We have to connect application on Windows with the one on a mobile device. Both devices need to be connected to the same local network. In the application which is on the PC.

In this manual, we will not present the entire installation process. But the details of the whole installation are presented in the video tutorial at our website.

We invite all to watch interested parties to our website:

https://www.reckeen.com/tutorials/Tutorial 42 Slideshow Controler

This example is one of the most interesting solutions. On the laptop we've run Reckeen Slideshow Controller and a slideshow presentation. The signal is sent to Reckeen system through NDI or HDMI connection, and then can be displayed on a virtual monitor. When the configuration process is done, a mobile device sends commands to Reckeen's system which with a use of programmed triggers, sends the command to a laptop. Picture below.

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Control Panel
VKEY100/200/200+
User guide

You can control the Reckeen 3D system with the VKey-100 & 200 control panel, or/and with a standard PC keyboard.

HOW TO CONNECT KEYBOARD VKEY-100 & 200/200+ TO THE RECKEEN SYSTEM

The full set of configurations includes:

- Vkey100/200/200+ Control panel
- RS 232 communication cable with DB9 connector.
- Power supply unit and adapterst

Connect the keyboard to the system using RS 232 communication cable with DB9 connector. Plug the end of the cable to the input / output card. Connect the other end of the cable to the keyboard's port. Screw in the locking screws. Picture below.

It is also possible to connect the Vkey100/200/200+ via a **USB** connector. For this you need an external USB to RS232 converter, it is not included in the set.

If you choose this type of keyboard connection, you must first configure the RS port in your system. Choose tab Option / Configuration / General / **External Keyboard Setings:**

In this window, a list of available Com ports will appear in your system. Indicate the correct port to which your Vkey100/200/200+ keyboard is connected **(Available serial port for the keyboard:).** Confirm by pressing option: **Change serial port.**

Function of automatically searching the port is also available. If the Vkey keyboard has not been found by manual selection, you can enable the function - **"Auto select first serial port if the keyboard not found".**

Use a proper power supply adapter used in different types of electrical networks. Select the appropriate adapter and insert it into the power plug. Move it forward until you hear a click. Picture below.

First connect the power supply plug to the VKey 100 / 200 keyboard power socket and bolt the locking screw. Picture below.

Next connect the power supply unit to the electrical outlet. Picture below

Now you can safely set the Reckeen system switch to position 1 and then turn on the power using the VKey 100 switch.

TEST AND CALIBRATION OF THE V-KEY 100/200/200+ KEYBOARD

In the first step, turn the keyboard on by switching the power button to position 1. The appropriate buttons will light up for a moment.

In order to perform the keys' illumination test, a proper sequence has to be performed.The following buttons have to be pressed simultaneously: DELEGATION A ,DELEGATION DSK 1 and LOCK like the picture below.

After this action, the LOCK and DELEGATION DSK 1 buttons are blinking. It is now possible to check the backlight of all buttons. Let's press the keyboard keys one by one, in any order.The first time you press a key, it lights up in white. A second press makes the key light up in its function color: red, green or orange - depending on its application. Picture below.

You can exit the test mode by pressing LOCK key. The keyboard will return to its normal operation mode.

CALIBRATION OF JOYSTICK AND T-BAR

Simultaneously press the following buttons: DELEGATION A , DELEGATION DSK 2 and and LOCK like the picture below.

5 buttons will light up signaling execution of a test for example, communication F1. Picture below.

The second test is JOYSTICK's calibration.Move it to the right and to the left to its extreme positions. When it's completed, the F2 LED will light up in white. Picture below.

Now let's move the joystick up and down to its extreme positions.When you complete that, the F3 LED will light up in white. Picture below.

F4 is the JOYSTICK's knob calibration.We turn it several times to the right and to the left to the extreme positions. When you complete that, the F4 LED will light up in white. Picture below.

F5 test is the T-BAR's calibration. Move the T-BAR to its extreme positions. Picture below.

After several movements, all the LEDs will go out. This way, the keyboard has been calibrated and has returned to its normal operation mode.

ADJUSTING THE BRIGHTNESS OF THE KEYBOARD'S BACKLIGHT

Simultaneously press the following buttons: DELEGATION A, DELEGATION B and LOCK like picture bellow.

The keyboard shows the current brightness of the keys. Pressing TAKE key several times decreases the backlight's brightness. AUTO key increases brightness of the keys. Picture below
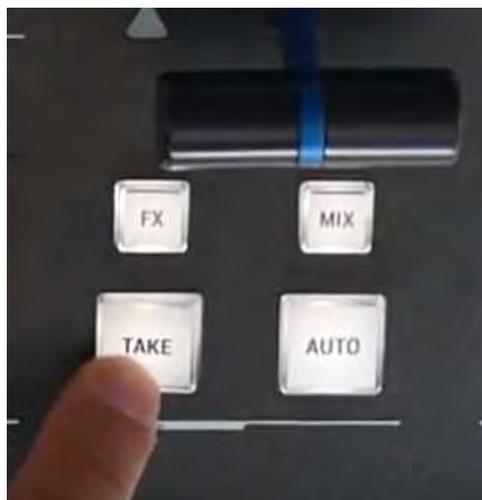
When an appropriate value is set, exit the mode by pressing LOCK key. The keyboard returns to its normal operation mode.

HOW TO USE V-KEY100/200 KEYBOARD

Control Pane: Picture below:

Vkey 200/200+   Vkey100

In the central part you can find a main mixer. The first row of buttons, backlit in red, stands for PROGRAM channel, live on-air.

The second row of buttons is the PREVIEW channel, where you prepare the the content that will go on-air next. It is backlit in green.
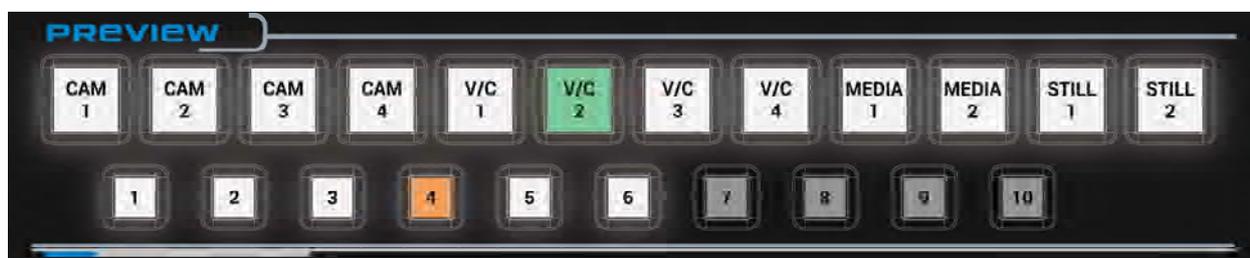
State of the keyboard keys reflects the state of the Reckeen application.

A transition between video channels can be performed with TAKE function. This is an immediate transition. In this case, the selected items on the Program and Preview mixers switch their places.
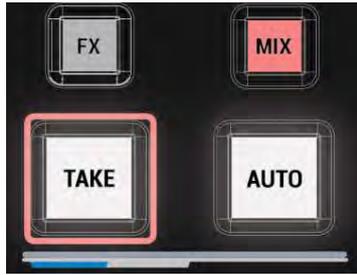
The second method is a transition with the use of AUTO. It is a smooth transition with a time set in the application. After its use, the T-BAR's motion is reflected in the application. And a smooth change between
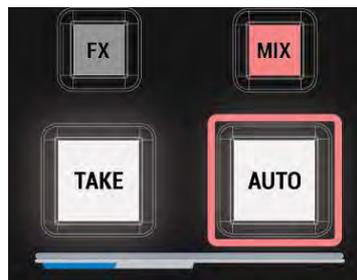
PROGRAM and PREVIEW channels takes place.

The third option is to use the T-BAR manually. A lit up green arrow indicates that the T-BAR is in its extreme position. After moving to the opposite extreme position, the arrow on the oppoite side will light up. The PREVIEW channel will smoothly transition to the PROGRAM channel.

You can control the camera shots using the V/C buttons. It is possible to highlight shots in the application after selecting an appropriate video channel. Press a button, for example PROGRAM channel's V/C 1.
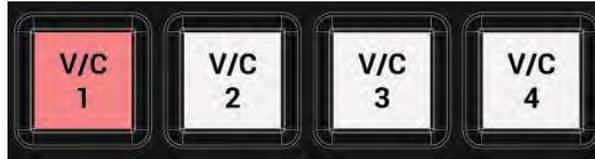
In the application, V/C 1 tab will be highlighted in red.

PROGRAM channel shots will appear next to it. There are 15 possible shots in a given V/C, first 10 of which can be found on the keyboard.
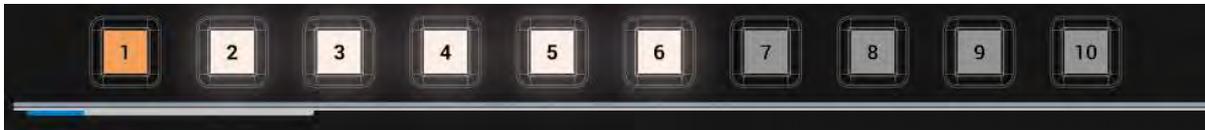
In the default NEWS studio, 6 shots have been programmed, so the same number of buttons is currently backlit on the keyboard in the PROGRAM shots section. After pressing one of the buttons, a virtual camera makes a transition to a given shot in accordance with an application mode set, e.g. linear or curved at the speed of 5. A smooth transition to the next point is made. After this movement, the button lights up permanently in orange.

The same can be done in the PREVIEW channel. Let's press one of the V/C buttons.
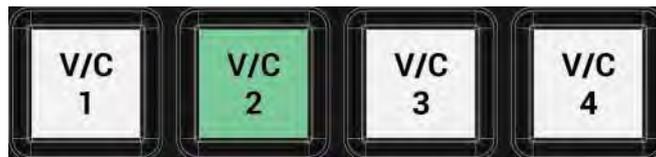
In the application, the tab will change its color to green.

In the window, you can see PREVIEW channel shots. Press one of the buttons to change the shot. The camera moves, this time in the PREVIEW channel. After this movement, the button lights up permanently in orange.

Next think you can configure are the signal sources in the virtual studio. In the application, the ABCD mixer is used for that purpose.

On the keyboard, the DELEGATION BUS keys will be used.

Vkey 100   Vkey 200/200+

Hold down one of the delegation button, for example A. Buttons with the available source selection for layer A will be illuminated in the PREVIEW channel.

Note: access to delegation E to H or DSK2 in VKey 200 require pressing Shift button first.

Note: Delegation E to H are not yet supported by the Reckeen application.

In addition, you can use the buttons on the media mixer.

VKey 100   VKey 200+
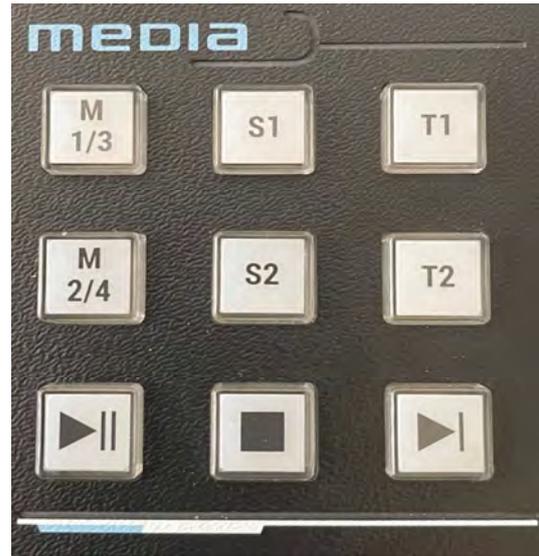
When you select one of the buttons, the selection will appear in the application's ABCD mixer.

Right next to ABCD delegation buttons, you can find buttons for setting up the sources for DSK layers.
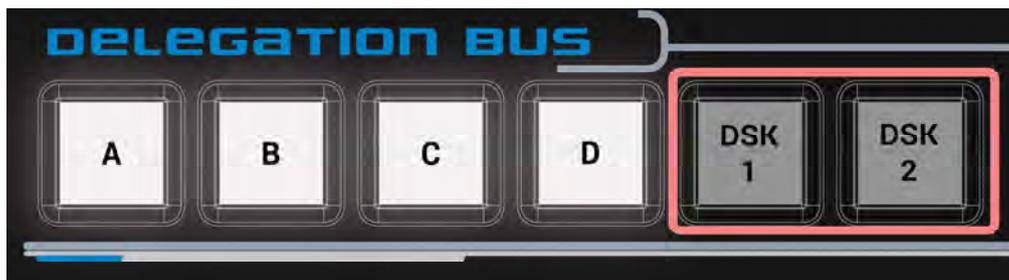
They are inactive, so first you have to enable one of the layers. Let's press a button, e.g. DSK 1.

Note: access to delegation DSK2 in VKey 200/200+ require pressing Shift button first.
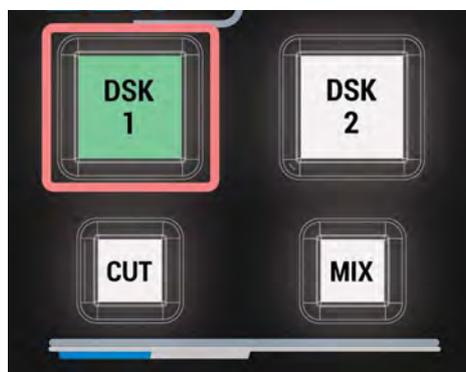
It will be backlit in green, which means - visible in the PREVIEW channel. Now the DELEGATION BUS button is active. Hold down one of the Delegation BUS buttons, e.g. DSK 1. This time you choose a source for DSK 1 in the PREVIEW channel. You can also use the media mixer. Pressing the button brings the keyboard to its normal operation mode.

Operating the DSK with the keyboard is synanomous to using the application. It is possible to redirect a DSK source from PREVIEW to PROGRAM channel using CUT button.

After pressing it, the source will immediately appear on-air. DSK 1 button lights up in red. DELEGATION DSK buttons are turned off. Another way to introduce a DSK source on air is to use MIX button.

When a proper time is set in the application, the source will appear by a smooth transition from the PREVIEW to the PROGRAM channel.

There are three OUTPUT buttons next to DELEGATION buttons.
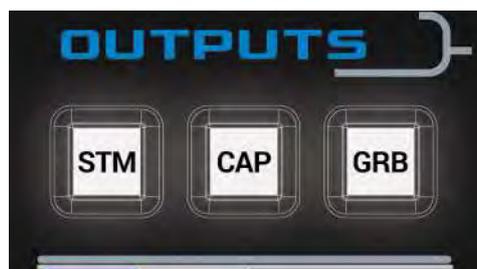
The first one - CAPTURE - allows you to record the PROGRAM channel to a video file on the PC disk. When pressed, it will light up in red. The recording starts and a corresponding button with a timer becomes highlighted in the application. The recording is stopped by pressing CAPTURE button again. The button is

backlit in white until its next use. Similarly, you can use STM button to stream to a server. Next to it, you can see GRB button for creating a graphic image of the program output.

There are 10 function keys in the upper part of the keyboard. If they are not backlit in white, it means that none of these buttons have been programmed.
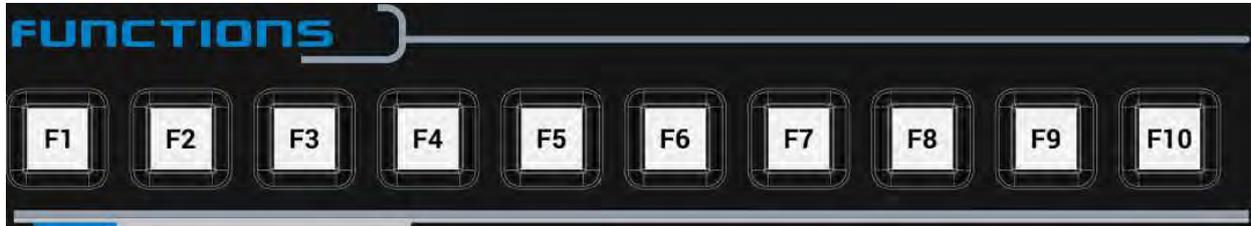
You can program them by going to MENU OPTIONS and CONFIGURATION. In the TRIGGER tab, you can assign them suitable functions, e.g. GRAPHICS OVERLAY. After programming two buttons, F1 and F3 for example, and exiting the configuration window, these programmed function keys will be backlit on the VKEY keyboard.

After pressing F1 key, it lights up in red as active. All the others are disabled. The function's deactivation occurs after pressing this button again. After switching it off, the programmed keys will light up in white.

It is possible to control a virtual camera with a JOYSTICK, both in the preview channel and on air.

On the PROGRAM mixer, select a button, V/C 1 for example.

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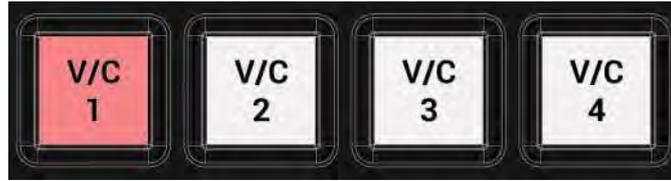
The corresponding tab will be highlighted in red in the application. In the Joystick control section, select V/C mode, which will enable control of this virtual camera on the Program Output using the joystick.

There are three options below.

- The first one is MOVE. When you select this button, it lights up in orange.

With the JOYSTICK you can move the camera forwards, backwards, to the right and to the left.

The three F M S buttons are used to set virtual camera speed. S stands for SLOW, M for MEDIUM, and F
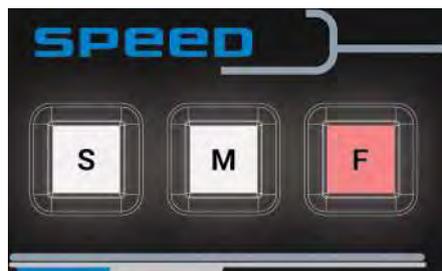
for FAST speed. The speed mode reacts with JOYSTICK's movements and rotations.

Rotating the joystick to the right raises the virtual camera position and rotating to the left lowers the virtual camera position.

- ROTATION is the second option for moving the camera.

Using the JOYSTICK you can rotate the camera around its own axis (right, left, up and down). Using the knob in this mode, you move the camera forward by turning the knob to the right and backwards by turning it to the left.

- The third movement option is ORBIT.

In this mode, you move the camera around a specific point in the studio with a fixed distance from it. By default, this is the 0.0 point. The point of orbit center can be changed in the CAMERA SETUP. Choose a new point for virtual camera orbiting by selecting and highlighting an object. After leaving the CAMERA SETUP editor, the new center point of the orbit will be remembered.

When you select a DSK option and its source, you can set the position of the DSK content on the screen with the JOYSTICK. If the DSK button is backlit in green, then the button is active and can be selected.

VKey 100 / 200   VKey 200+

Note: access to delegation DSK2 in VKey 200/200+ require pressing Shift button first.

There are two options at your disposal.

- The first - positioning of DSK source.

With a JOYSTICK you can, for example, insert a picture, such as a logo, anywhere in the PREVIEW screen. Use the JOYSTICK's rotation to scale it. Reduce its size by turning the joystick to the right and enlarge it by turning to the left. Move the joystick up, down, right and left to change the content's position on the screen.

If the DSK layer is transferred to the PROGRAM channel, then making adjustments with a JOYSTICK is no longer possible.

• There is also a second option to use a JOYSTICK for DSK. Choose DSK and ROTATION option.

By rotating the joystick, you can rotate the DSK content to the right or to the left respectively.

You can find a LOCK button next to the Joystick. It allows you to completely lock the JOYSTICK. When it lights up in red, the JOYSTICK is protected against accidental use.

In emergency situations, it is possible to press the FTB button which will then light up in red. A black board will appear on the PROGRAM screen and the sound on the mixer will be muted. Pressing this button again restores the previous view and the sound mixer's state.
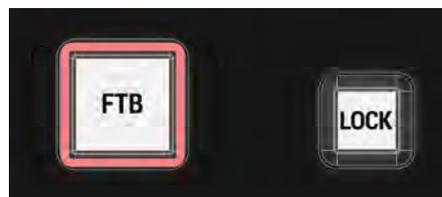
With the keyboard, you also have control over video and image trays. With a single button, e.g. M1, you can select MEDIA 1 video tray in the application.

VKey 100/200   Vkey 200+

Note: access to delegation M3, M4 in VKey 200+ require pressing Shift button first. 3 & 4 are not yet supported in the Reckeen application.

It will automatically open MEDIA 1 video tray in the application and will highlight previously chosen file.

Stop the media playback by pressing STOP button.

Start the playback with PLAY button. When it is playing, you can PAUSE it with the same button as well.

Press NEXT button to select the next file from the tray.

It will be highlighted in the window as ready to use. You open a new file by pressing PLAY button. In the same way, you can view STILL and TEXT image files or play a playlist sequence.

Vkey 200+ control panel has a dedicated key PTZ that indicates the active assignment of the joystick function to the PTZ camera. This key is highlighted in blue.

Note: Control Panel VKey 200/200+ has additional keys: CAM 5 to CAM 8, MEDIA 3, MEDIA 4, VSE 1, VSE 2 - these are not supported in Reckeen 3D Studio V3.1 or earlier software, and have future intended use in subsequent versions of the software.
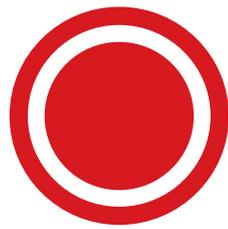
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Programing triggers

PROGRAMMING TRIGGER BUTTONS

This chapter is devoted to Triggers that allow you to assign a function sequence to function keys F1 to F10.Thanks to this, it is possible to create many very helpful subprograms that facilitate controlling the Production process. Triggers have two basic modes, Simple and Advanced:

Simple mode has been created for the on PRG screen viewing of movies, full-screen images, or for quick.

There are three OUTPUT buttons next to DELEGATION buttons input of audio files . In Advanced mode we can freely combine the functions of the whole application.

You can set the following commands to the function buttons:

AUDIO	DSK	GENERAL	V/C	MEDIA	OUTPUT
Input: Mute	Set Position	Reset	Studio Load	Auto Play	Select Preview
Input: Solo	Set Preview	Delay	Select Camera	Loop Play	Select Program
Input: Volume	Set Rotation	Wait for key	Select Camera immediately	Pause	Transition Auto
Master Output: Mute	Set Scale	Animation Control	Set Bus A Source	Play	Transition Fade to Black
Master Output: Volume	Set Source	TCP IP: Send commands	Set Bus B Source	Select	Transition Take
Output: Mute	Transition CUT	Remote control: Send command	Set Bus C Source	Stop	
Output: Source	Transition MIX		Set Bus D Source		
Output: Volume					

To assign a specific command to one of 10 function buttons F-1 to F10, click on the Triggers icon in the Reckeen 3D system configuration window. Then select a Mode - Simple or Advanced - at top right side of the window.

TRIGGERS - SIMPLE MODE

Let's set the Trigger, which is to be assigned to the F1 key. The icon of Key F1 tab is highlighted . First, in the upper right corner of the window, switch to Simple mode. In a Simple mode, click on an icon at the upper left side of the window, and you will be able to select None or Graphics Overlay from the drop-down list.
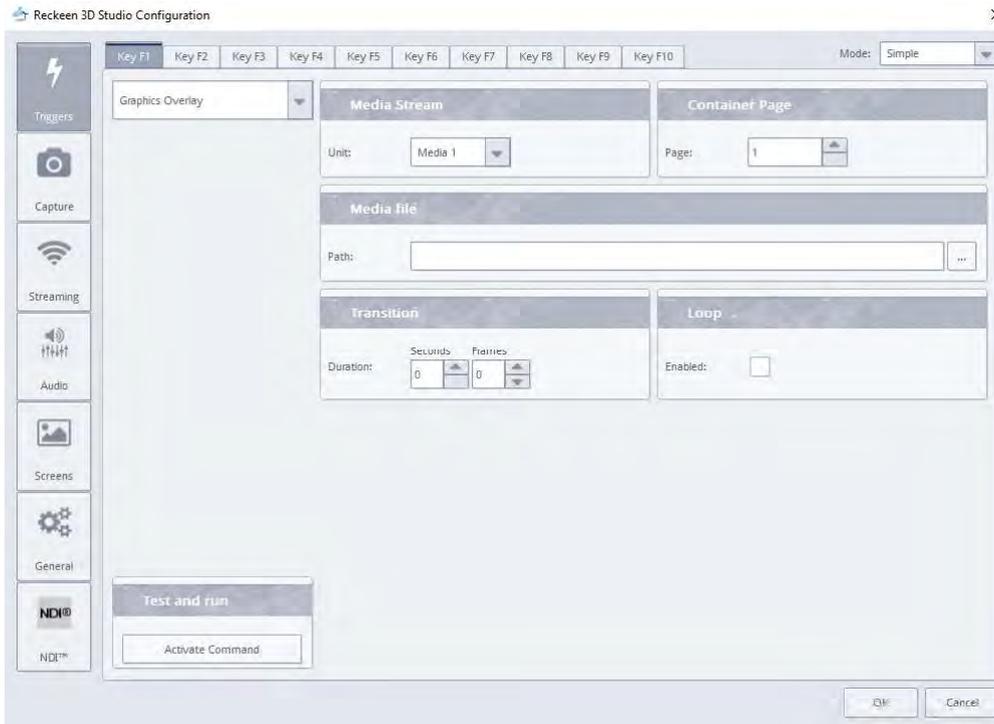
Graphics Overlay mode enables you to easily load a file with a chosen type of medium. Click on the white arrow in the Media Stream field and select the type (that is a tab from the media tray where you have placed your file) from the drop-down menu: Still 1, Still 2, Text 1, Text 2, Media 1 Media 2, or Sound.
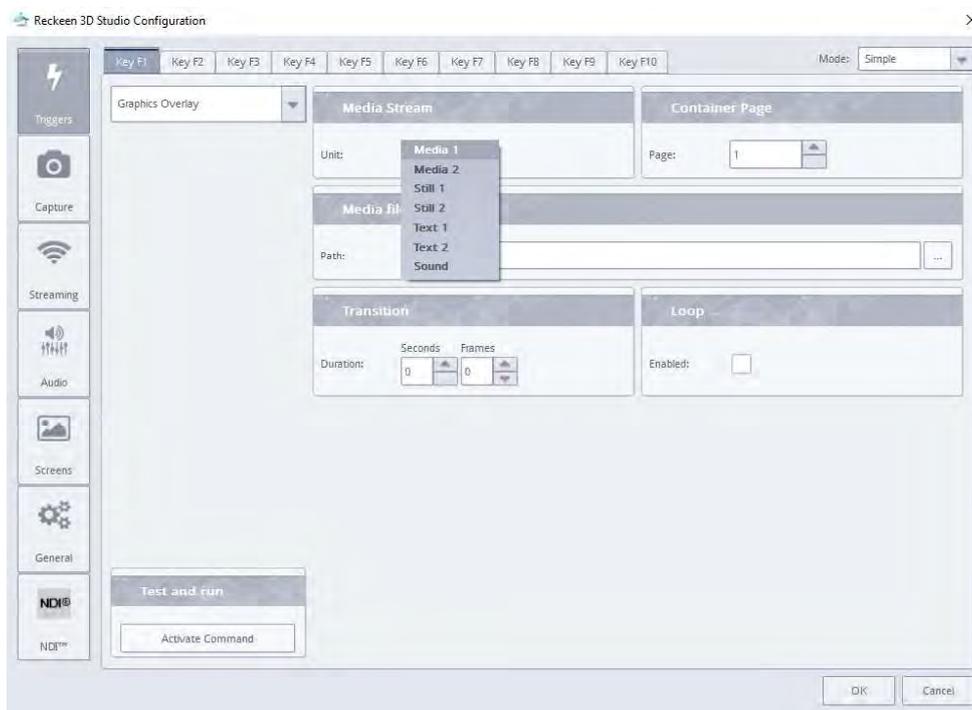
Choose a number of a page from the drop-down menu by clicking on the white arrow in the Container Page field.

The next step is to click the square button with three dots in the Media file field, to set the path to the file in the selected tab page of the tray.

A window reflecting a given medium tray (for example Media 1) will open. If the file of your interest does not exist, then you can double-click on an empty field and add it to the tray from the hard drive. This will create a file's icon ready to be chosen as a path.

You can also set a manner in which the selected file enters on the vision. It is done by clicking on the Transition icon and setting the transition's duration - the number of seconds or frames. For video files (Media) and Sound, a loop, that is playing a file repeatedly, can be enabled.

When the Loop is marked as active, the file will be visible on the air and played in a loop until the function button 'F' is pressed again by the user.

When the Loop is not checked, the file will be visible on the air and will end with its last frame, automatically leaving the Program image, i.e. turning the Trigger function off automatically.

The beginning and the end of the medium file take into account Mark In and Mark Out markers on the file, when you use it as a Simple Trigger.

Simple Trigger supports full audio for a given file, so when the tray is active on a mixer, the sound will appear at the system output when the Trigger is activated.
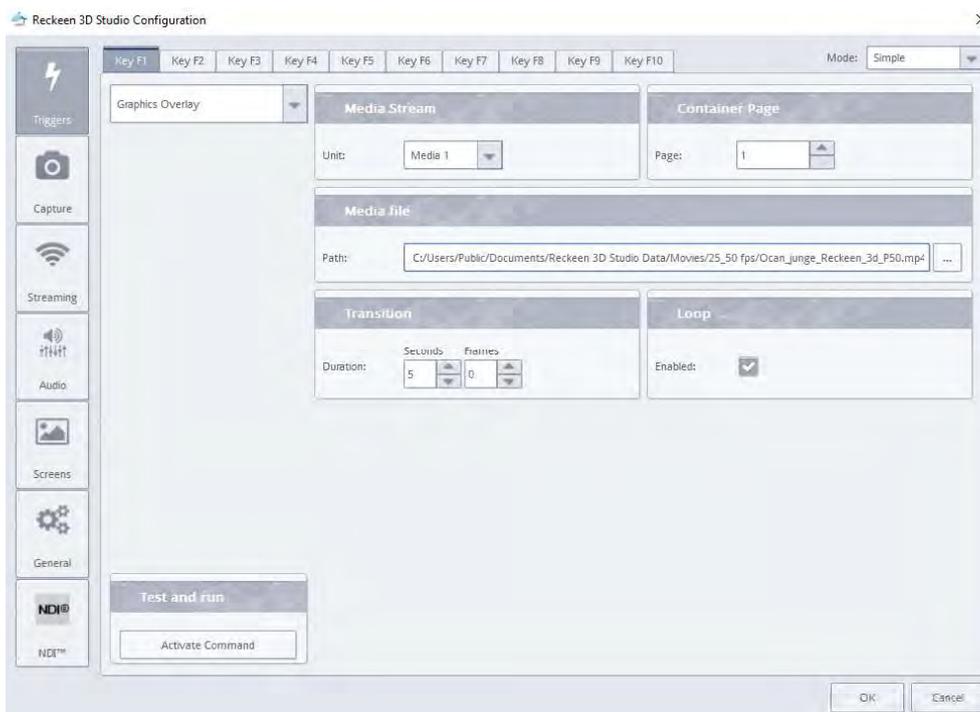
Simple Triggers are often used as additional scenery or special effects files, like for example semitransparent video files.

After setting all the parameters, click on the Activate Command icon at the bottom left of the window. If all the following actions were completed correctly, the command will be activated for a given key. If not - the system will inform you what yet remains to be set.

Normally, during the production, the functions are not triggered with Activate Command icon, but with the 'F' function keys located on the control panel's keyboard vKEY-100 or PC keyboard .

TRIGGERS - ADVANCED MODE

First of all, it has to be said that the PRODUCTION module application is divided into functions that can be turned on and off with a mouse or a keyboard, like changing the state of a main BUS mixer or DSK settings. To facilitate your work, you can combine several functions creating a command sequence that can be programmed to be executed by one of the Trigger banks. A Trigger bank can be set off automatically with a single button. The functions are then triggered one after the other, creating interesting sequences. A classic use of Triggers is displaying content (pictures, videos) automatically at a specific time in the PROGRAM output. For example: setting Media as a source, introduction as DSK, its positioning, scale and rotation, going on the air at a certain time to PROGRAM and going off the air. Therefore, a Trigger is a programmed sequence of functions set off with a single button.

There are 10 Trigger banks assigned to F1 to F10 function keys in the Reckeen 3D system.

Programming a Trigger:

Open Menu> Options> Configuration> Triggers.

When you open Triggers window, first select a key that will be programmed (KeyF1 to KeyF10).

In the upper right corner of the window, select for this chosen key a Mode in which you will enter Triggers: Simple or Advanced. Simple Mode has been created for displaying videos, full screen pictures or for the sound file to go on the air quickly. In Advanced mode, you can freely combine functions of an entire application.

If for a certain key (e.g. KeyF1) you chose a mode (e.g. Simple), you can still assign both Simple and Advanced modes to the other keys (KeyF2 to KeyF10).

At any given point of time, only one set of Triggers assigned to a specific function key can be executed in the Reckeen 3D system. The remaining function keys are not available until the termination of the functions. If you use KeyF1, you will not be able to activate another key, e.g. KeyF2, until all the functions stored in the bank are not completed. Operation of a given KeyF is signaled on the VKey-100 control panel with its button illumination.

At any time, you can terminate the operation (stop executing the functions set) of the KeyF button by pressing the active key button again. However, a single internal function must reach its completion and only then the remaining KeyF keys will be unlocked. Pressing the same KeyF once again will not continue execution of the consecutive functions - an entire list of functions will start from the beginning.

Let's now discuss all the functions that can be programmed.

AUDIO: INPUT MUTE

In the audio mixer, each input has a separate slider for adjusting this input's signal level. Audio: Input Mute

function allows you to mute (enable Mute to) a single channel selected from the Audio Mixer's inputs. These are: Line In 1, Line In 2, Camera1, Camera2, Camera3, Camera4, MIC, Media 1, Media 2, and Sound.

For example, let's use Audio: Input Mute function to enable Mute option for a signal from a Camera1 input.

In order to add the function to a KeyF function key, press a square icon with a plus sign (see the image below).
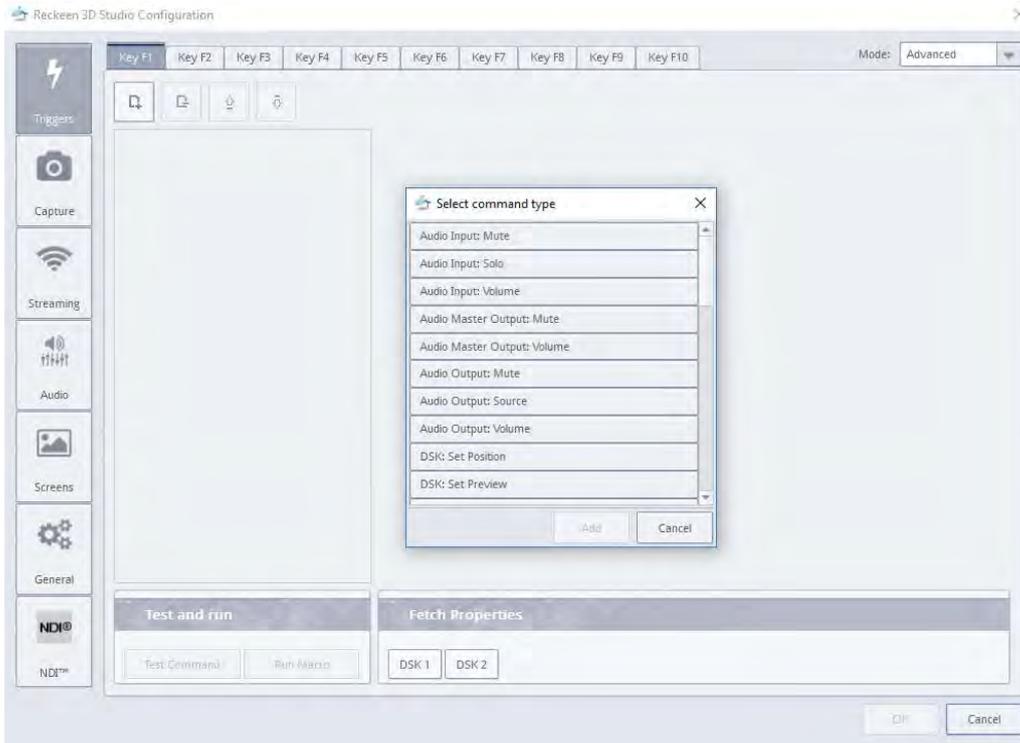
A drop-down list of functions will appear: Select command type. To select a function, highlight it with a cursor and double-click it or click on an icon: Add. The function will be added to the bank. In the same manner you can add more functions with different ranges.

To delete a chosen function, you have to move the cursor on it so that it becomes highlighted and press a button with a minus sign (as shown above). The function will be deleted.

After adding Audio Input: Mute, the following options will appear on the right side of the window: Audio Input and Mute.

Audio Input option - from the drop-down list, choose an input to which you want to apply Mute function. Image below.
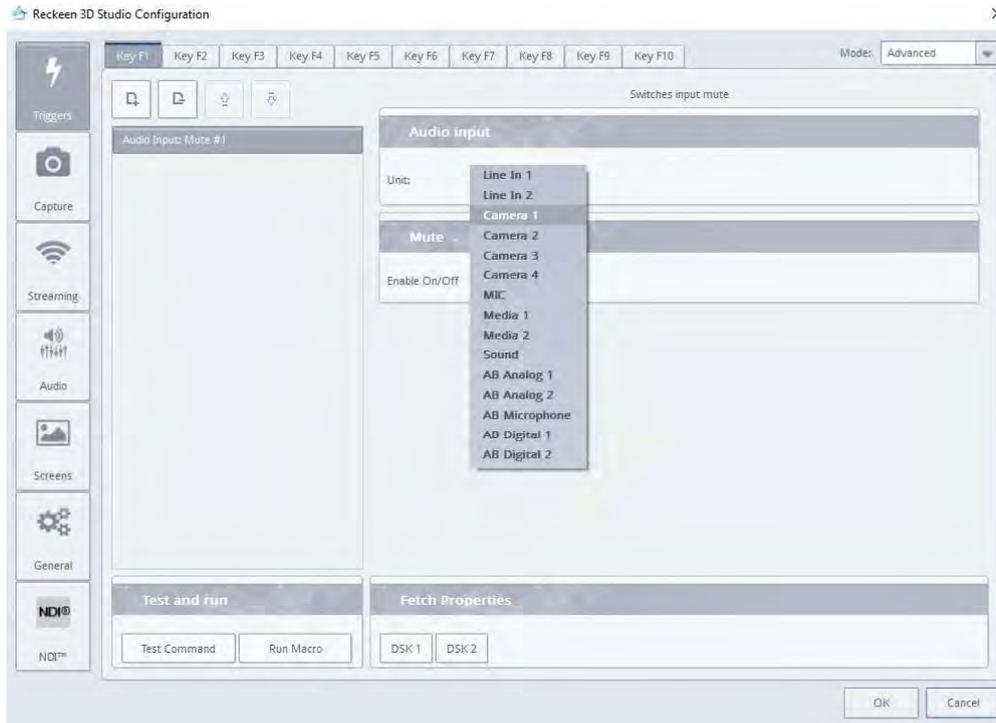
Mute option: when you tick the Enabled On / Off checkbox, it means you want to turn Mute function ON. That is, when the Trigger is activated by pressing the KeyF, the sound on Camera1 channel will be muted.

If the checkbox is not ticked, then pressing KeyF will turn Mute function OFF.

If there are several functions assigned to one KeyF, you can change their order. Select one of them and move it up or down using the cursor (as in the image below).

To test operation of a single function, highlight it with the cursor and press Test Command button on the screen. To turn the testing off, press Test Command button again with the cursor. Image below.

415
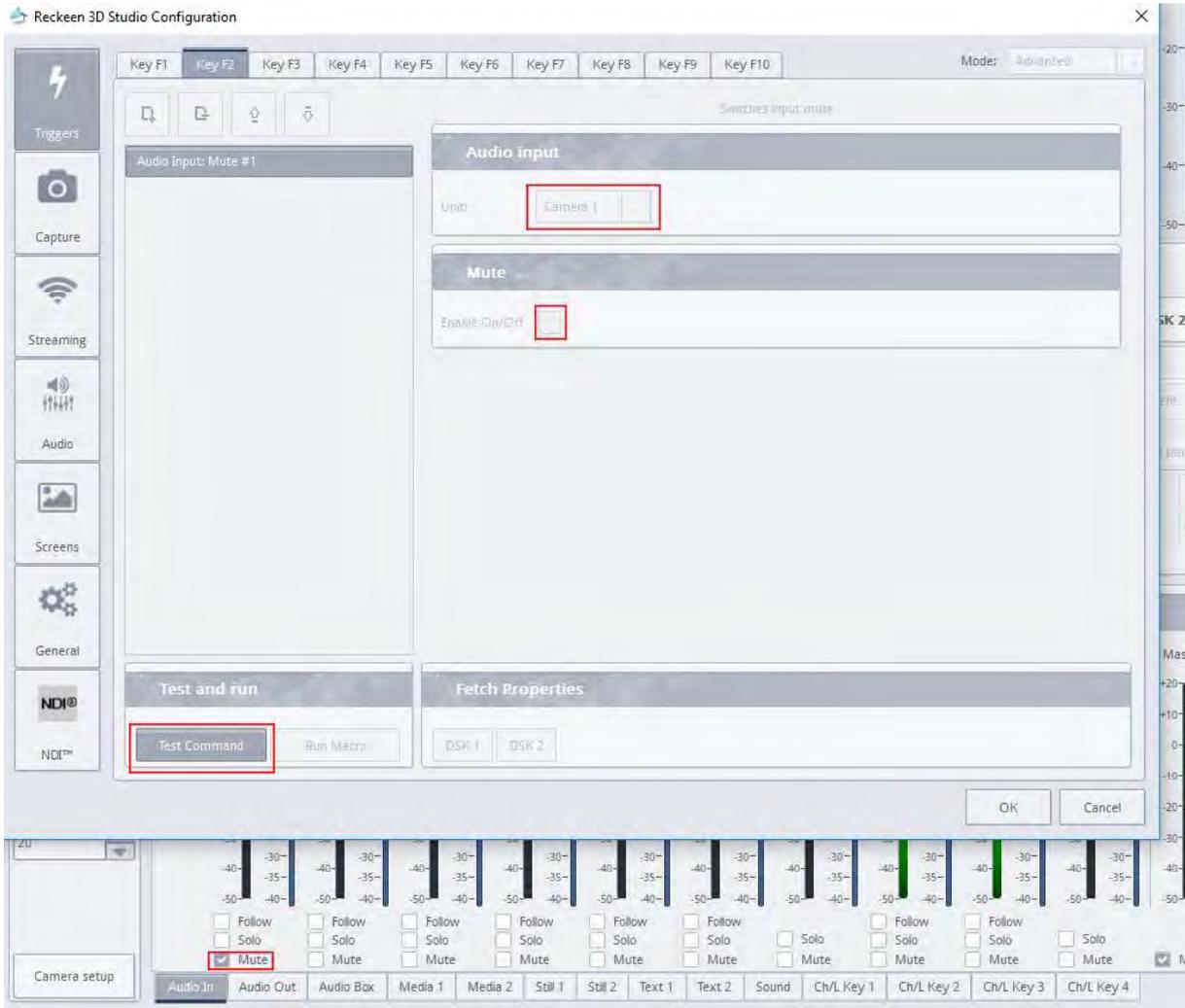
After pressing Test button for the selected Audio Input: Mute function, the sound will be muted. You can see on the screen that a MUTE checkbox under Camera1 slider in the Audio In settings is automatically ticked. Image above.

Run Macro button located on the right side, right next to Test Command button, allows you to test the entire set of functions assigned to the given KeyF's bank. Pressing Run Macro button should show you how the functions set would work if you pressed a physical function key F on a PC keyboard or on a VKey-100 control panel.

Example: We want to create a set of functions so that, when you press F1 key on a PC keyboard or on a VKey-100 control panel, the Camera1 sound is muted for 10 seconds.

We start with a function:

Audio: Input Mute - select Camera1 from the drop-down list in the Audio Input field. Tick Enabled On / Off checkbox, enabling the function. When you press plus button, select General Delay from the Select command type drop-down list. See the image below.
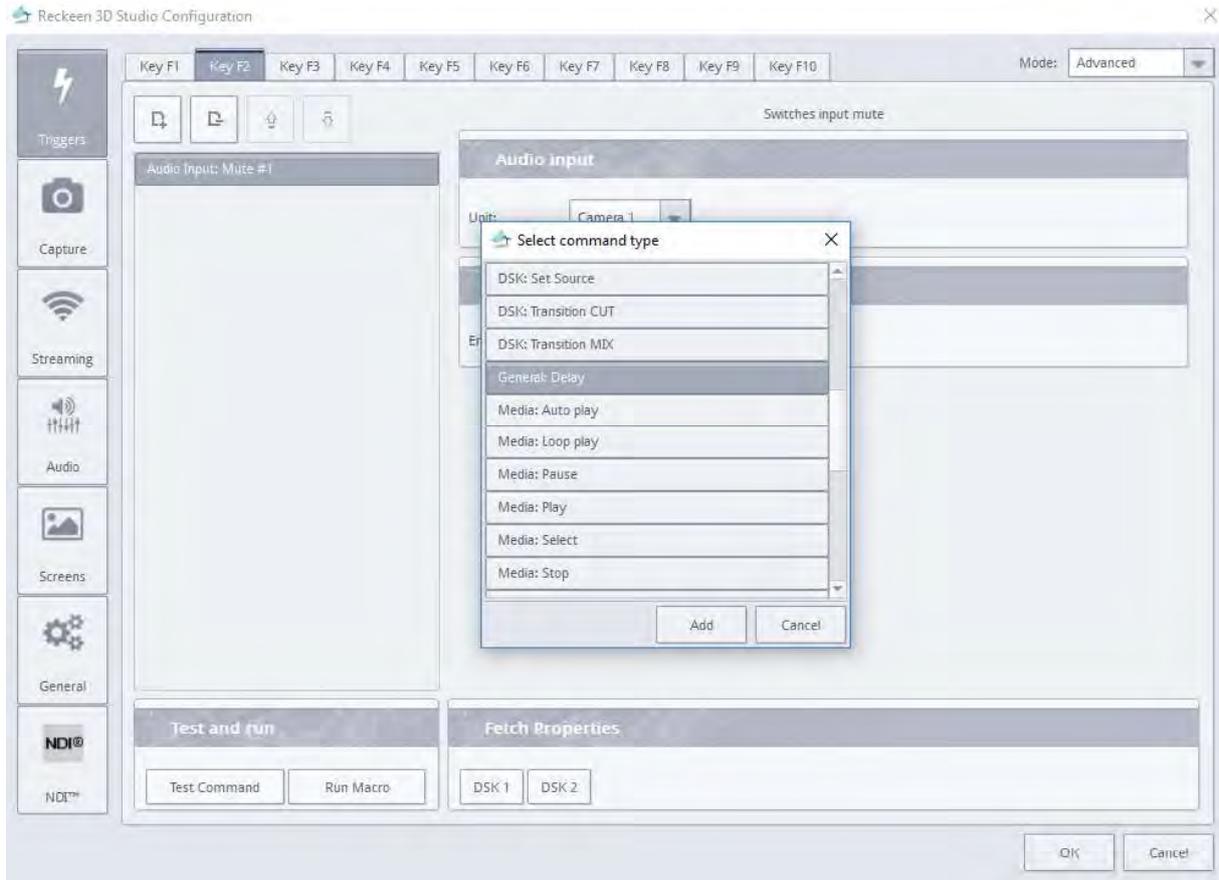
This function allows you to incorporate a pause defined in seconds or frames. We set a 10 seconds delay in the Transition field.

The General Delay function will be further described in the text.

As a third one, add again Audio Input: Mute function from the dropdown list. Set it for Camera1, but this time do not tick the Enabled On / Off checkbox. This means Audio Input: Mute function for Camera1 will be disabled. Image below.

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The whole sequence triggered with the function key will be as follows:

- Mute the sound of Camera1 channel.
- The mute lasts 10 seconds.
- Turn off mute for this channel.

Example: You can enable Audio Input: Mute for several input channels. Then, after turning on this Trigger, the Mute function will be enabled simultaneously for all the chosen sliders. All selected channels will be muted after pressing a single function key on the keyboard. The image below - muted channels: Media1, Media2, and MIC.
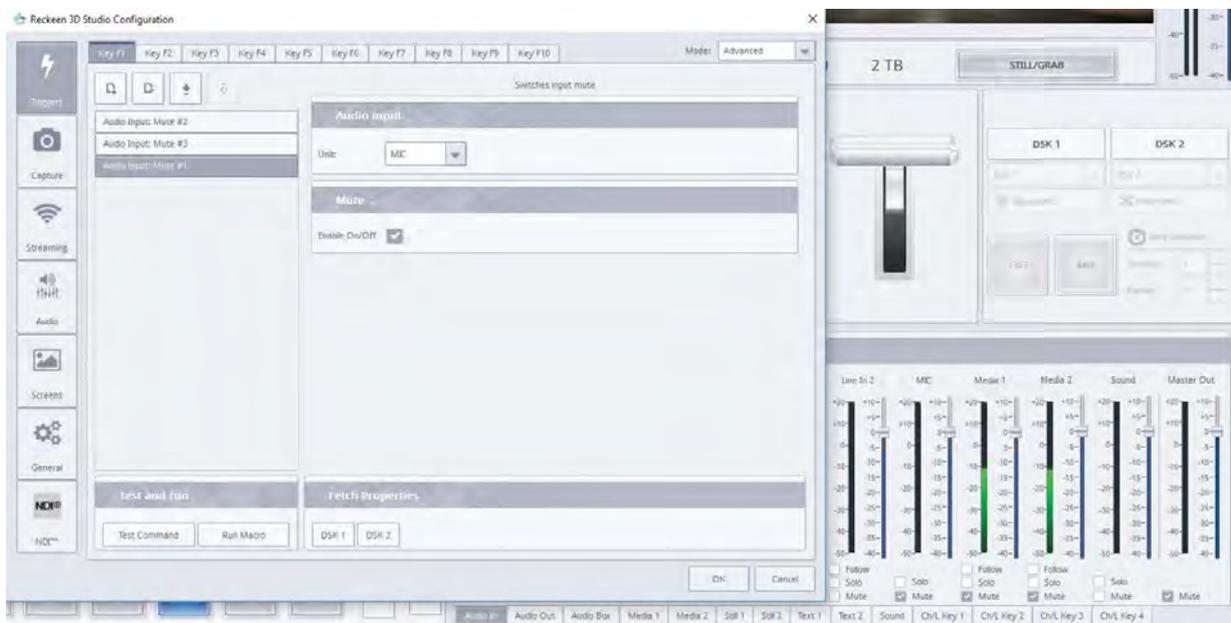
AUDIO INPUT: SOLO

This function is similar to Audio Input: Mute function, as you can see in the image below.
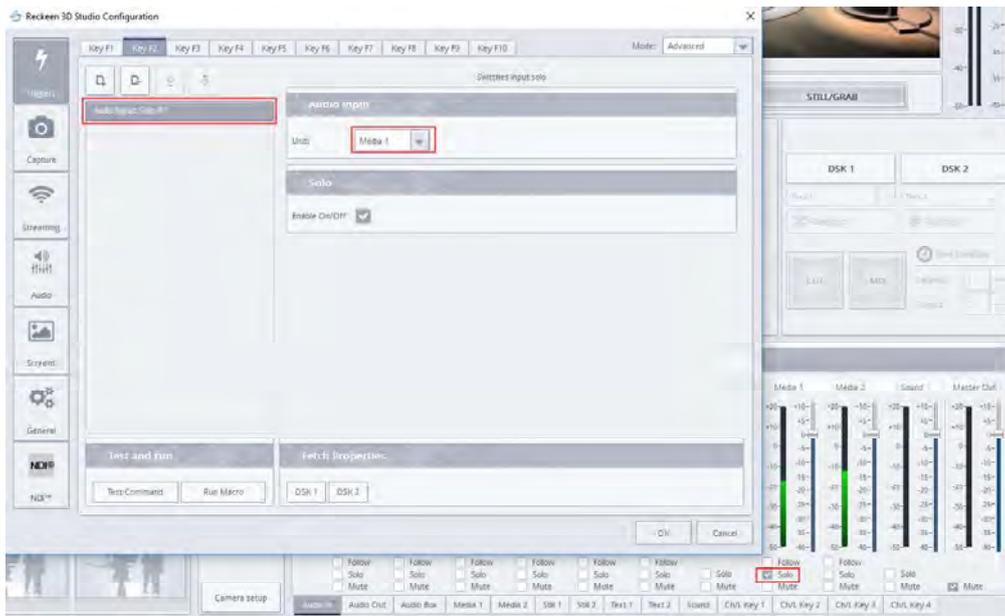
The difference is that with Audio Input: Mute function you can simultaneously silence several different Audio Inputs in the mixer, while using Audio Input: Solo function, you can only set one channel as Solo. This stems from the definition of a Solo function:

Solo - a feature that enables sending a selected signal individually to the output. Enabling this feature for the chosen channel mutes all the other input channels. Only the signal for which the Solo feature has been enabled is sent to the outputs.

AUDIO INPUT: VOLUME

With enabling this feature, you are able to increase or to lower a sound value for a selected input channel by setting an exact dB value of this channel's slider. After selecting a channel from Audio Input drop-down list, e.g. Media1, entering a value in the field, e.g. 5 dB, and enabling Audio Input: Volume, the Media1 channel volume slider will be set exactly in the position: 5 dB.

The image below.
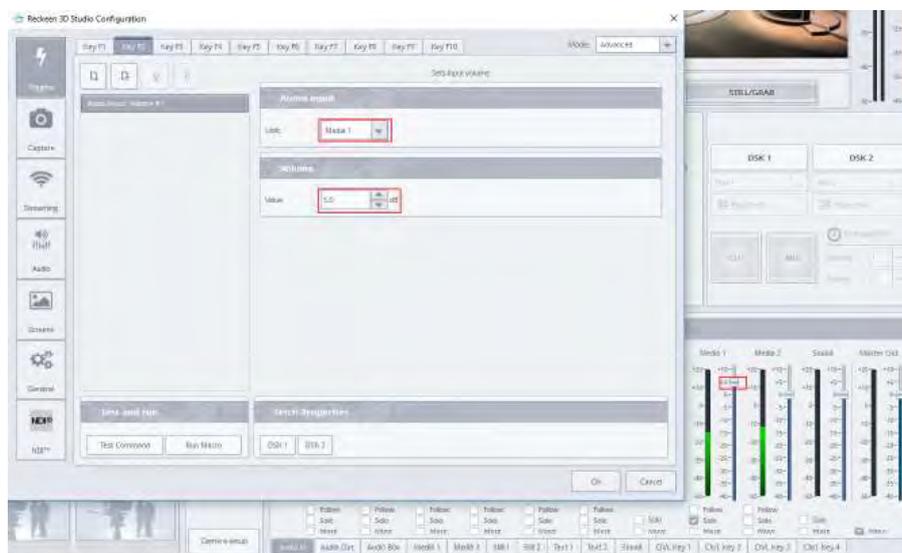
AUDIO MASTER OUTPUT: MUTE

By enabling this function, you will mute the main output of the system, that is the Master Out slider.

The image below.
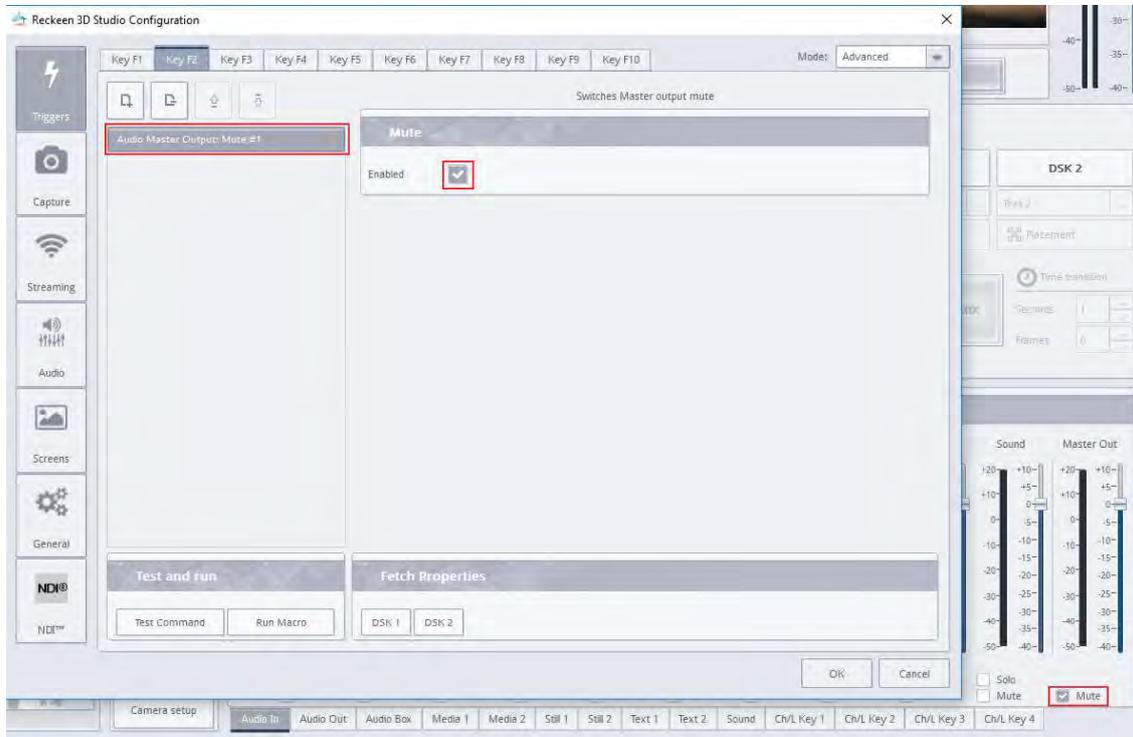
AUDIO: MASTER OUTPUT VOLUME

With enabling this feature you are able to increase or to lower the sound value for the system's main audio output channel by setting an exact dB value of Master Out slider.

AUDIO OUTPUT: MUTE

Audio Output: Mute function allows you to mute (enable Mute to) each of the Audio mixer's outputs. These will be the slides: Capture, Streaming, and Headphone.

AUDIO OUTPUT: SOURCE

Audio Output: Source function enables you to select a channel you want to listen to on your Headphones. After pressing a function key F, you will hear the sound of a selected channel on the headphones and the name of this channel will be displayed on the screen under the headphones slider. The image below.
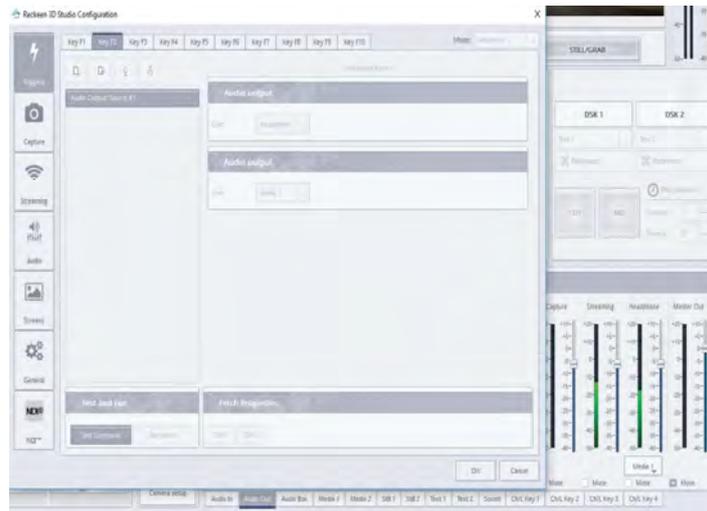
You can assign several different sources - channels - to different function keys F and switch between them. Then, the channel you are listening to on your headphones will change when you press a different F button.

AUDIO OUTPUT : VOLUME

With enabling this feature, you are able to increase or to lower a sound value for a selected audio output channel by setting an exact dB value of this channel's slider. These will be the slides: Capture, Streaming, and Headphone.

DSK: SET POSITION

This function allows you to adjust the screen position of a content currently loaded to DSK, from a chosen tray, or from a camera image. This way, you can position, e.g. a station logo on DSK1 and, let's say, a movie title on DSK2.

When you enable this function, you have to select from the drop-down list in DSK Unit field to which DSK this function will refer to, DSK1 or DSK2. Then, set the logo's X and Y coordinates on the screen in the Position field. The image below.

Point X = 0, Y = 0 is located in the middle of a field with an output resolution for which a pixel is a unit. Values increase moving to the right for X and upwards for Y.

If you made an earlier attempt to set a position of a logo or a text on the screen with Placement for DSK function, you can read X and Y coordinates' values from the opened window. You can enter these values in the Position field. See the image below.

Enabling DSK: Set Position sets the parameters for DSK on the screen (e.g. logo's position), but does not enable DSK itself. To be able to see the effects of this function, DSK should have been made visible earlier on the PREVIEW screen (DSK buttons backlit in green).

In order to enable DSK on the screen, you have to use DSK: Set Preview function described below.

DSK: SET PREVIEW

Enabling this feature allows you to make DSK visible on Preview. You have to choose which DSK you want to enable by indicating it in the box: Set visibility of DSK units on Preview. You can turn both DSKs on at the same time, you just have to tick both Enabled checkboxes. When you press a key with this function, DSK content will be displayed on the Preview screen and DSK buttons will lit up green. The image below.
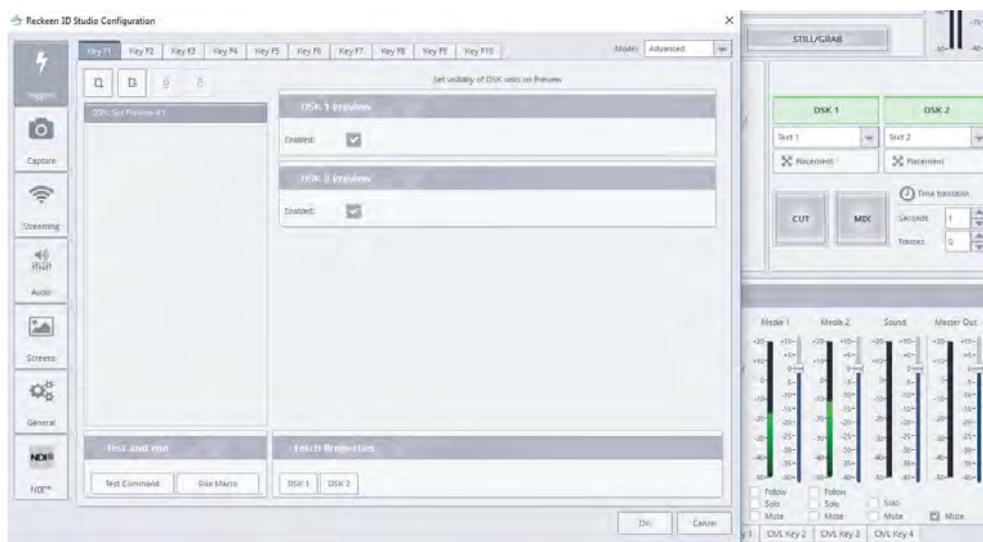
Example: the following task is to be accomplished: after pressing F1 function key, a logo from Text1 tray is to be assigned to DSK1, then enabled and positioned on the Preview screen at X=55, Y=01 coordinates. At the same time, a text from Text2 tray assigned to DSK2 is to be shown on the screen at X=65, Y=60.

Then, after spending 5 seconds on the Preview screen, the text and the logo should appear on the Program screen via MIX transition with 3 seconds transition time. They are to be displayed for 10 seconds on the air. Then, after these 10 seconds, the text and the logo should be removed from the air via MIX transition with 3 seconds transition time.

A description of the whole procedure will be as follows:

- Select one of the KeyF keys in the Triggers window, e.g. Key F1. Select Advanced mode in the upper right corner of the window.

- From the Select command type drop-down list add DSK: Set Preview function using Add button and then, tick both Enabled checkboxes, enabling this function for DSK1 and DSK2 on Preview.

- Then, add DSK: Set Source function from the drop-down list, set DSK1 in DSK Unit feld and Text1 in DSK Stream feld.

- Next, once again select and add DSK: Set Source function setting DSK2 in DSK Unit feld and Text2 in DSK Stream feld.

- Afterwards, select and add DSK: Set Position function from the drop-down list. In the Unit feld, select DSK1 and set the logo's desired position on the screen. That is, X=55, Y=01.

- Add DSK: Set Position function once again. In the Unit feld, select DSK2 and set a position the text is to have on the screen, i.e. X=65, Y=60

- Then, add General Delay function and set a delay of 5 seconds. It will be a time in which the logo and the text will be displayed the Preview screen.

- Now, add DSK: Transition MIX function with Transition time of 3 seconds, which will allow the logo and the text to enter the Program screen.

- Add General Delay function again with a delay of 10 seconds, which will be the time the logo and text remain on the Program screen.

- After that, add DSK: Transition MIX function with Transition time of 3 seconds, which will allow the logo and the text to go off the air to the Preview screen.

- At the end, add DSK: Set Preview function - and leave the two Enabled checkboxes unchecked, i.e. turn DSK1 and DSK2 off.

The image below.

The whole sequence triggered by pressing F1 function key will look like this: DSK1 and DSK2 buttons are being turned on. In the application, both DSK buttons light up green. Simultaneously, a source for

DSK1 and for DSK2 is selected. At the same time, positions of the logo and the text are set. The logo and the text remain on the Preview screen for 5 seconds. They go on the air on the Program screen via MIX transition that lasts 3 seconds. They remain on the air for 10 seconds. They go off the air to the Preview screen via MIX transition lasting 3 seconds. Both DSKs are being turned off.

Note: Additional interesting use: The situation where you have more than one file in the tray from which you will be importing a source for DSK (as in the example above, Text1 and Text2 trays). Then, you can add Media: Select function (described later in the text) before using DSK: Set Source function. This will allow you to select a precise tab in the tray and then select a file that you want to assign to DSK.

DSK: SET ROTATION

Enabling this feature allows you to rotate by a chosen angle a logo, a text, etc. assigned to DSK.

First, in the DSK Unit field, select to which DSK this rotation is to be applied, and then, in the Rotation field, enter an angle of rotation in degrees.

DSK: SET SCALE

Enabling this feature allows you to enlarge a logo or a text loaded into DSK.

First, in the DSK Unit field, select to which DSK this enlargement is to be applied, and then, in the Scale field, enter an enlargement value in %.

You can determine the enlargement value in % by trial and error. Enable DSK, press Placement button and set the desired enlargement with a center scroll wheel. Read the value in the field below, as in the image below.
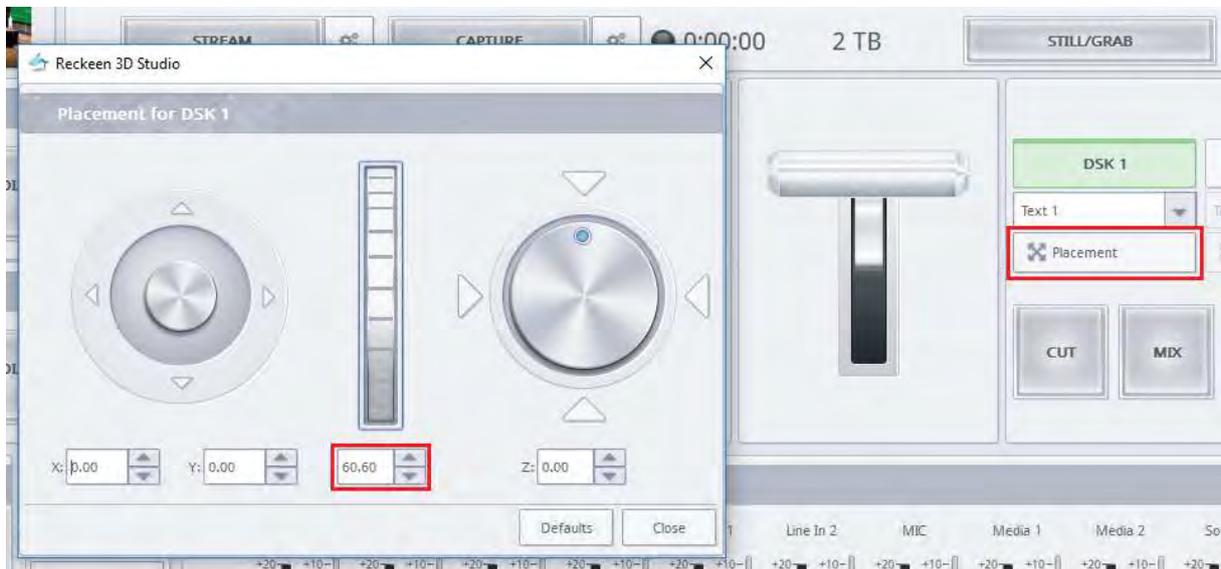
DSK: SET SOURCE

This feature allows you to set a source, i.e. which media or images tray should be assigned to which DSK. A live image source from CAM1 - CAM4 can also be used here.

First, choose DSK1 or DSK2 in the DSK Unit field and then, from the drop-down list, select a tray for the

chosen DSK. You can choose from among: Text1, Text2, Media1, Media2, Still1, Still2, CAM1 - CAM4. See the image below.
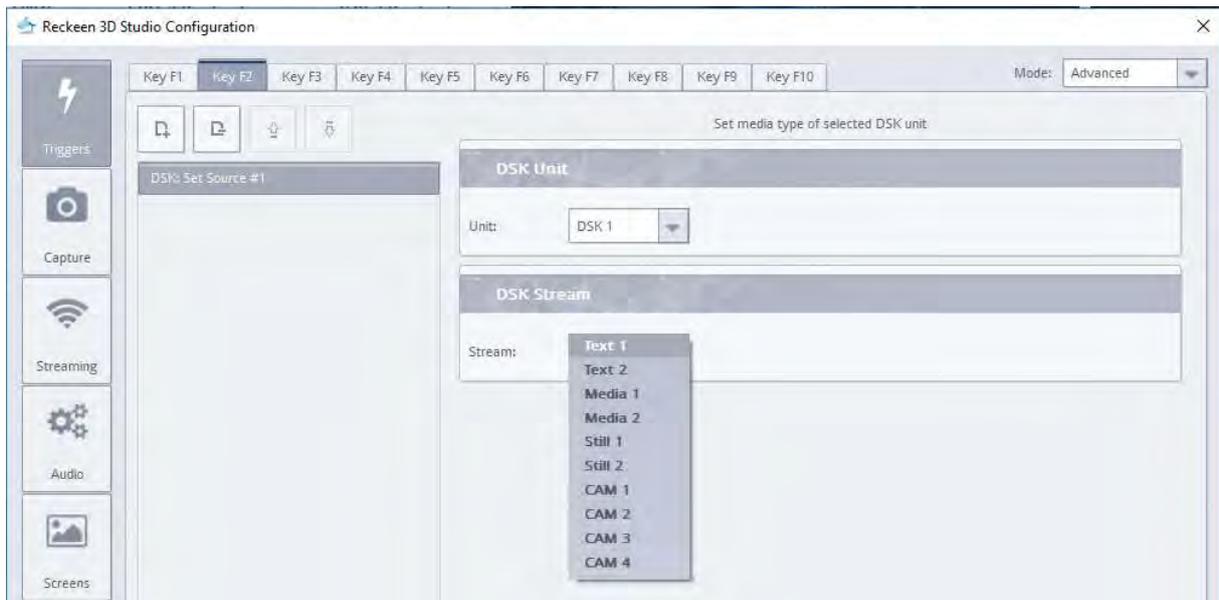
DSK: TRANSITION CUT

With this feature, you can move content (logo, subtitles, etc.) from the Preview screen to Program via Cut transition, that is, immediately, without delay. This function also allows you to remove the content from the air (Program) back to the Preview screen.

Caption: 'This command does not have any arguments' means that there is no need to enter any values for this function. The image below.
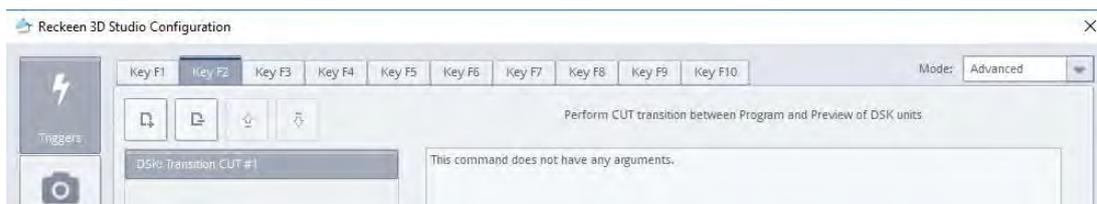
DSK: TRANSITION MIX

Just like the previous one, this function allows you to move content (logo, subtitles, etc.) from the Preview screen to Program, but via Fade transition. You can set the speed, that is duration, of this transition in seconds or in frames. This function also allows you to remove the content from the air (Program) back to the Preview screen.

FETCH PROPERTIES DSK1 DSK2

As the certain set of functions is repeated frequently when programming the Triggers for DSK, in order to facilitate your work, Fetch Properties panel has been placed at the bottom of the window. This allows you to load a sequence of the most commonly used functions for DSK by pressing a button for a given

DSK. See the image below.
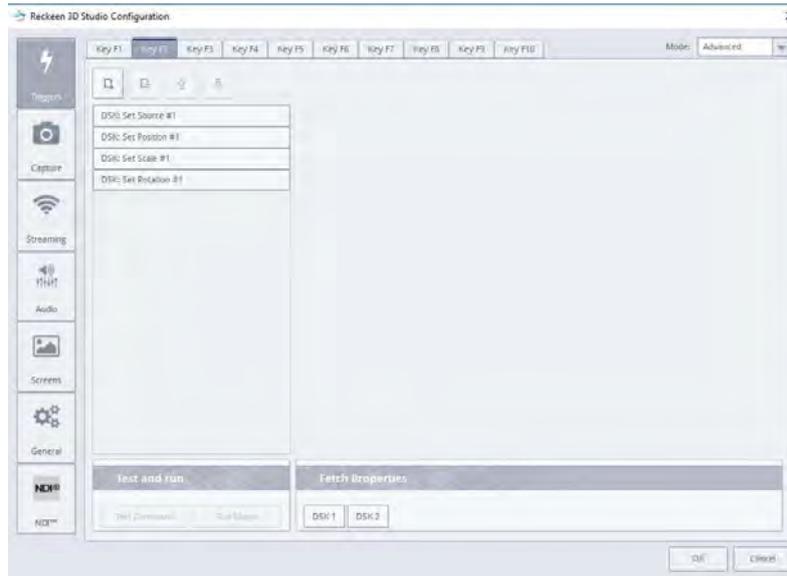
When you press the second of the two DSK buttons, a subsequent set of functions will be loaded. You have to pay attention which function has been highlighted last, as a beginning of an inserted new sequence will be in that place.

GENERAL: RESET

One of triggers is General Reset, it has options related to video inputs, smartkey and animations, a detailed description of the selected options can be found in the chapters on topics such as animation, smartkey, video input, picture below:
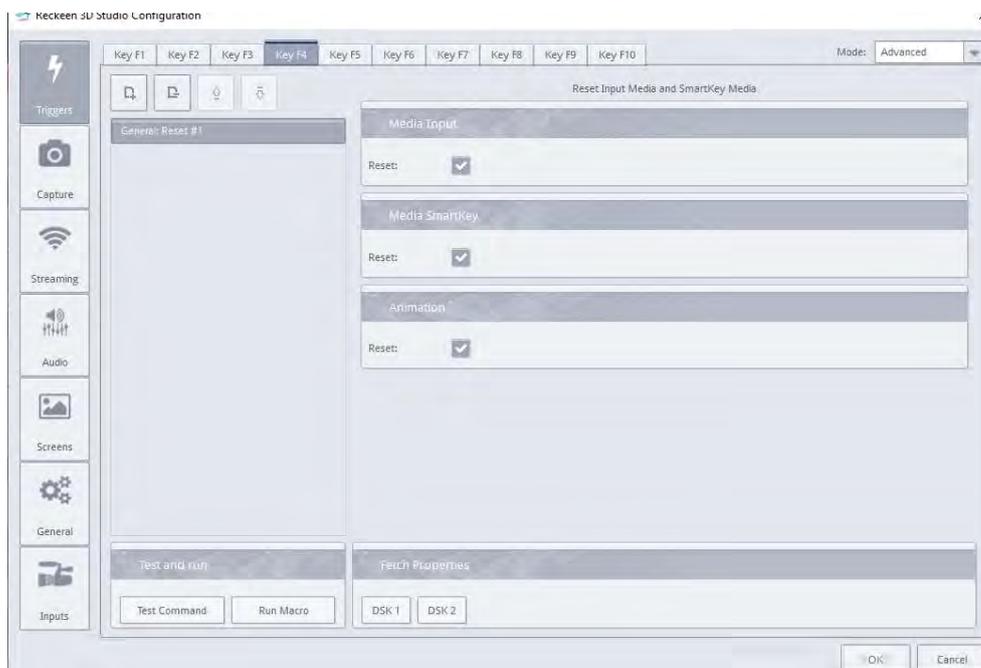
GENERAL: DELAY

This feature allows you to insert a pause between other functions. The duration of such pause is set in seconds or in frames in the field: Transition.

GENERAL: WAIT FOR KEY

When creating a sequence of functions, the first function starts and performs its action. Sometimes another function is waiting for its completion, although it also happens that there is no such need and another function is being performed. After passing the whole sequence of functions trigger F(n) is turned off.

There is also a need for the user that he would like to perform the first function and wait for the second to be performed by pressing the same F(n) button. This allows you to add the Wait for Key function between them as in the picture below.

After calling the F button, you will immediately (without waiting for the end) to move to the camera of the first function. Then the function is waiting for "Wait for Key". Pressing the F button again will perform the next shot selection function until the end of the sequence sequence, then the F(n) button and the entire

sequence will end.

GENERAL: ANIMATIONS

Animation triggering is described in detail in chapter 12.

GENERAL: TCP IP SEND COMMANDS

The trigger function enables communication with devices supporting the TCP / IP protocol. One such device may be e.g. Blackmagic HyperDeck Player 12G. This device has its own unique and configurable IP address. He works on port 9993.

Enter the device's **address** and **port** fields in the TCP IP parameter fields: Send Commands.

wait for connection waiting for the socket connection to be established.
wait for write will wait until the data is sent.

A full list of commands can be found on the manufacturer's website.
An example of a command that supports this device is shown below. Enabling remote device support, setting the first clip on the disk currently selected, setting the file timecode to zero, opening the file and disabling remote communication.

This instruction block is entered in the arguments field.

remote: enable: true
goto: clip id: 1
goto: timecode: 00: 00: 00: 00
Play: loop: true
remote: enable: false

GENERAL: REMOTE CONTROL SEND COMMAND

Remote Control Send Command - triggering is described in detail in chapter 26 - "Slideshow Controller".

MEDIA: AUTO PLAY

This feature allows you to turn Auto Play function on for a chosen tray: Media1, Media2, Still1, Still2 Text1 or Text2. When you enable Media: Auto Play feature, a file from the tray will start playing from the beginning when going on the air (i.e. to the Program screen), regardless of whether it is to be displayed full screen or on a virtual screen in the scenography. If a Mark in tag has been set for the file, the file will start playing from that point. If this is a Play list, it will start from the beginning of the first file or from the Mark in tag in the first file. The image below.

MEDIA: LOOP PLAY

This feature allows you to turn Loop function on (plays back a file in a loop) for a chosen tray: Media1, Media2, Still1, Still2, Text1, Text2 or Sound.

MEDIA: PAUSE

This feature allows you to turn Pause function on (pauses playing back a file) for a chosen tray: Media1, Media2, Still1, Still2, Text1, Text2 or Sound.

MEDIA: PLAY

This feature allows you to turn Play function on (plays back a file) for a chosen tray: Media1, Media2, Still1, Still2, Text1, Text2 or Sound.

MEDIA: SELECT

If you have more than one file to choose from as a source in the tray, Media: Select function will allow you to select a proper file. First, from the drop-down list in the Media Stream field select a tray: Media1, Media2, Still 1, Still2, Text1, Text 2 or Sound. Then, in the Container Page field, select Page tab number, and in the Media File field, set a path to the file by clicking on an icon with 3 dots. Files (or rather their shortcut icons, as the files themselves remain on the disk and are not copied to the trays) can be added earlier to the tray and so that they appear in the window. If you want to add a shortcut to a file that is not in the tray, but is on the disk, click on the black background in the open window, not on any of the files shortcuts' icons. You will be automatically transferred to the folders on the disk. After selecting the file from the disk and clicking on it, its shortcut icon is added to the tray.

Note: When you play a sequence of multiple files (All Play) from a given tray and you use Triggers function Media: Select concerning one of the files in the sequence, then the sequence will be turned off and solely the selected file will be played.

MEDIA: STOP

This feature allows you to turn Stop function on (stops playing back a file, the next playback will start from the beginning of the file) for a chosen tray: Media1, Media2, Still1, Still2, Text1, Text2 or Sound.

OUTPUT: SELECT PREVIEW

With this feature you can choose what is to be visible on the Preview screen after pressing a function key. Select a source from the drop-down list in the Output Media field. This function operates on the bottom line (Bus) of the video mixer's PRV (Preview) buttons. The active button is backlit in green. When you press a key with Output: Select Preview function assigned, a button with the selected source will light up green. The image below.
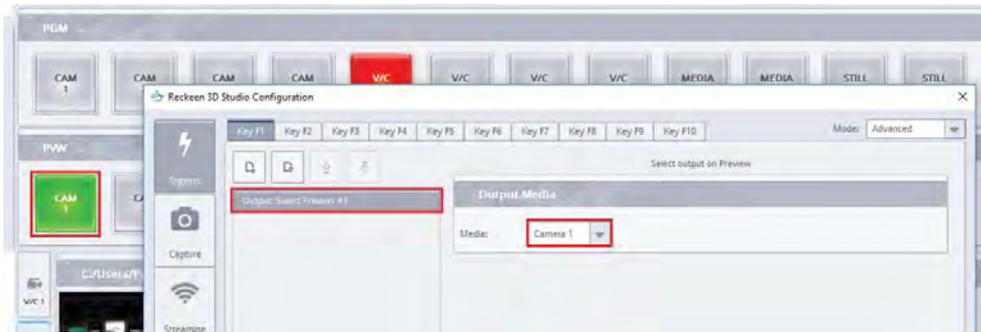
OUTPUT: SELECT PROGRAM

With this feature you can choose what is to be visible on the Program screen after pressing a function key. Select a source from the drop-down list in the Output Media field. This function operates on the upper line (Bus) of the video mixer's PRG (Program) buttons. The active button is backlit in red. When you press a key with Output: Select Program function assigned, a button with the selected source will light up red.

OUTPUT: TRANSITION MIX

This function is used to make the content shown on the Preview screen go on the air to the Program screen. The same operation is performed by V-Key 100 T-bar handle or a T-bar handle on the production screen. You can set T-bar's transition time in seconds or in frames in the Transition field.

OUTPUT: TRANSITION FADE TO BLACK

When you enable this function the Program screen will make a transition to black. All you need is to tick Enabled checkbox. If you leave the box unchecked, you will get an opposite function, i.e. the black screen will be turned off.

OUTPUT: TRANSITION TAKE

Just as the MIX function, this function is used to make the content shown on the Preview screen go on the air to the Program screen. The only difference is that it is implemented in an instant, without delay.

V/C STUDIO: LOAD

With this function, you can load a chosen studio from the hard drive. The path to the studio file is set in the Studio File field.

V/C STUDIO: SELECT CAMERA

This function is used to enable a particular camera shot. First, select a virtual cameraman (V/C1 to V/C4) in the V/C Unit field. Later, select a shot's index (1 to 15) in the Camera field and then, select a type of a virtual camera movement in the V/C Transition field. Should the camera move around the studio in a linear fashion: Linear or in a curved one: Curved (real dynamic). The last value to set is a speed of the virtual camera motion in 3D studio - in the Speed field. The image below.
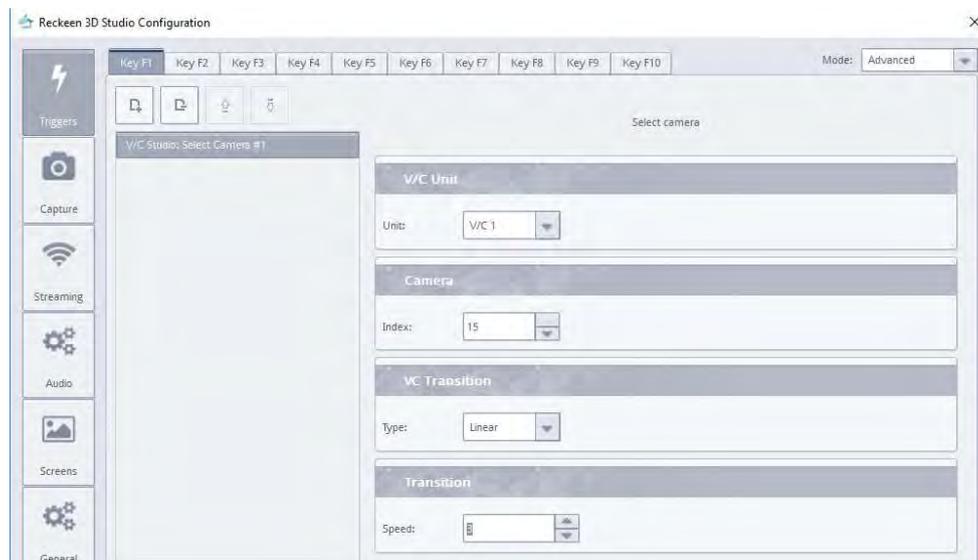
Note that, for this function to be executed, image from this virtual camera V/C has to be on the air, that is on the PROGRAM screen.

Let's assume that a virtual cameraman V/C1 is in a certain position in the studio (e.g. SHOT 1). When you are programming a Trigger for this V/C1 cameraman, the camera moves (Linear or Curved) to SHOT 2 at an indicated speed after the KeyF is activated. The image below.

This way you can design a path a camera moves along. To Key F1 you can assign V/C 1 cameraman's movement to SHOT 2, make a close-up to the presenter (talent), to Key F2 you can assign V/C 1 cameraman's movement to SHOT 3 and so on.

This function has one more important feature. Typically, during production, when you go through consecutive shots of a virtual camera, they all have the same transition speed and Linear or Curved (real dynamic) type set. However, a camera movement programmed with V/C Studio: Select Camera function can have any speed and movement type set. Therefore, the camera path composed of sequences triggered by F keys can have different transition speed and type parameters in each part of motion.

V/C STUDIO: SELECT CAMERA IMMEDIATELY

Makes the transition to the camera shot without waiting for the previous function to end e.g. without waiting for the transition from point A to point B to finish, can make the transition to point C.
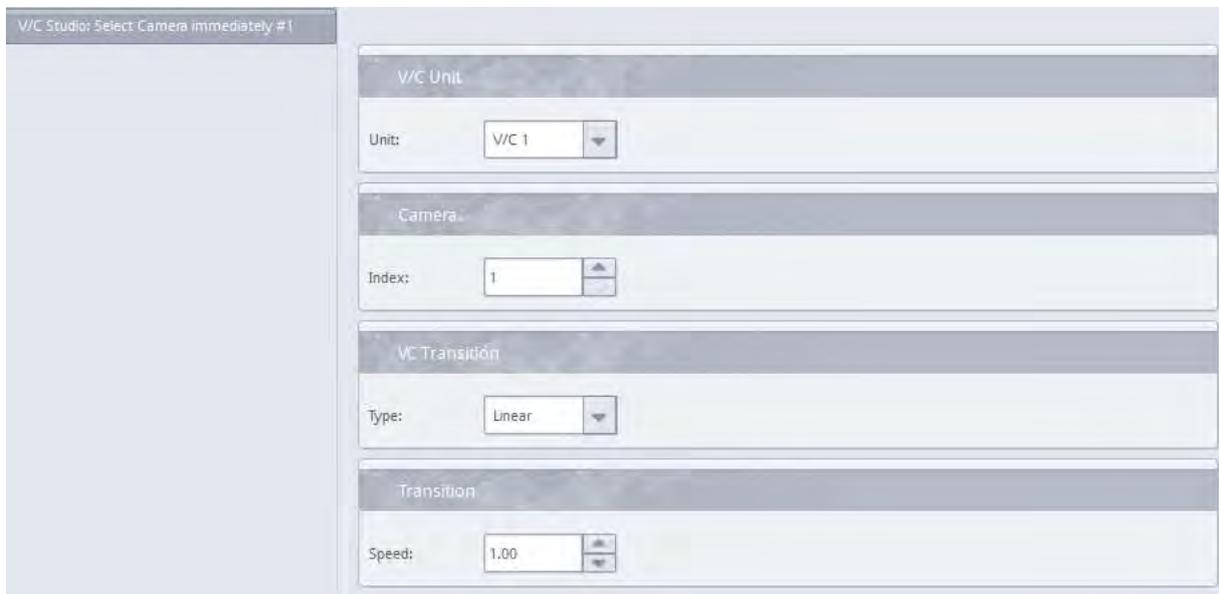
The function parameters are V/C virtual cameraman (V/C 1-4). The next to index shots from 1 to 15 for each V/C. The next parameter is the type of transition linear or bent line smoothly taking into account the virtual camera mass and movement. The last one is the passage speed.

V/C STUDIO: SET BUS SOURCE

With this feature, you can set a signal source A in your studio. The function operates on line A buttons on an additional panel in the lower left corner of the screen. On this panel, you can select A, B, C and D signal sources for your studio.

Select a source from a drop-down list in the V/C Studio Stream field. When you press a key with V/C Studio: Set Bus A Source function assigned, a button with the selected source will light up on the panel.

Image below shows a selected source: Camera1.

The active CAM1 button is backlit on the panel.

V/C Studio: Set Bus B Source function allows you to set a source for the line B,

V/C Studio: Set Bus C Source function - a source for line C and consequently,

V/C Studio: Set Bus D Source function - for line D.

V/C SET DEPTH OF FIELD

With this feature, you can set the value of the depth filter for the selected V/C 1 to 4, the value is given in the range from 0 to 100. This function must also have an Enable checkbox to work:

Select command type

Animation: Control

Audio Input: Mute

Audio Input: Solo

Audio Input: Volume

Audio Master Output: Mute

Audio Master Output: Volume

Audio Output: Mute

Audio Output: Source

Audio Output: Volume

DSK: Set Position

DSK: Set Preview

DSK: Set Rotation

DSK: Set Scale

DSK: Set Source

DSK: Transition CUT

DSK: Transition MIX

General: Complex control

General: Delay

General: Departure time

General: Reset

General: Wait for key

Key: Complex control

Light: Attenuation

Light: Color

Light: Complex control

Light: Cone

Light: Direction

Light: Enable

Light: From File

Light: Position

Light: Power

Light: Type

Media: Auto play

Media: Loop play

Media: Pause

Media: Play

Media: Select

Media: Stop

Output: Select Preview

Output: Select Program

Output: Transition Auto

Output: Transition Fade To Black

Output: Transition Fx Effect

Output: Transition Take

Remote control: Send command

Script: ConditionalJump

Script: Evaluate

TCP IP: Send commands

V/C Studio: Load

V/C Studio: Select Camera

V/C Studio: Select Camera immediately

V/C Studio: Set Bus A Source

V/C Studio: Set Bus B Source

V/C Studio: Set Bus C Source

V/C Studio: Set Bus D Source

V/C: Set Depth Of Field
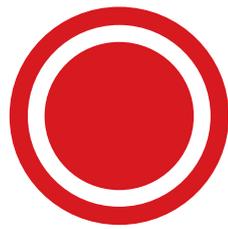
External Keyboard – Shortcuts

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RECKEEN 3D STUDIO SHORTCUTS

Module	Function	Shortcut
Vision Mixer (Production Switcher)	Source Selection PGM :CAM1…Still2	1 … +
Vision Mixer (Production Switcher)	Source Selection PRV : CAM1…Still2	Q …]
Transition	FTB	Ctrl+B
Transition	Take	Return
Transition	Auto	Space
DSK	DSK 1	Insert
DSK	DSK 2	Home
DSK	DSK 1 - select next item from list	Delete
DSK	DSK 2 - select next item from list	End
DSK	DSK Cut	Page Up
DSK	DSK Mix	Page Down
	Stream	F12
	Capture	Scroll Lock
	Still/Grab	Pause/Break
	Programming Trigger Buttons	F1-F10
Media Trays	Tray Selection: Audio In … Sound	Ctrl + F1 … Ctrl + F9
Media Trays	Stop in active Tray	K
Media Trays	Play in active Tray	L

Media Trays	Loop in active Tray	apostrophe '
Media Trays	Tab selection in active Tray	Ctrl+1 .. Ctrl+5
V/C Shots	Speed Transition Slow	Num /
V/C Shots	Speed Transition Medium	Num *
V/C Shots	Speed Transition Fast	Num -
V/C Shots	Shot selection in active V/C (the first 10 shots) − move	Num: 0..9
V/C Shots	Shot selection in active V/C (the first 10 shots) − cut	Shift + Num 0..9
ABCD Mixer	Source Selection A OFF...Still 2	Alt +1 ... Alt + 9
ABCD Mixer	Source Selection B OFF...Still 2	Alt + Q ... Alt + O
ABCD Mixer	Source Selection C OFF...Still 2	Alt + A ... Alt + L
ABCD Mixer	Source Selection D OFF...Still 2	Alt + Z ... Alt + .
	Configuration Window	Ctrl+P
	Camera Setup	C
	3D Editor	V
	Load 3D Studio	Ctrl + L
Camera Setup	V/C Selection	Num: 0..9
Camera Setup	Undo/Redo	Ctrl+Z, Ctrl + Y
Camera Setup	Close	ESC
3D Editor	Delete the selected object	Delete
3D Editor	Add a new object	Insert

3D Editor	Undo/Redo	Ctrl+Z, Ctrl + Y
3D Editor	Move Mode	Alt + Z
3D Editor	Rotate Mode	Alt + X
3D Editor	Scale Mode	Alt + C
3D Editor	Deselect the object	Space
3D Editor	Wizard	CTRL + W
3D Editor	Close	ESC
3D Editor	View Mode	1..7

RECKEEN LITE SHORTCUTS

Module	Function	Shortcut
Vision Mixer (Production Switcher)	Source Selection PGM :CAM1…Still2	1 … +
Vision Mixer (Production Switcher)	Source Selection PRV : CAM1…Still2	Q …]
Transition	FTB	Ctrl+B
Transition	Take	Return
Transition	Auto	Space
DSK	DSK 1	Insert
DSK	DSK 2	Home
DSK	DSK 1 - select next item from list	Delete
DSK	DSK 2 - select next item from list	End

DSK	DSK Cut	Page Up
DSK	DSK Mix	Page Down
	Stream	F12
	Capture	Scroll Lock
	Still/Grab	Pause/Break
	Programming Trigger Buttons	F1-F10
Media Trays	Tray Selection: Audio In … Sound	Ctrl + F1 … Ctrl + F9
Media Trays	Stop in active Tray	K
Media Trays	Play in active Tray	L
Media Trays	Autoplay in active Tray	;
Media Trays	Loop in active Tray	apostrophe '
Media Trays	Tab selection in active Tray	Ctrl+1 .. Ctrl+5
V/C Phase	Speed Transition Slow	Num /
V/C Phase	Speed Transition Medium	Num *
V/C Phase	Speed Transition Fast	Num -
V/C Phase	Phase selection in active V/C (Phase1…4) – move	Num: 0..3
V/C Phase	Phase selection in active V/C (Phase1…4) – cut	Shift + Num 0..3
ABCD Mixer	Source Selection A OFF…Still 2	Alt +1 … Alt + 9
ABCD Mixer	Source Selection B OFF…Still 2	Alt + Q … Alt + O
ABCD Mixer	Source Selection C OFF…Still 2	Alt + A … Alt + L

ABCD Mixer	Source Selection D OFF...Still 2	Alt + Z ... Alt + .
	Configuration Window	Ctrl + C
	Load Studio	Ctrl + L
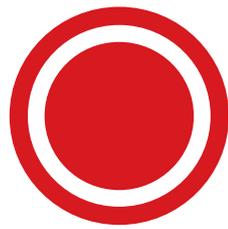
Reckeen LITE : Production module screen

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After clicking on the LITE Production icon on the start screen, the main module of the system appears on the screen. It's a kind of an executive center, where most of the Reckeen LITE system production functions are activated from.

The screen of LITE Production for Reckeen LITE Studio (Black Style)
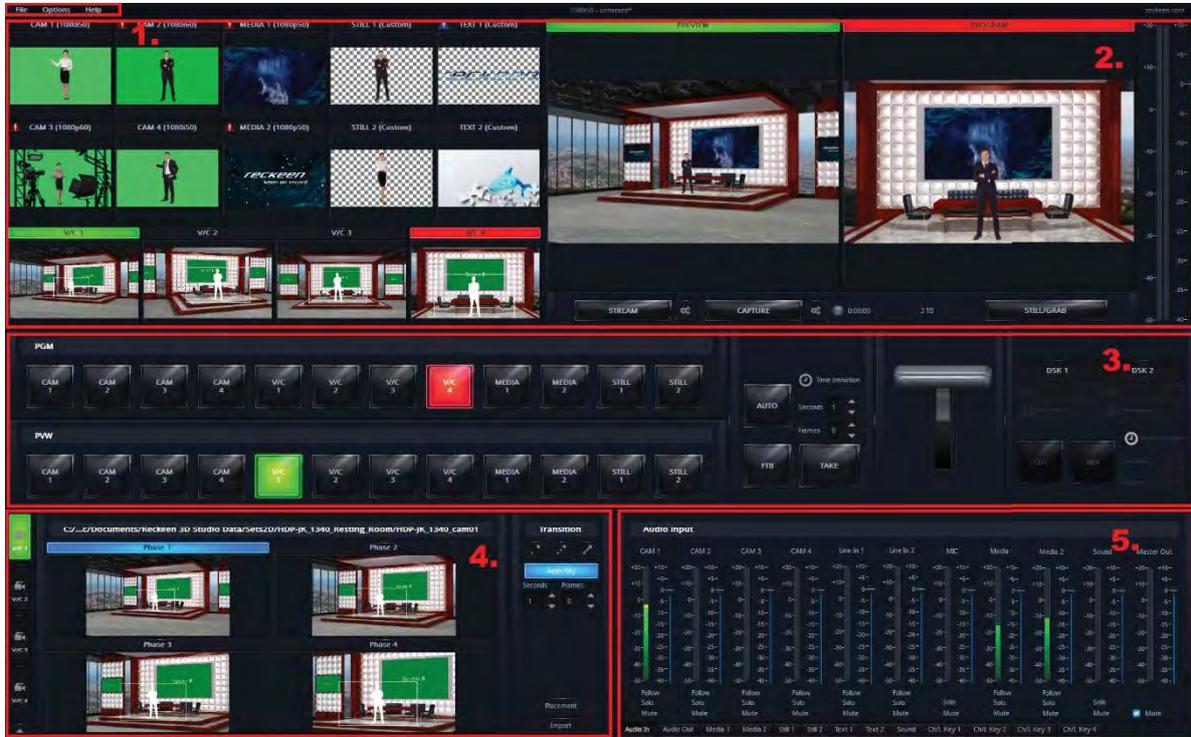
The production screen area can be divided into five main areas, the same as the 3D Production version:

1. Toolbar

2. Multiview Panel (previews panel)

3. Vision Mixer (production switcher)

4. Virtual studio Configuration Panel

5. Media trays

Areas described in points 1, 2, 3 and 5 are common to both systems: Reckeen 3D Studio and Reckeen LITE . These areas have already been described in the manual. Please see the corresponding chapters. The area Virtual studio Configuration Panel , needs to be discussed in detail below.
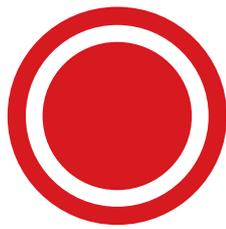
Reckeen LITE: Virtual studio Configuration Panel.

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After opening a production screen of LITE Production, you will find the virtual studio Configuration Panel in the lower left corner. The Reckeen LITE Studio system will always open a new session with a starting studio loaded. Picture below.
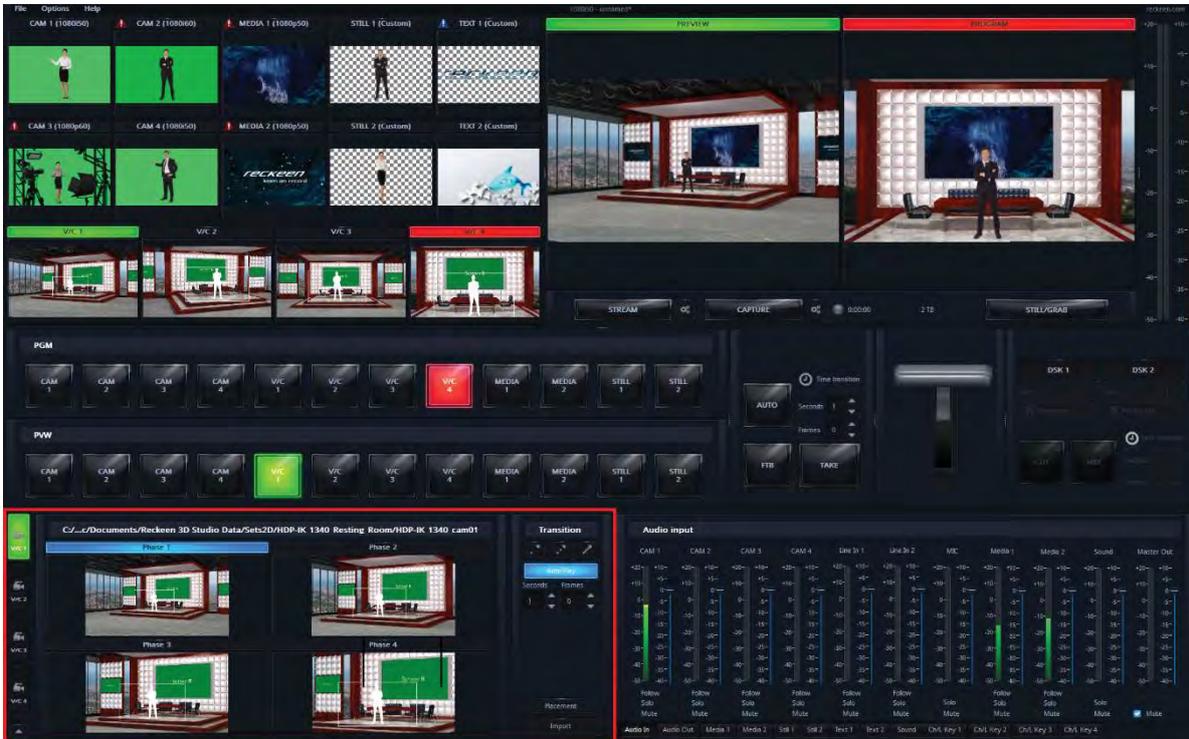
A studio file's path on the disk is displayed at the top of the panel. See the image below:

The Reckeen LITE Studio system is equipped with 4 V/C channels, that is Virtual Cameras. The backlit buttons V/C 1 to V/C 4 on the left side of the configuration panel allow you to choose which group of V/C shots you can currently configure.

The V/C buttons in the panel are fully compatible with the main video mixer. If you change the status of the main mixer (switch the V/C on the mixer), whether it is in PREVIEW (PVW) section or PROGRAM (PGM) section, the button in V/C control panel will switch automatically. V/C tab button is highlighted in red when the virtual camera V/C to which it is

assigned, is on the air, that is, in a live signal on the PROGRAM screen. And when the button is highlighted in green, it means the virtual camera V/C image is displayed on the PREVIEW screen. See the image belo

Each V/C shot of the studio enables definition of virtual camera movements in 4 different phases.

Control panel allows you to define four phases for one virtual camera V/C shot (Phase 1, 2, 3 and 4 previews). The current phase is marked by a highlighted stripe above the preview. Phases can be switched at any time, both when the studio is on the air, and when it is being prepared for broadcast. Clicking on a preview of one of inactive phases switches the view to that phase.

After loading to the control panel a studio's set design that has several virtual camera shots, the shots will be loaded into V/C 1, V/C 2, V/C 3, and V/C 4 trays. This will correspond to images from 4 virtual cameras in the studio. Switching between the trays allows you to quickly change the virtual camera's view.

In the Reckeen LITE system, you can also load one studio into the V/C 1 container, which is going to be on the air, and a completely different one into the V/C 2 tray, which we is going to be prepared for broadcast on the PREVIEW screen. The image below.

PROGRAM and PREVIEW screens for two different studios loaded into two V/C trays. The image below.
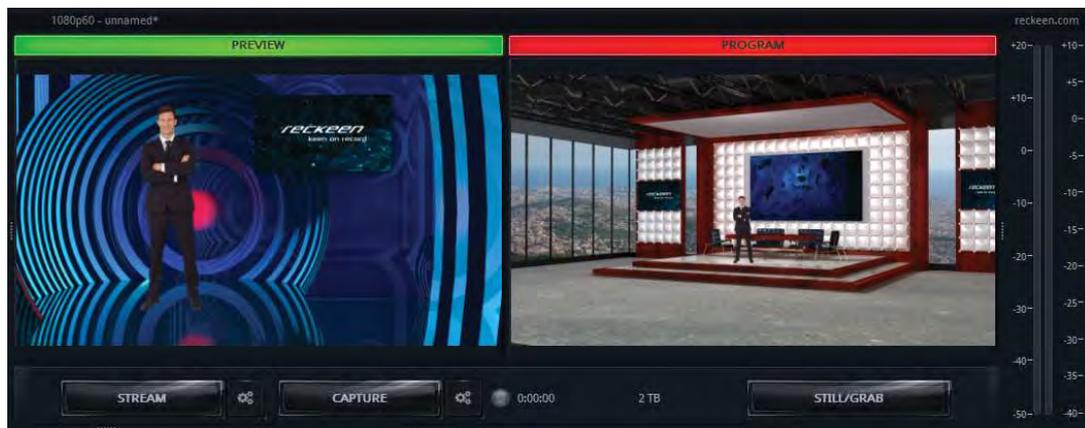
SELECTION OF SIGNAL SOURCES A, B, C ,D

Unlike Reckeen 3D in Reckeen Lite, the setting of sources A, B ,C and D is different for each camera V/C.

The fundamental part of studio configuration is a selection of a source. Usually, a studio project allows you to place there 4 input signals A, B ,C and D that are set on the mixer in an additionally opened panel.

In a studio design, the first two of them, namely A and B, are almost always images of presenters (Talents), from CAM 1 to CAM 4 sources. A keying filter is applied to these sources.

The applied key removes a uniform background (e.g. green), on which the presenter is filmed.

The third and fourth signal source – C and D may be a film or a still image. They are usually displayed on virtual screens that are a part of studio scenography. Everything depends on the project. In the picture below, you can see two images of presenters (source A and B) and studio screens, where a film (source C and D) is displayed. Picture below:

Most often the default A, B , C and D sources were defined by a studio designer, but you go to the VSM Lite Editor and create your own settings, e.g. remove a Talent or add a screen. In each studio, signals can be used in a different way. Due to this flexibility, the signals have been described in a studio configuration panel in a universal way - symbols A, B , C and D (image below).

There are four separate rows of buttons with identical descriptions for sources A, B ,C and D. This enables a separate regulation of parameters for sources A, B , C and D.

The input signal for studio composition can be: a transparency (Off), a camera image (CAM_1, 2,3,4), a video file (Media 1, 2), an image/bitmap (Still 1, 2),

And so are called the buttons located in four rows below the studio previews. The button with selected source is highlighted . Changing the input source takes place immediately, so you can change it during the live broadcast.

After selecting the appropriate signal sources, a figure of a presenter will be displayed against a studio scenography, and a selected video file or a still image will be shown on virtual screens. If a keying filter has not been enabled for the source with a presenter figure, you have to switch it on and set its parameters. After applying the correct keying parameters, a background against which the presenter is filmed (e.g. green) will be removed and the figure of the presenter will be visible against the background of the studio

scenography.

In order to make the figure of the presenter fit better into set design you have used, you can adjust the figure's size and position in the studio. A separate window is used for changing these parameters. The window can be opened with a button located next to the buttons used for the studio's signal sources selection. Picture below.

This window works on the same principle as the Placement window earlier described in the DSK section. The only exception is an additional function Aspect Ratio: Keep / Stretch described on the following pages of the manual. Picture below.

SELECTION OF SIGNAL SOURCES A, B, C ,D ASPECT RATIO FUNCTION: KEEP/STRETCH

With this function, you can set the aspect ratio for sources A, B, C or D, for movie files or for images.

The Keep option allows you to maintain the source's aspect ratio, while the Stretch option stretches the image to cover the whole desired area. See the following example.

If, for example, a video file with its aspect ratio of 4:3 is placed in a studio on a display, which has an aspect ratio of 16:9, the image file proportions will be maintained and the 'lacking' space on the screen will be transparent.

If you select the Stretch option, the image of an aspect ratio of 4:3 will be stretched to 16:9 proportions, and there will be no uncovered space on the display. You have to remember that the stretched picture will not have the previous aspect ratio. Picture below.

LOADING A STUDIO FILE

In order to load a selected studio project, choose one of the V/C trays to which a new studio is to be loaded. Press one of V/C buttons on the PVW switcher. You can also select the tray by pressing V/C button on the side bar. The selected button will lit up green. The image below:
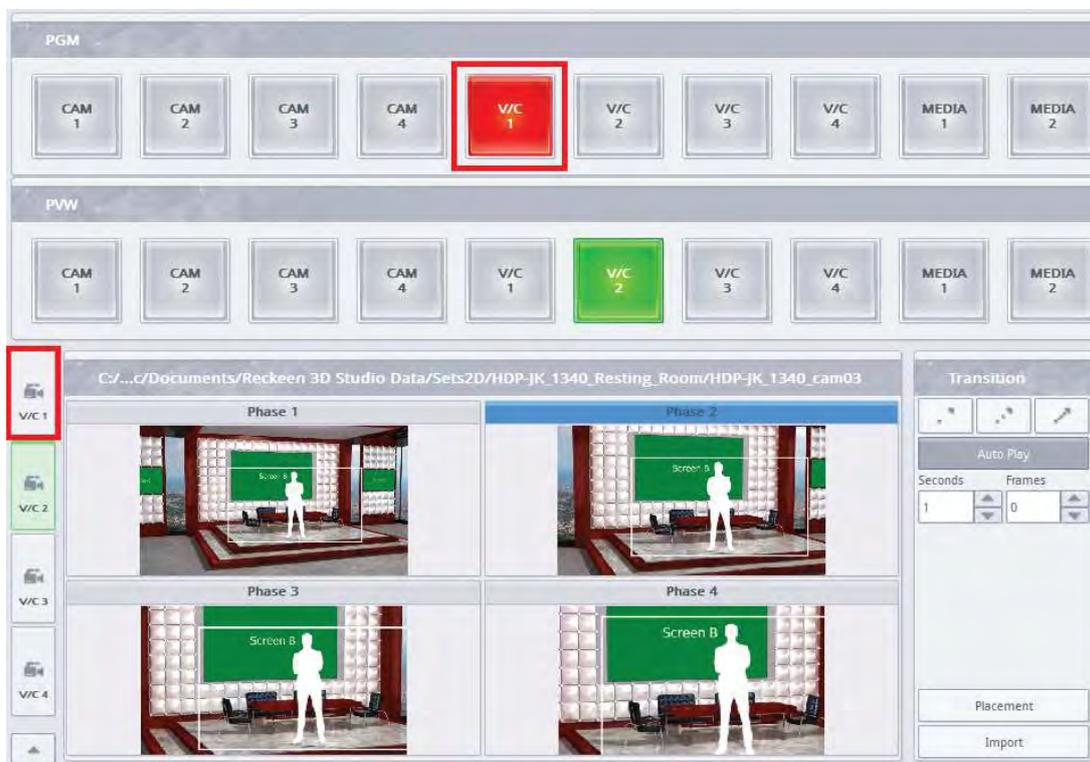
Then, press Import button in the studio's configuration panel.

Specify a proper file with *.rec2D extension in the file selection window that opens. After clicking on a file,

its set's preview is displayed in the window on the right. Picture below
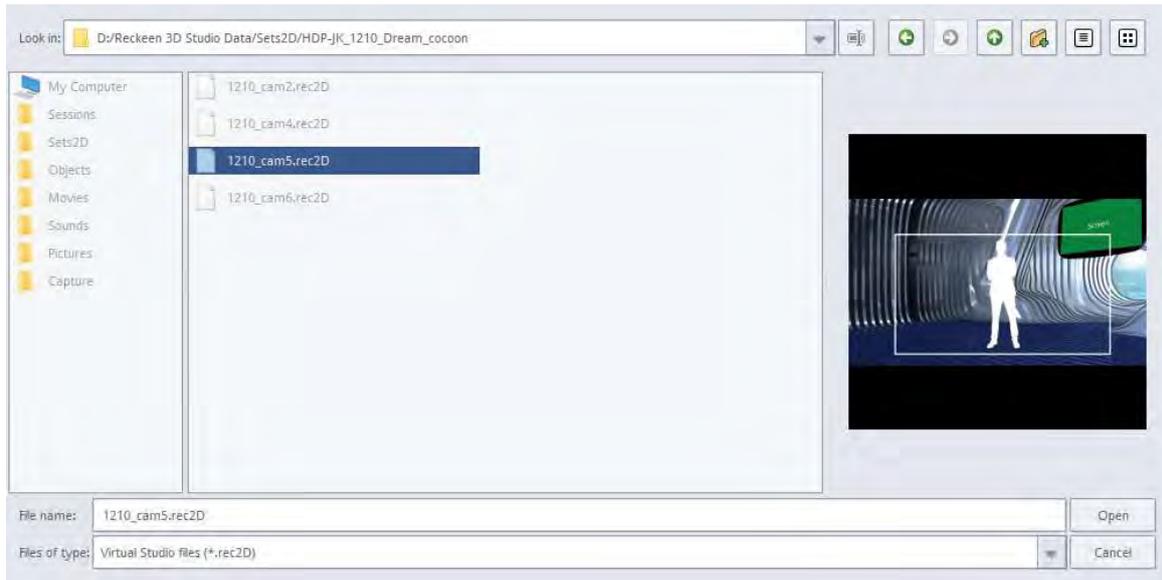
The file will be loaded into the selected V/C tray. In order to load the consecutive projects or studio shots, the action should be repeated for the subsequent studio shots, choosing a different V/C tray number.

PLEASE NOTE: For each studio's set design, you should choose sources A, B, C, D that will be used in the displayed studio.

Such loaded studios are immediately ready to be used, so if you want the studio to appear on the air, you only need to press TAKE button.

AUTOPLAY FUNCTION
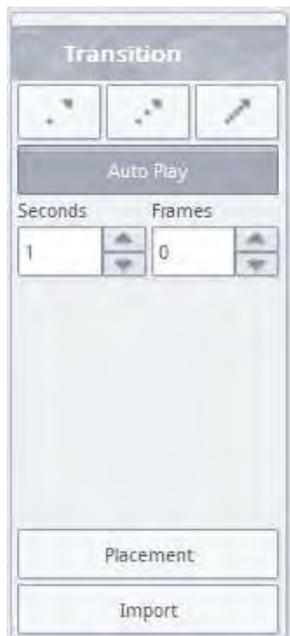
The AutoPlay feature allows you to animate the camera's PTZ (Pan, Tilt, Zoom) transition effect. If AutoPlay function is enabled, the camera's motion is smooth and animated. The time of this transition can be adjusted with up / down arrows placed on the right of the phase previews (Seconds, Frames).

If the AutoPlay button is turned off, the camera changes its position 'sharply' (without animation). For the ease of use, three default durations of transitions between phases has been defined - fast (1 second), medium (3 sec), and slow (5 s). The image below.

PLACEMENT

Placement button allows you to change the camera's position in a currently active phase manually, in a separate window. Controls in the window enable you to change both camera's position and its zoom. With an additional Defaults button you can restore the default settings. See the image below.
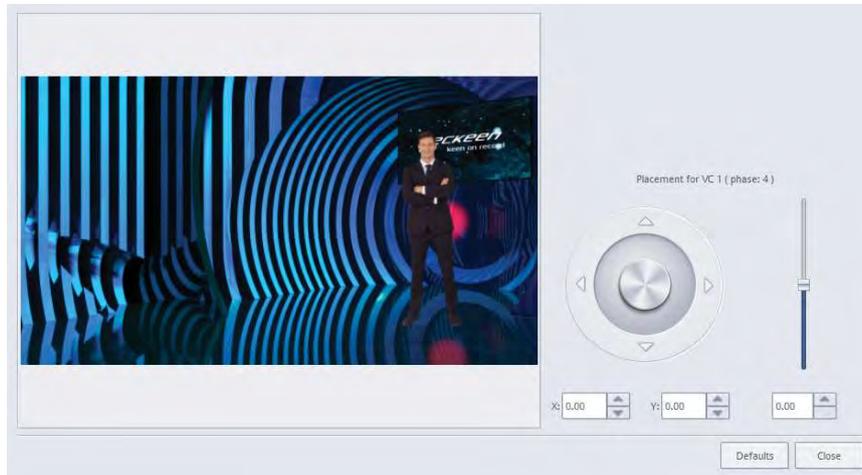
Camera settings are saved after closing the window. The program retains the settings introduced for a given V/C tray until a new shot or a new studio project is loaded.

For each newly imported studio, phase settings are defined by default - the first phase zoom is set to zero (0%) of the maximum zoom, the second phase 33%, the third 66%, and the fourth 100%.

Remember that the area of the presenter's possible movement in the studio is the Talent area - limited by a white line, as shown in the image below.

SAVE SESSION FILES

In order to keep all the studio settings (selected sources, virtual camera V/C positions and settings, and others) and be able to use them for the next production, there is a possibility to save them in a session file. To open such saved settings, you have to load an appropriate session file at the start of LITE Production module.

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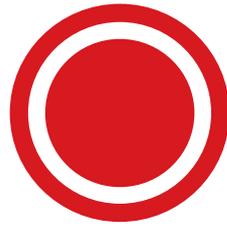
VSM - Virtual Space Maker LITE Editor

INTRODUCTION

Virtual Space Maker - a virtual set design editor is an additional module of RECKEEN LITE system, complementing its Production LITE module. It has also been prepared to operate as a stand-alone program that can be installed on any PC. With its help, you can easily set up your own virtual studio scenography. The design of a studio is carried out with the use layers placed one above the other. This way, you can make a composition of pre-prepared graphics and layers representing signals - sources A and B (Talents) and sources C and D (Screens). A Talent is a presenter or an actor in front of the camera. After saving a project prepared in this manner as rec2D file, you can use it as a ready-made virtual studio's set design, that is, load it into RECKEEN LITE system. Before you begin working with VSM Editor, on a startup screen you should choose an image system in which you are going to work in the editor. See picture   section: Reckeen 3D Studio System Startup> LITE VSM Editor. Picture below.

Key features of the Virtual Space Maker editor:

- create your own virtual set designs,

- graphic file layers layout,

- edit layers: add a new layer, reorder the layers, hide existing layers or remove unwanted ones,

- changes in a layer such as zoom, changes in its position and rotation along its X, Y and Z axes,

- special .rec2D file format that can be easily loaded into the production module,

- menu available in different languages,

- various Talent views to be set: full, behind the desk, middle - showing shots of a set.

- choice of application style: white or black.

WORK AREAS OF VIRTUAL SPACE MAKER EDITOR

Virtual Space Maker's application screen can be divided into four areas. They will be described in detail in the further part of this manual. Picture below.

- Area 1 - Menu bar, where you have access to many of the editor's functions.
- Area 2 - Layers window - contains buttons for adding, removing and changing layers order. In addition, thumbnails representing project's individual layers are shown in this area.
- Area 3 - Control window with controls to change properties of a layer currently marked for editing.
- Area 4 - Workspace screen window for previewing the created set design. It shows ongoing changes introduced to the studio's design.

TYPES OF LAYERS

Composition of a studio consists of flat images and areas for the sources. These are the layers. They are placed one above the other, and their order 'on the stack' can be freely changed. There are four types of layers in the program:

- a Studio layer,
- an Object layer,
- sources A and B (Talents),
- sources C and D (Screens).

Picture below:

Studio layer - an image that covers entire screen - it cannot be scaled or moved. However, this layer may be partially transparent and more than one studio layer can be added.

Object layer - it is a graphic layer that can be scaled and moved. It is assumed that this layer is partially transparent, but it is not obligatory. There can also be several layers of this type.

Talent layer - it is an area for the 'source signal' from a camera. Such a layer can be scaled or moved.

Screen layer - a place where graphic files or video files can be displayed. This layer also can be scaled or moved.

Talent layers and Screen layers are represented differently in the editor, but the difference between them is arbitrary - they are identical on a technical level. It is even more evident later on, in the LITE Production module, where they can have any kind of input signal assigned, i.e. camera image, video, static image, etc.

Below, you can see the image of a whole studio with all its layers.
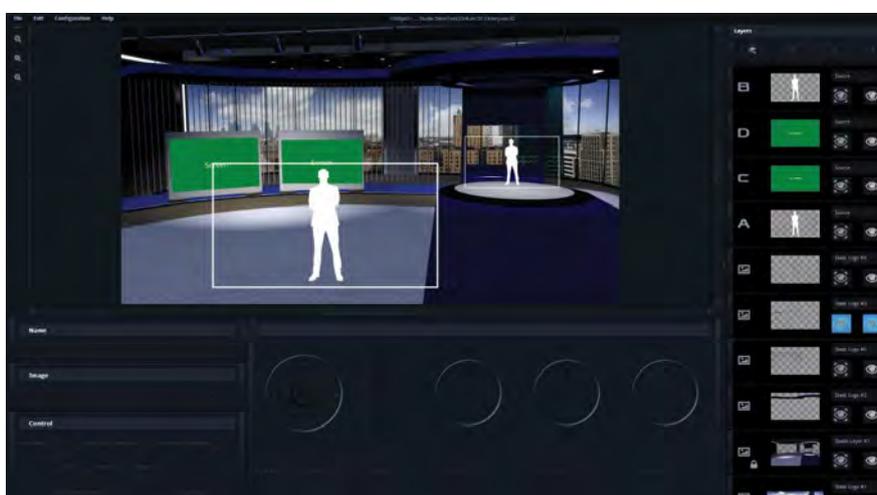
STUDIO LAYER

This type of layer is used for placing graphic files representing the studio's interior (background). Picture below.

Graphics loaded into studio layers are scaled so that they fill an entire Screen. Graphics with a resolution lower than the Screen's resolution will be stretched to full Screen, which may cause deterioration of their quality. It is therefore recommended to use files in PNG, JPG, JPEG, or BMP formats with resolution of 1920x1080 or 2880x1620, that is with image aspect ratio of 16:9.

You cannot perform any transformations on Studio layers, therefore, when you select such a layer to be edited, its transformation controls are not active (they are dimmed) and a padlock symbol appears next to the layer's thumbnail. PNG files that you place on a studio layer may contain transparency. This allows you to create a background by combining several graphic files, you just have to note that the files should have the same resolution. If you load a PNG file with no transparency or a JPG, JPEG, or BMP file on a studio layer, it will completely cover all the layers placed below the layer containing such file. The order of studio layers can be freely changed using arrows located at the top of Layers area. On the image below, a file on a studio layer contains transparency in the areas of studio's windows (areas with a grid representing transparency on the thumbnail).

NOTE: if you want to avoid automatic stretching of the file you are planning to put as a studio layer (e.g. when you want to use some part of it or scale it appropriately), then you should load it as an object layer.

On the image below, you can see a view with an additional loaded layer of a city panorama outside studio windows. When you click an object layer's thumbnail in the layers window, the size and location of the image is indicated with a white frame.

OBJECT LAYER

You can complete the studio with object layers. These can be any objects of a studio decor: a desk, a lamp, etc. You can also place logos anywhere in the studio, e.g. a sports club logo on the studio's floor. This layer can be scaled, moved, and rotated by any angle. It is assumed that this layer is partially transparent, but it is not obligatory. There can be also several layers of this type. However, if you want to insert a TV station's logo that is supposed to be in the same place on the Screen all the time on the air, regardless of the virtual camera's movements, you should not put it on your set design. Instead, use DSK function in LITE Production module at the production stage and load your logo as DSK. On the image below, you can see the object layers with two different objects loaded.

SOURCES A AND B -TALENTS

A layer representing signal sources - sources A and B (Talents). This layer can be placed anywhere on the Screen and can be resized freely. It represents a figure of a presenter - the Talent layer is a 'place for the source signal' from the camera. For the ease of use, there are several Talent thumbnails depicting different shots of the set. You choose a type from Source Type drop-down list. See the image below.

Talent and Screen layers are represented differently in the editor, but the difference between them is arbitrary - they are identical on a technical level. It is even more evident later on, in the LITE Production module, where they can have any kind of input signal assigned, i.e. camera image, video, static image, etc.

It is possible to place several Talent layers in your studio's set design. The maximum number of layers with sources (Talent + Screen) in the set design is 8.

The maximum number of sources in the set is 4 and they are marked with letters A, B, C and D. It means that if you put more than 4 sources in the set, e.g. 1 talent and 5 screens, then on some screens the same content will be displayed (they will have the same source, e.g. A). The image below.

By default, A and B sources are for the Talents and C and D are for the Screens, but you have always a possibility to change the source. Image below: selecting a signal source from Source Index drop-down list.
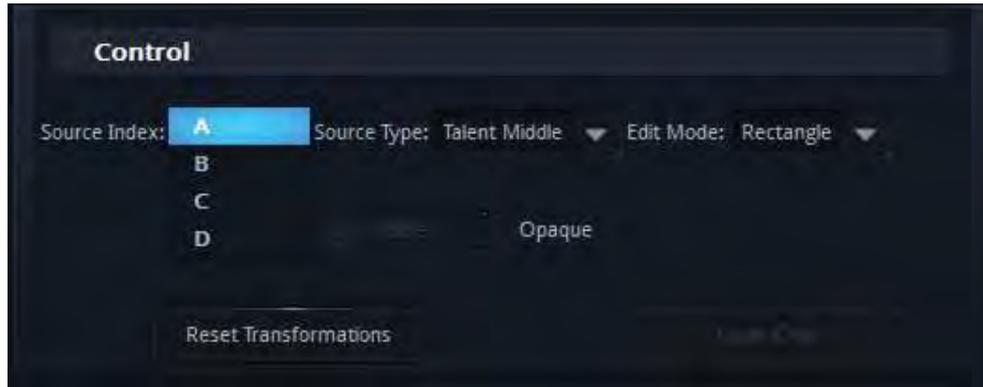
SOURCES C AND D (SCREENS)

A layer representing signal sources - sources C and D (Screens). It can be placed anywhere and freely scaled. The layer represents a place in the studio where additional content can be displayed (video material, panels, etc.), i.e. virtual Screens.

The Screen layer can be scaled and moved. Image below shows such a Screen layer.

Example:

The simplest set design may consist of three layers (the program operates on two-dimensional layers, placed one above the other). The first one is a background layer (Studio layer). You can place any image depicting an interior of a studio (it can be, for example, a photo) on this layer. The image will be scaled to fill an entire video frame (in the pre-defined resolution).

Subsequently, you should add layers representing signal sources - source A (Talent) and source C (Screen). Both can be placed anywhere in the studio and freely scaled. The first source represents a form of a presenter, while the second one - a place in the studio where additional content can be displayed (video material, panels, etc.), i.e. a virtual Screen.

A Talent layer should be placed on the very top, so that the presenter would not be accidentally covered. Unless, of course, you want to achieve such effect intentionally, when the presenter is, for example, partly obscured by a desk. In such case, a layer with a desk object should be placed in front of the Talent layer.

The program, however, allows you to change the order of already added layers at any time.

The image below shows a set design created with the use of three layers. A photo is loaded to the studio layer.
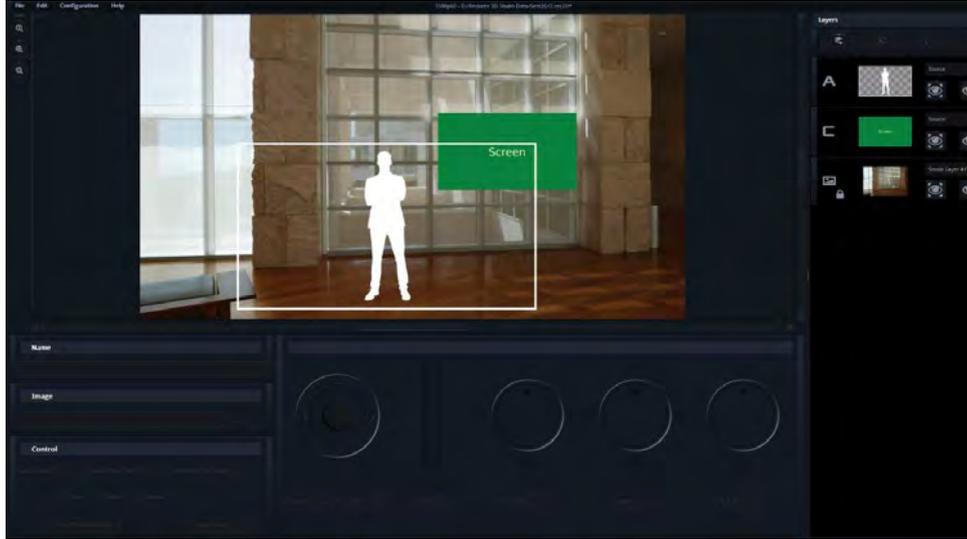
At this point, the studio is ready to be used in LITE Production module. As you can see, Virtual Space Maker editor is a tool that is very easy to use and which allows you to create a new virtual studio set design with layers in just a few moments.

In addition, the studio can be completed with an object layer, where you can place any piece of interior design, e.g. a lamp. This layer can be placed wherever you want on the screen by moving and scaling it.In the image below, 3 hanging lamps have been added to the studio
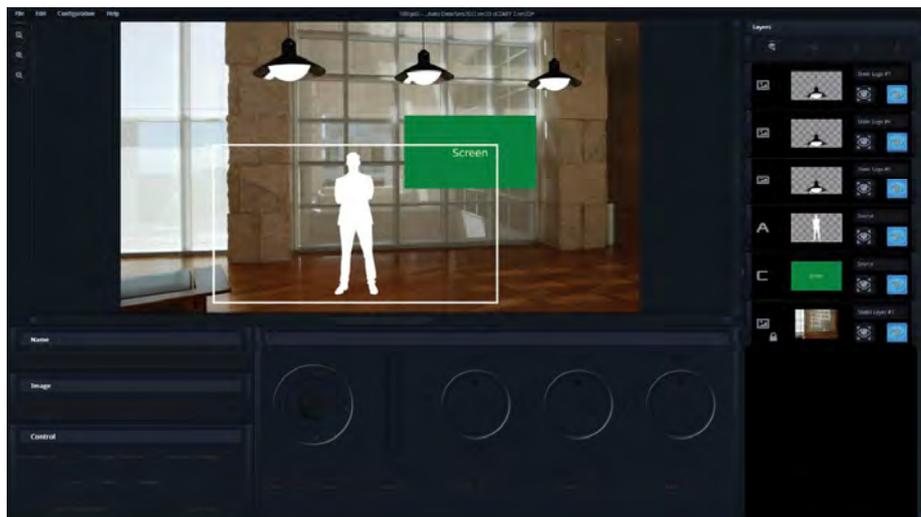
Example:

If you have a set created with two layers - e.g. Screen (source C) and presenter (Talent - source A), then the presenter will be moving against the background of what is currently being displayed on the Screen. If you choose a video with an image of a street filmed with a stationary camera to be displayed on the Screen, it will be a background for your presenter. With that, you can achieve an effect that the presenter

is visible, for example, on a busy street in the middle of a city.

Such created composition can be now saved and so it becomes immediately available in the production module.

Naturally, along with RECKEEN LITE system, you get a package of ready-made set designs that can be used in a program broadcast. You can edit any of these set designs supplied in the package using Virtual Space Maker editor module.

In the case of ready-made sets, you have, among others, the following editing options:

- hiding / revealing selected layers - an easiest way to get a different version of the same studio is to, for example, hide a table behind which a presenter should sit in the studio, creating an open studio set design,
- inserting additional graphics, e.g. placing additional objects in the studio.

Due to the fact that a structure of ready-made sets can be very complex (multi-layered), it is easy to accidentally 'break' such composition, e.g. by removing one of the layers. To protect against this kind of error, the provided set design files are protected against modification. However, you can always save such set under a different name, marking a new file as unprotected, and then modify it as you like.

RECKEEN LITE system is delivered with a package of ready-made set designs, that is, virtual studio scenographies. In addition, the system includes a rich library of objects used in these sets. The objects are available as PNG files with a transparency layer. Each of these objects can be used also in other sets.

With the Virtual Space Maker editor, every user can create their own studio set design or make modifications to an existing one.

There is no difference between the set designs from LITE Production module perspective, regardless of how they were created. Note that some functions, such as assigning signals (media, camera, image) to the sources, only takes place in LITE Production module, not in the VSM editor.

In the VSM editor, a new studio consists of flat layers, previously prepared in, e.g. Photoshop, 3ds MAX or GIMP. No operations can be performed on the original set design (provided in the package), as its file

is protected. To be able to modify it, you need to create a copy of the studio file, change its name and operate on a new file. However, for Reckeen LITE program, there is no difference between the previous studio and its modified copy.

VIRTUAL SPACE MAKER SOFTWARE – HARDWARE REQUIREMENTS

Virtual Space Maker - apart from being an element of Reckeen LITE virtual studio software, this set design editor has also its stand-alone version. This software can be installed on your computer, just like any other standard software. But before installing, make sure that your computer meets the minimum requirements.

- CPU: i3 or faster

- Memory: 4GB RAM

- Graphics Card: GPU with DirectX 11 drivers

- Operating System: Windows 7 (64-bit) SP1 with 'Platform Update' , or higher

- Monitor resolution of 1680 x 1050 or higher

- CPU: the x64 processor must support the AVX2 instruction, i.e.: https://en.wikipedia.org/wiki/Advanced_Vector_Extensions#Advanced_Vector_Extensions_2 .List with support for such a CPU :

  - Intel

  - Haswell processor, Q2 2013

  - Haswell E processor, Q3 2014

  - Broadwell processor, Q4 2014

  - Broadwell E processor, Q3 2016

  - Skylake processor, Q3 2015

  - Kaby Lake processor, Q3 2016(ULV mobile)/Q1 2017(desktop/mobile)

  - Coffee Lake processor, Q4 2017

  - Cannonlake processor, 2018

  - Cascade Lake processor, 2018

  - Ice Lake processor, 2018

  - AMD

  - Excavator processor, Q2 2015

  - Zen processor, Q1 2017

SOFTWARE INSTALLATION

After loading the software on your computer, double click Virtual Space Maker Software icon on your desktop. The program will launch in English language. To change the language, click Configurations on the top bar and then Language on the drop-down menu that appears. Select the language afterwards.

Before opening the start screen, make sure that your computer monitor has its resolution set to 1680x1050 or higher.

VSM EDITOR'S WORK AREAS

After opening the VSM editor, you can see its start screen. It can be divided into 4 areas, as shown in the image below.
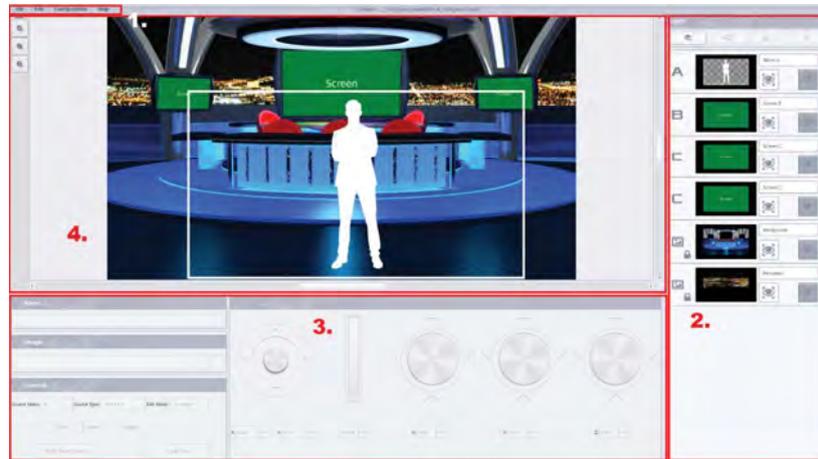
- Area 1 - Menu bar.
- Area 2 - Layers window, where you can see inserted layers and their order. You can also change their order or hide their visibility there.
- Area 3 - Control window is a part, where you can find editing tools: zoom, rotation and other alterations in the layers of your set design.
- Area 4 - Workspace screen window, which allows you to see all the changes you introduce to the set design. The view on the work screen retains all the proportions and shows you how your set design will look like on the Production module screen.

MENU BAR

Menu bar is located at the top of the screen. You can find four main options there: File, Edit, Configuration and Help.

The table below shows the following sub-options available after clicking on a main option.

MENU BAR – FILE
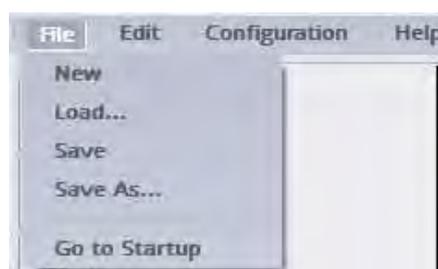
- New - creates a new file.
- Load - loads an existing file.
- Save - saves the changes made to the current project.
- Save as - saves the project file under a different name (There is a function preventing unintentional overwriting of a file).
- Go to Startup - exits the editor.

MENU BAR – EDIT

Picture below.

- Undo - deletes the last introduced change. Keyboard shortcut: Ctrl + Z.
- Redo - reverses the undo command. Keyboard shortcut: Ctrl + Y.

MENU BAR – CONFIGURATION

- Language - allows you to choose the application's language.
- Styles - changes the application's appearance: black or white version.

MENU BAR – HELP

- Help - About the program - User license agreement (EULA)
- QR Code- Here, you can scan the QR code to open the support Reckeen website.

LAYERS WINDOW

You can see Layers window on the right side of the screen - area 2. This window renders accessible the following 4 functions. Function icons are located at the top of the window. Picture below.
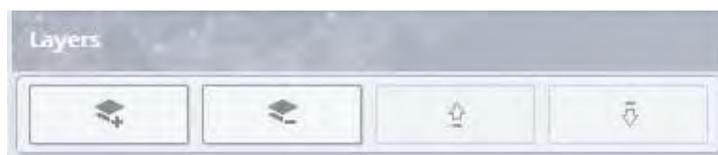
Starting from the left:

- Create: Add a layer
- Delete: Delete the existing layer

- Move up: Move the layer up

- Move down: Move the layer down

In order to start editing, click the first icon on the left: Add a layer. A window will open: Select layer type. See the image below.
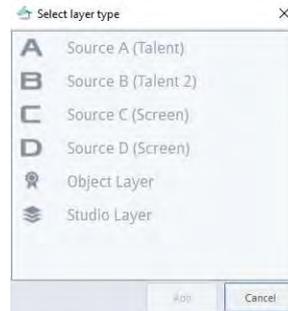
In this window, you can find four different types of layers that can be added by clicking on a layer:

- Sources A and B (Talents),

- Sources C and D (Screens),

- Object layer,

- Studio layer.

 After marking Studio Layer, click Add button. You can now browse graphic files on your hard drive. A single click on a file will open the file's preview. To load a graphic file, press Open or double click on the file name. The image below.
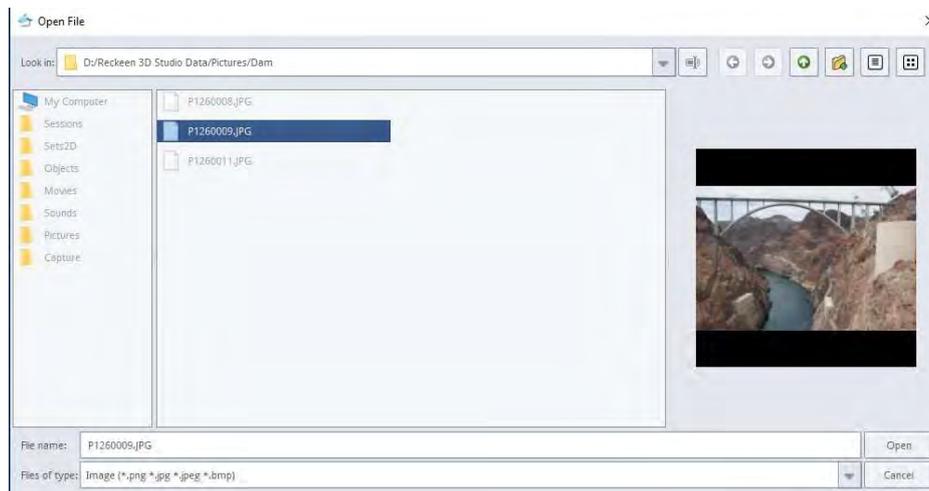
After loading the image file, it appears in the workspace, while its thumbnail shows up in the Layers window. There are two icons on the right side of the image's thumbnail: Visible and Solo. Picture below.

Their functions are described below:

Icon: Visible - by default, the visibility of a given layer is enabled, and you can disable visibility of a given layer in the studio by clicking on this icon. This way, you can, for example, turn off the visibility of a desk or other object in the studio, without removing it from the list.

Icon: Solo - this icon is disabled by default. Click on Solo icon to hide all the other layers. Only the selected layer will be visible in the workspace. All the others will disappear. This feature is especially useful if the studio contains a lot of objects and some layers' visibility is hindered.

CONTROL WINDOW

There are various options of layers' editing available in the control window in the lower left corner of the screen. The image below. Options available for an object layer - there is an image loaded from the disk on the layer.
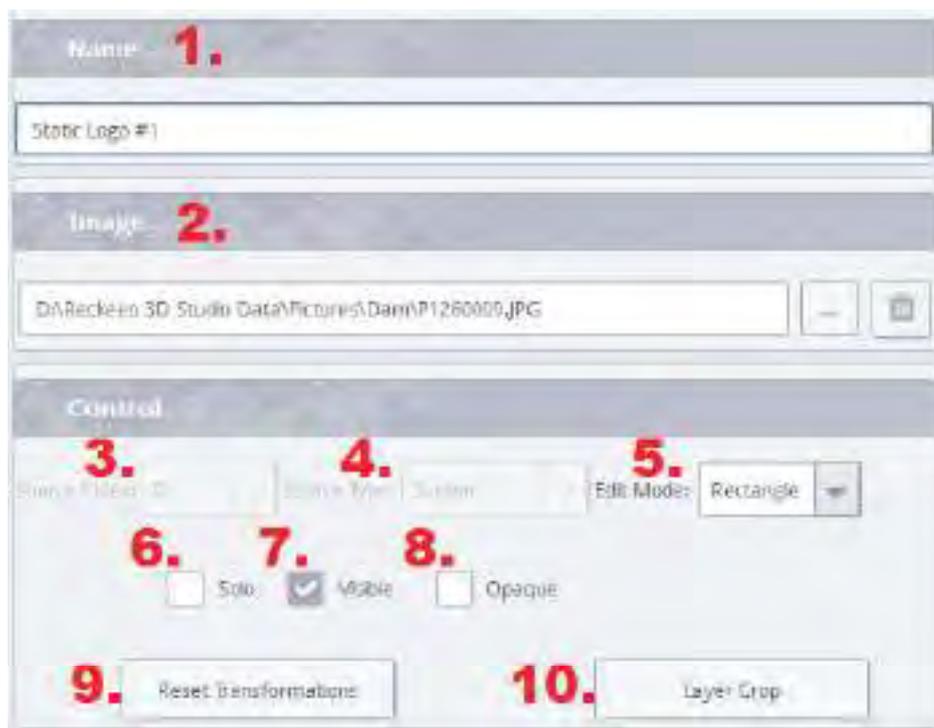
Below, you can see a description of individual buttons' operation.

1. Name panel - a place where you define the layer. A description 'Source' appears for the Talent and the Screen layers, while a 'Static logo' is shown for the Studio layer and for the Object layer, just as in the image above.

2. Image panel - a path on the disk to a selected file for Studio layer or for the Object layer. Click on an icon with 3 dots to choose a different graphic file from the disk and load a different Image in its place. In order to delete an image from a layer, click on an icon with bin mark.

3. Source Index - select a source for the Screen or the Talent layer from a drop-down list: A, B, C and D.

4. Source Type selection: from a drop down list: Talent Full, Talent Desk, Talent Middle, Screen and Other.

5. Layer's Edit Mode: available modes are: Rectangle and Points.

   • Rectangle - in this mode, you can change shape, size and position of a layer with the use of icons set at the bottom of the Screen (joystick and knobs). A detailed description in the further part of the manual.

   • Points - this edit mode is available when you choose Talent, Screen or Object layer. It allows you to perform various kinds of transformations on a selected layer. You can move it anywhere on the Screen by hooking the cursor on a point located in the corner. You can change positions of the points to be able to freely modify the layer's shape. A detailed description in the further part of the manual.

6. Solo - by default this option is disabled. By enabling it, you hide all the other layers except the selected one.

7. Visible - this option is enabled by default. Disabling this option hides the selected layer.

8. Opaque - opacity. This option is available for the Talent, Screen and Object layer. It is enabled by default for the Screen layer, while for the Talent and Object layer, it is disabled by default. By enabling this option a transparent area on the selected layer changes to black.

9. Reset Transformations - you can restore the selected layer to its default initial size and shape by clicking on this icon. All operations performed on this layer will be deleted.

10. Crop Layer - this function allows you to crop the loaded image. You can only use it on the Object layer. Description further in the text.

CONTROL WINDOW – EDIT MODE : RECTANGLE AND POINTS

The set design editor provides you with various options of editing a single layer. Let's examine an example.

Example: The goal is to insert into the set design a layer with a screen so that it fitted into TV housing. Image below: a studio with two TVs without screens.

Keep in mind that, when you add another layer, it will be placed in front of those previously added in the studio, i.e. the lowest layer is the furthest layer from the camera's perspective. Therefore, most often the Talent layer is added at the very end (it will be at the very top), so that nothing obscures the form of a presenter.

Let's use Rectangle mode to load the first Screen layer into the TV housing, and Points mode for the second TV to show you the difference between them.

Load the Screen layer. As in the image below:

Note that, after loading, the Screen layer fills an entire screen area, covering all the other layers.

Let's use Rectangle edit mode. This edit mode is enabled by default. There is a control panel for this mode at the bottom, it comprises of five elements: a joystick, a vertical controller and three rotary knobs.
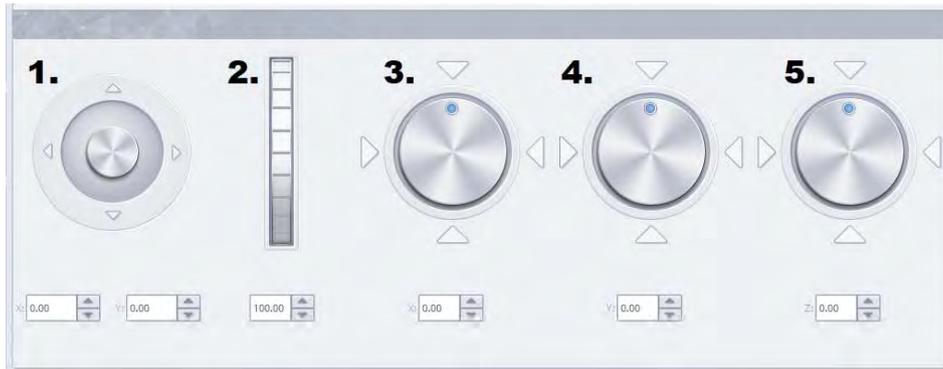
1. Joystick - changing the position of a selected element / layer. The position can be also changed by 'grabbing' the element with the cursor and dragging it with the mouse.

2. Vertical controller - resizing the element, scaling.

3. Rotary knob: X plane - rotation of the element in the X plane.

4. Rotary knob: Y plane - rotation of the element in the Y plane.

5. Rotary knob: Z plane - rotation of the element in the Z plane.

There are two ways to operate the vertical controller:

1. Click on any place on the controller's knob and move it up or down

2. Use the arrows located next to the numerical value field for precise movement of the controller's knob.

In the case of rotary knobs, there are the following ways to operate them:

1. Click on any place on the knob and turn it to the left or to the right.

2. Click on one of the four triangles around the knob to turn the knob setting the knob's dot exactly at the point indicated by an arrow. It will be a rotation of exactly 90 degrees or of a multiple of this value.

3. Use the arrows located next to the numerical value field for precise movement of the knob.

Use the vertical controller to reduce the size of the Screen layer's green rectangle. Image below.

Since immediately after loading, the Screen layer fills up an entire area, the controller's value is 100 (in%). After reducing the layer's size, the parameter's value also decreases.

The layer can be rotated along its X axis with the use of the first rotary knob. Click on any place on the knob and rotate it. Image below.

The Screen layer can be also rotated along its Y axis. Use the second rotary knob for that purpose. Image below.

You can also rotate the layer along its Z axis. Use the last rotary knob on the right side for that purpose. Image below.
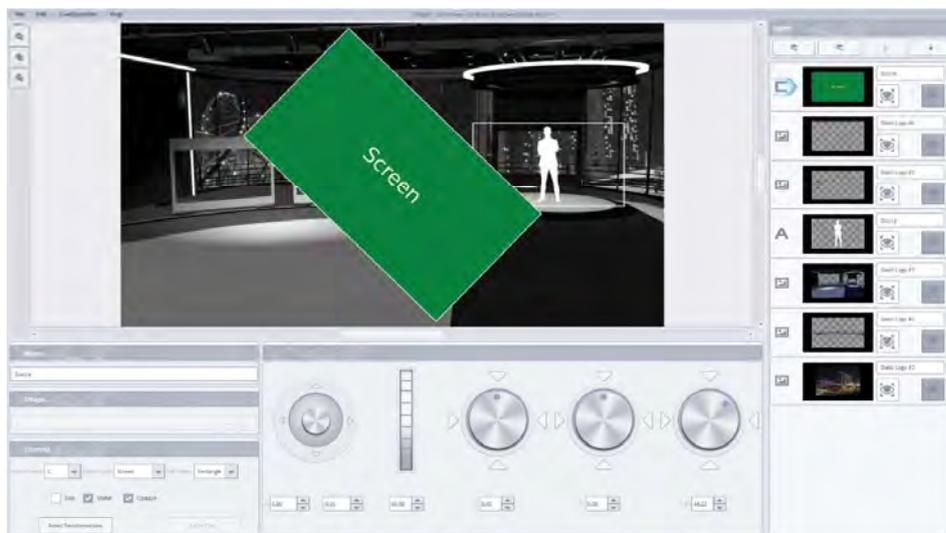
Use the vertical controller to get the appropriate size of the Screen layer. Then use all the rotary knobs to set the correct position. At the end, the goal has been achieved: green Screen is correctly placed inside the TV housing.

You can achieve the same effect, but much faster, by using the edit mode: Points.

Just as before, after loading the Screen layer, scale it as so that it doesn't cover an entire area. Use the vertical controller to reduce the size of the Screen layer's green rectangle. After resizing, activate the Points mode. When the program warns you with a message, select YES option. See the image below.

Points - this edit mode allows you to perform various types of transformations on the selected layer.

After switching to this mode, square points will show up in the corners of the green Screen layer. When you hook the cursor on the corner point (the point's color will change to red), you will be able to move it to any place. By changing positions of the points, you can freely modify the shape and swiftly adjust the Screen to the TV's housing. Just change the positions of the 4 points.

To facilitate the task, use the icons: Zoom Out, Zoom In and Zoom 1:1.

See the image below.

1. Zoom 1:1 icon - deletes all zoom changes made.

2. Zoom In icon - enlarges the image - for example, if you want to precisely set the points in the Points edit mode, you can enlarge the area. After adjusting the points, change the view back to 1:1 by clicking Zoom 1:1 icon.

3. Zoom Out icon - reduces the image's view.

The image below. Edit mode: Points. Setting the points. Image enlarged with Zoom In.

If there are many layers in your project, remember to mark the layer's thumbnail before introducing the changes. It will allow you to click with the mouse only on the selected layer.

After selection, a blue border in the shape of an arrow will appear around a letter D. The image below.

After this editing, there are two green Screens inserted into TV housings in the studio. See the image below.
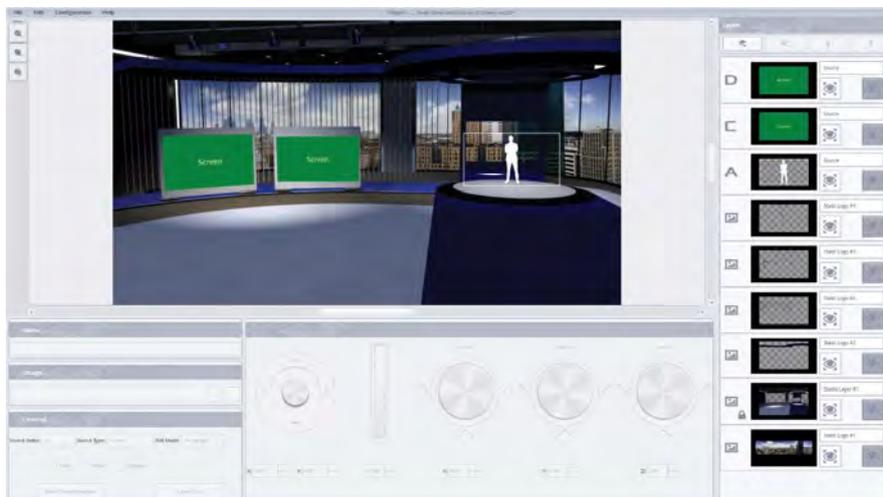
You can edit the Talent and Object layers in the same way as the Screen layer.

CONTROL WINDOW - LAYER CROP FUNCTION

This function allows you to crop the loaded image, but you can only use it with the Object layer. Let's examine an example. In the image below, you can see an image loaded into Virtual Space Maker editor. Only a fragment with a dragon is needed from this image. You enable the crop function by clicking Layer Crop button. See the window that appears in the image below:

Now, change the image borders using the sliders - top and bottom, left and right. This way you can limit the image area to the desired fragment. Picture below.
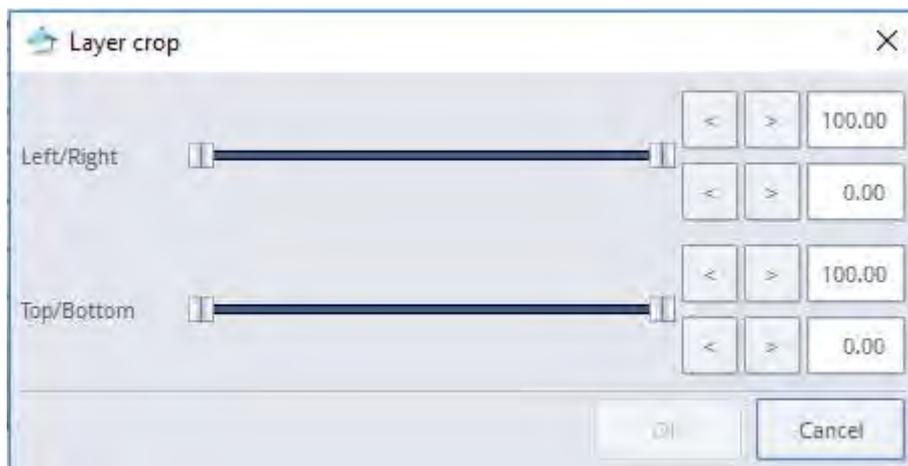
The Object layer's image obtained in this manner can be further adjusted to your needs by using other functions, such as enlarging or using the Points mode.

CONTROL WINDOW - TALENT LAYER

The Talent layer (source A or B) is the last layer to be inserted into the set design. Normally, one or two Talent layers are used in the project. Picture beside.
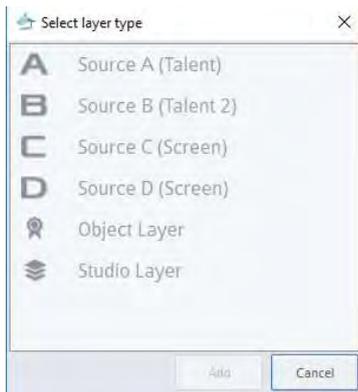
After loading the Talent layer into the set design, a white frame appears surrounding this layer. This white frame indicates the size and location of the camera image in the studio's set design. Picture below.

When the Talent layer is loaded, you can properly adjust its size and location to a desired position.
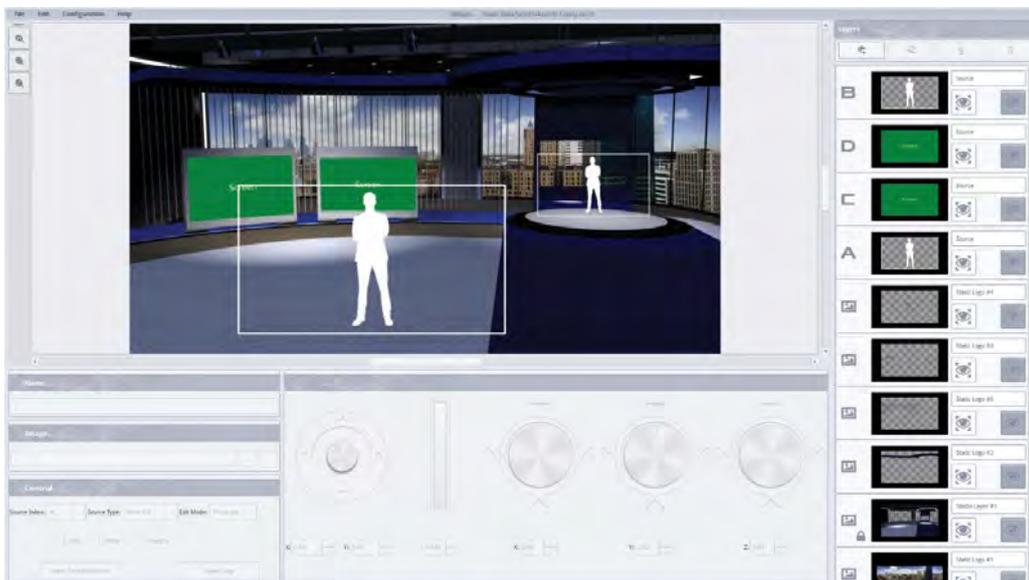
At the end, save your set design on the disk by clicking: File > Save as. At this point, you can enable mark set as not writable option at the bottom left of the window to protect your set design from any changes made to this file, e.g. overwriting it.
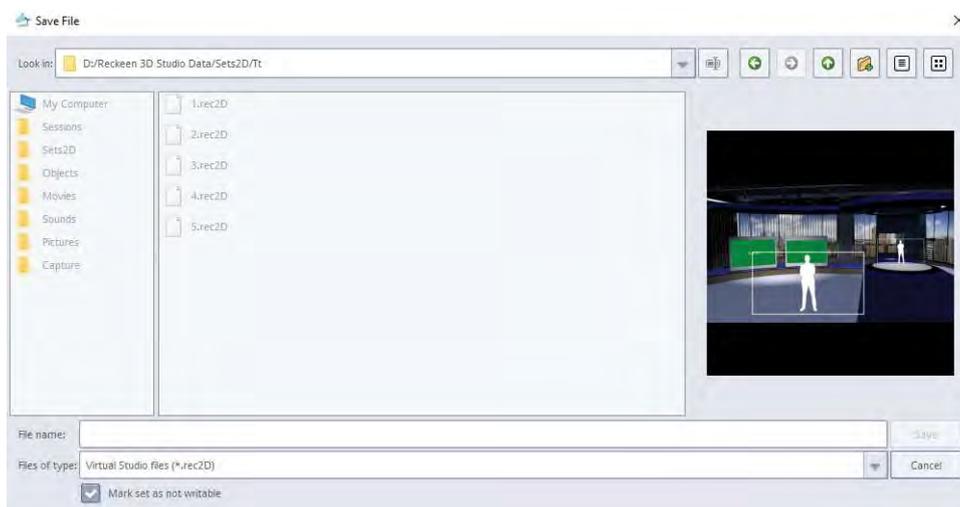
When the set is saved on the disk, you can close the editor. Now, if you have Reckeen LITE virtual studio running, you can load your set design into the LITE Production module and make a live show.

Good luck!

QUESTIONS & ANSWERS

Question:

CAN I USE A READY-MADE SET DESIGN PROVIDED WITH RECKEEN LITE SYSTEM AND INTRODUCE SOME CHANGES TO IT?

Solution

Yes, it is possible. After loading a scenography to the editor, you just have to save the file under a different name. Afterwards, in such scenography you can, for example, insert additional studio equipment using an object layer or a .png file with transparency (alpha channel).

Question:

WHERE CAN I GET .PNG OBJECT FILES WITH A TRANSPARENT BACKGROUND?

Solution

There is a rich library of such files in the Reckeen system. These kind of files can be created with, for example, GIMP program. You can also download ready-made files from the Internet using a search engine. When searching for such image, select Search Tools color: transparent. These are the files that have a characteristic checkered background representing an alpha channel or transparency.

Question:

HOW TO MAKE SURE MY GRAPHICS CARD IS COMPATIBLE WITH DIRECTX 11?

Solution

First of all, you can check on the seller's website whether your graphics card is compatible with DirectX 11.

You can also open DirectX diagnostics tool to help you check, if your computer meets the minimum requirements. To start the DirectX diagnostic tool, click Window's Start button and type 'dxdiag' in the search box, and then press ENTER. Picture below:
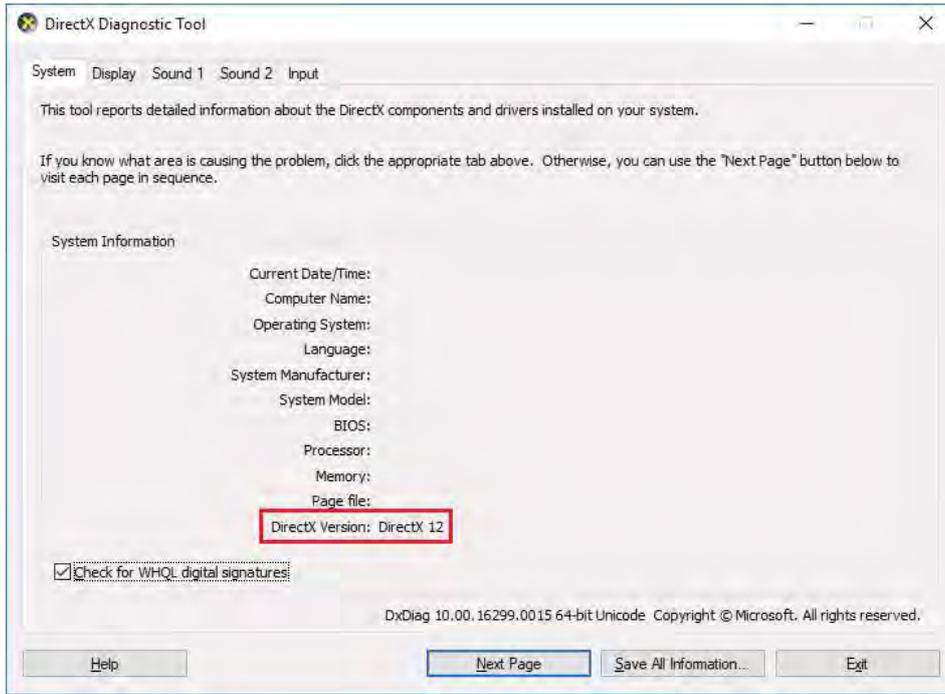
If you click a Display tab ,you can see what drivers your computer supports. Picture Below (26 DIRECT X)
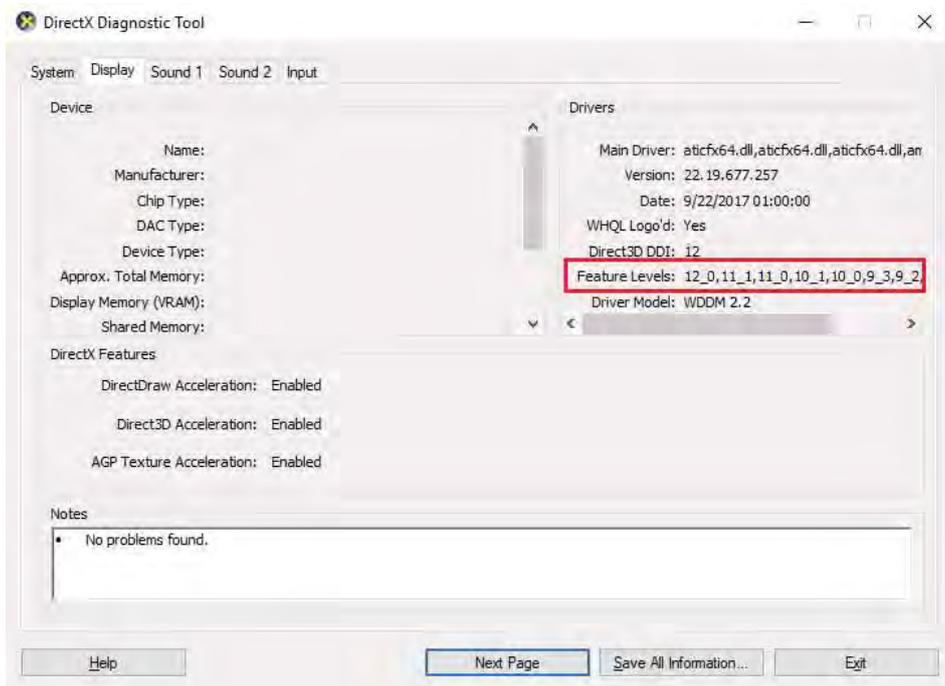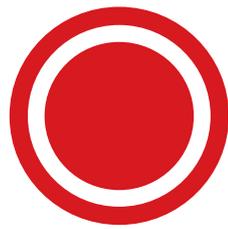
F.A.Q

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Here, you will find descriptions of the problems you may encounter when working with the Reckeen system.

If you have any questions - search the relevant section for a description of a problem and a solution for it. If you cannot find the information you are looking for, please contact your local distributor.

Question:

Unexpected disruptions in the stable operation of the Reckeen system

Solution

Make sure that all the devices connected to the Reckeen system (cameras, external audio mixer, PC , etc.) and the system itself are powered with the voltage of the same phase. The easiest way to verify this is to connect all the devices to a single power strip in accordance with the grounding principles.

Question:

Windows system wants to update itself or displays a message referring to inability to start the system or a message about invalid graphics card drivers

Solution

For the Reckeen system, Windows updates are disabled. You should not change this allowing the updates or Windows system upgrade , as this may cause instability of the system or even inability to start the Reckeen application. This also applies to updating your graphics card drivers. If you update Windows, you have to restore it to the previous version.

Question:

Can I install antivirus software?

Solution

In the event of the need to use antivirus software, it shall be installed, the computer shall be scanned for viruses, and then the software shall be uninstalled. This is to avoid the uncontrolled incorporation of this software during live production and unstable system operation.

Question:

How can I reduce the noise created by the Reckeen workstation? Can I replace the fans with quieter ones myself?

Solution

To reduce the noise of the workstation, we recommend moving the workstation away from the studio where the sound is being recorded. The ideal situation is when the workstation is located in a separate control room. And in that case, we recommend using the ADB-100 audio box to connect microphones from the studio. The sound transferred digitally from ADB-100 through RJ 45 connector is linked to Reckeen workstation in a control room. The sound maintains the highest quality and avoids noise.

We do not recommend replacing the fans because of the need for intensive cooling of the workstation's components - factory-fitted fans provide sufficient amount of cooling. Replacing the fans will also void the warranty.

Question:

Is the default content provided with Reckeen system, such as videos, graphics, sounds etc., my legal property? Can I prepare and broadcast productions using these materials without worrying about the license?

Solution

Reckeen has copyrights to all content sold with the Reckeen system. After purchasing the system, a user is authorised to use the content freely.

Question:

VKey-100 control panel - I'm having trouble switching buttons on mixer's Preview and Program busses

Solution

Check that the T-bar handle on VKey-100 control panel is fully moved to its upper or bottom end, no matter whether the green triangular LED on the T-bar desktop is lit or not - if the T-bar is in between these positions, it might cause disruptions while switching PVW and PGM buttons.

Question:

What kind of monitor should I use as multi-viewer when working with the Reckeen system?

Solution

For best results, you should use a monitor with HD resolution 1920x1080 working in 8-bit system. It is possible to connect up to 3 monitors at a time. We do not recommend connecting TVs as an external screen because TV might operate in 12-bit resolution or in a 3D mode, which would significantly burden the graphics card and slow down the Reckeen system.

Question:

## I changed the disk partition's name on Reckeen's PC from C and D partitions to C and Z, and I have a problem with saving session files, how to solve it?

Solution

C and D partitions must be on your computer for Reckeen software to work properly. Do not change this. All directories related to Reckeen Software should be placed on the D partition, as it was originally intended on that equipment.

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TECHNICAL
SPECIFICATION
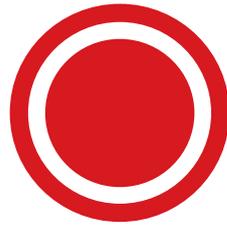
reckeen®

reckeen lite

Reckeen Lite technical specification.
There are two version of system 3G SDI or HDMI.

Video input

Reckeen SDI Virtual Studio System*
- **SDI Video Input**
  - 2 x 3G – 3G/HD/SD auto switching
- **HDMI**
  - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k 30p

Reckeen HDMI Virtual Studio System
- **HDMI**
  - 4xHDMI 1,4 type A connector with support for 1080p60 two up to 4k 30p

Monitor output
- **3x DP output for monitor**
- **1x HDMI output for monitor**

I/O port
- **Tally Output**
  - TL – DB9 – 4 channels
- **Reckeen External Keyboard port**
  - RS – DB9 – RS 232
- **Reckeen External Audio port**
  - LAN – Audio Link
- **Ethernet**
  - Gigabit Ethernet LAN

- **PC/2**
  - PC keyboard
- **USB**
  - 2 x USB 3.0 (front panel)
  - 4 x USB 3.0 (back panel)
  - 1 x USB 3.1 (back panel)

Audio output
- **Digital**
  - embedded stereo on each SDI and HDMI

- **Analog**
  - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 1 x Jack 6,3mm – stereo Headphone output

Video standards

Reckeen SDI Virtual Studio System*
- **SDI**
  - SMPTE2082-1*
    - 2160p (29.97/25)
  - SMPTE–425M
    - 1080p (60/59.94/50/30/25)
  - SMPTE–292M
    - 1080p (30/29.97/25)
    - 1080i (60/59.94/50)
  - SMPTE–296M
    - 720p (60/59.94/50)
  - SMPTE–259M
    - PAL, NTSC
- **HDMI**
  - Video standard – HDMI spec 1.4

Reckeen HDMI Virtual Studio System
- **HDMI**
  - Video standard – HDMI spec 1.4

NDI
- **NDI input:**
  - 4 input interchangeably as cam 1 to cam 4 with supported stream key or Reckeen chroma key
  - 2 input interchangeably as media 1 and 2

- **NDI output:**
  - program out

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Video output

Reckeen SDI Virtual Studio System*
- **SDI Video Output**
  - 2 x SDI – 3G/HD
- **HDMI**
  - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k 30p

Reckeen HDMI Virtual Studio System
- **HDMI**
  - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k 30p

Audio input
- **Digital**
  - embedded stereo on each SDI and HDMI

- **Analog**
  - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - Two types of microphones – dynamic and condenser with + 48V phantom

Video formats

Reckeen SDI Virtual Studio System*
- **Input**
  - 2 x HDMI v1.4, 2 x SDI
    - 2160p 30/25 on one HDMI and 12G* SDI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
  - PAL, NTSC
- **Output**
  - 2 x HDMI v1.4, 2 x SDI
    - 2160p 30/25 on one HDMI and 12G* SDI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50

Reckeen HDMI Virtual Studio System
- **Input**
  - 4 x HDMI v1.4
    - 2160p 30/25 on two HDMI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
  - PAL, NTSC
- **Output**
  - 2 x HDMI v1.4
    - 2160p 30/25 on one HDMI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50

Features
- **Downstream Key –** x2
- **Media Format**
  - MPEG2, MPEG4 and H.264 containers: (avi, mpg, mpeg, mp4, mxf, mov)
  - Audio: WAV, MP3
- **Video Capture Format**
  - H.264 (.mp4) MPEG-2 (.mpg)
  - 1080p 60/59.94/50/30/29.97/25
  - 1080i 60/59.94/50
  - 720p 60/59.94/50
  - H.264 up to 4k 30p

- **Still Picture –** x2
- **Picture Format**
  - .png, .jpg, .bmp
- **Still Text –** x2
  - Still Editor included
- **Keyer –** x4
  - Chroma Key / Luminance Key
- **Streaming**
  - Facebook
  - YouTube
  - NicoNico
  - Ustream
  - NDI
  - and custom profiles

Software
- **Reckeen 3D package DEMO:**
  - 3D Production
  - 3D Studio Editor
  - Wizard
  - MS 3D Paint
  - Still Editor

- **Reckeen Lite package:**
  - Lite Production
  - VSM Lite Editor (also as a standalone version)
  - Still Editor

reckeen
3D STUDIO

reckeen XR
3D STUDIO

Reckeen 3D Studio technical specification.
of system SDI12G

Video input

Reckeen SDI Virtual Studio System*

- **SDI Video Input**
  - 1 x 3G – 3G/HD/SD auto switching
  - 1 x12G – 12G/HD/SD auto switching
- **HDMI**
  - 2 x HDMI 1.4 type A connector with support for 1080p60 one up to 4k 60p

Monitor output

- 3x DP output for monitor
- 1x HDMI output for monitor

I/O port

- **Tally Output**
  - TL – DB9 – 4 channels
- **Reckeen External Keyboard port**
  - RS – DB9 – RS 232
- **Reckeen External Audio port**
  - LAN – Audio Link
- **Ethernet**
  - Gigabit Ethernet LAN

- **PC/2**
  - PC keyboard
- **USB**
  - 2 x USB 3.0 (front panel)
  - 4 x USB 3.0 (back panel)
  - 1 x USB 3.1 (back panel)

Audio output

- **Digital**
  - embedded stereo on each SDI and HDMI

- **Analog**
  - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 1 x Jack 6,3mm – stereo Headphone output

Video standards

Reckeen SDI Virtual Studio System*

- **SDI**
  - SMPTE2082-1*
    - 2160p (60/50/30/25)
  - SMPTE−425M
    - 1080p (60/59.94/50/30/25)
  - SMPTE−292M
    - 1080p (30/29.97/25)
    - 1080i (60/59.94/50)
  - SMPTE−296M
    - 720p (60/59.94/50)
  - SMPTE−259M
    - PAL, NTSC
- **HDMI**
  - Video standard – HDMI spec 1.4

Reckeen HDMI Virtual Studio System

- **HDMI**
  - Video standard – HDMI spec 1.4 / 2.0

NDI

- **NDI input:**
  - 4 input interchangeably as cam 1 to cam 4 with supported stream key or Reckeen chroma key
  - 2 input interchangeably as media 1 and 2

- **NDI output:**
  - program out

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Video output

Reckeen SDI Virtual Studio System*

- **SDI Video Output**
  - 1 x SDI – 3G/HD
  - 1 x12G - 4k 60p
- **HDMI**
  - 2 x HDMI 2.0 connector with support for 1080p60 one up to 4k 60p

Audio input

- **Digital**
  - embedded stereo on each SDI and HDMI

- **Analog**
  - 2 x XLR two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 2 x Jack 6,3mm two channels – professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - Two types of microphones – dynamic and condenser with + 48V phantom

Video formats

Reckeen SDI Virtual Studio System

- **Input**
  - 2 x HDMI v2.0, 2 x SDI 3G and 12G
    - 2160p 60/50 on one HDMI and 12G SDI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
  - PAL, NTSC
- **Output**
  - 2 x HDMI v1.4, 2 x SDI
    - 2160p 60/50 on one HDMI and 12G* SDI
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50

Features

- **Downstream Key –** x2
- **Media Format**
  - MPEG2, MPEG4 and H.264 containers: (avi, mpg, mpeg, mp4, mxf, mov)
  - Audio: WAV, MP3
- **Video Capture Format**
  - H.264 (.mp4) MPEG-2 (.mpg)
  - 1080p 60/59.94/50/30/29.97/25
  - 1080i 60/59.94/50
  - 720p 60/59.94/50
  - H.264 up to 4k 60p

- **Still Picture –** x2
- **Picture Format**
  - .png, .jpg, .bmp
- **Still Text –** x2
  - Still Editor included
- **Keyer –** x4
  - Chroma Key / Luminance Key
- **Streaming**
  - Facebook
  - YouTube
  - NicoNico
  - Ustream
  - NDI / Skype
  - and custom profiles

Software

- **Reckeen 3D package:**
  - 3D Production
  - 3D Studio Editor
  - Wizard
  - MS 3D Paint
  - Still Editor

- **Reckeen Lite package:**
  - Lite Production
  - VSM Lite Editor (also as a standalone version)
  - Still Editor

* XR features (PTZ tracking Virtual Studio and AR) are fully available after purchasing an add-on software license - XR License.
There are time-based as well as lifetime licenses available - ask your distributor or send an email to sales@reckeen.com for more information.
Without purchasing the XR license, in the software version 1.9 or newer, the XR features are still available to test for free by 3D Studio users
- testing mode results in a watermark being displayed on the Program Output only in XR Features.

3DSPRO XR
3D Studio PRO

Reckeen 3DSPRO X8 technical specifications

Video input

SDI
- **SDI Video Input**
  - 4 x 3G − 3G/HD/SD auto switching
  - 3G,12G − 4 x 3G SDI and 2 x 12G SDI

HDMI
- **HDMI**
  - 2 x HDMI 2.0 type A connector with support for 1080p60 up to 4k 60p

Monitor output

- **3 x DP output for monitor**
- **1 x HDMI output for monitor -** - The number of HDMI/DP outputs depends on the graphics card

I/O port

- **Tally Output**
  - TL − DB26 − 4 channels
- **Reckeen External Keyboard port**
  - RS − DB9 − RS 232 and RS422
- **Reckeen External Audio port**
  - RJ45 − Audio Link
- **Ethernet**
  - AQUANTIA® / Marvell 10G LAN
- Intel® Gigabit LAN
- Intel® Wi-Fi 6 802.11ax (2.4Gbps) + BT 5.0
- **USB**
  - 2 x USB 3.0 (front panel)
  - 2 x USB 3.2 Gen2 Type-C
  - 6 x USB 3.2 Gen1
  - 2 Intel® Thunderbolt™ 3 Type-C

Reference input – (Genlock)

- Black Burst or Tri-Sync

Audio output - ADB 100

- **Digital**
  - embedded stereo on each SDI and HDMI
  - 2 x AES/EBU
- **Analog**
  - 4 x XLR two channels − professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - 1 x Jack 6,3mm − stereo Headphone output

Video standards

SDI
- **SDI**
  - SMPTE2082-1
    - 2160p (60/59.94/50/30/25)
  - SMPTE−425M
    - 1080p (60/59.94/50/30/25)
  - SMPTE−292M
    - 1080p (30/29.97/25)
    - 1080i (60/59.94/50)
  - SMPTE−296M
    - 720p (60/59.94/50)
  - SMPTE−259M
    - PAL, NTSC

HDMI
- **HDMI**
  - Video standard − HDMI spec 1.4
  - Video standard − HDMI spec 2.0

NDI

- **NDI input:**
  - 4 input interchangeably as cam 1 to cam 4 with supported stream key or Reckeen chroma key
  - 2 input interchangeably as media 1 and 2
- **NDI output:**
  - program out

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Video output

SDI
- **SDI Video Output**
  - 8 x SDI − 3G/HD
  - 3G,12G − 6x3G/HD and 2x12G - 4k 60p

HDMI
- **HDMI**
  - 2 x HDMI 2.0 type A support for 2160p60

Audio input - ADB 100

- **Digital**
  - embedded stereo on each SDI and HDMI
  - 2 x AES/EBU
- **Analog**
  - 4 x XLR two channels − professional balanced analogue audio stereo differential input (-10dBV, or 4dBu)
  - Two types of microphones − dynamic and condenser with + 48V phantom

Video formats

SDI
- **Input -** auto switching
  - 2 x SDI 12G
    - 2160p 60/59.94/50/30/29.97/25
  - 6 x SDI 3G
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
  - PAL, NTSC
- **Output**
  - 2 x SDI 12G
    - 2160p 60/59.94/50/30/29.97/25
  - 6 x SDI 3G
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
    - PAL, NTSC

HDMI
- **Input -** auto switching
  - 2 x HDMI 2.0
    - 2160p 60/59.94/50/30/29.97/25
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50
  - PAL, NTSC
- **Output**
  - 2 x HDMI 2.0
    - 2160p 60/30/29.97/25
    - 1080p 60/59.94/50/30/29.97/25
    - 1080i 60/59.94/50
    - 720p 60/59.94/50

Features

- **Downstream Key −** x2
- **Media Format**
  - MPEG2, MPEG4 and H.264 containers: (avi, mpg, mpeg, mp4, mxf, mov)
  - Audio: WAV, MP3
- **Video Capture Format**
  - H.264 (.mp4) MPEG-2 (.mpg)
  - 1080p 60/59.94/50/30/29.97/25
  - 1080i 60/59.94/50
  - 720p 60/59.94/50
  - H.264 up to 4k 30p and 60p
- **Still Picture −** x2
- **Picture Format**
  - .png, .jpg, .bmp
- **Still Text −** x2
  - Still Editor included
- **Keyer −** x4
  - Chroma Key / Luminance Key
  - SmartKey with 4 SDI outputs
- **Streaming**
  - Facebook
  - YouTube
  - NicoNico
  - NDI and Skype
  - and custom profiles

Software*

- **Reckeen 3D package :**
  - 3D Production
  - 3D Studio Editor
  - 3D Wizard
  - MS 3D Paint
  - Still Editor
- **Reckeen Lite package:**
  - Lite Production
  - VSM Lite Editor (also as a standalone version)
  - Still Editor

Reckeen ADB 100 technical specifications

- 4 x XLR channels – two professionally balanced stereo analogue audio differential inputs
- 4 x XLR channels – two professionally balanced stereo analogue audio differential output
- High quality headphones output
- 2 x digital inputs: AES/EBU (AES3)
- 2 x digital outputs: AES/EBU (AES3)
- Audio Link connector – for RJ45 cable up to 50 m, equipped with galvanic isolation
- ¼-inch microphone input – professionally balanced stereo analogue audio differential input for dynamic and condenser microphone
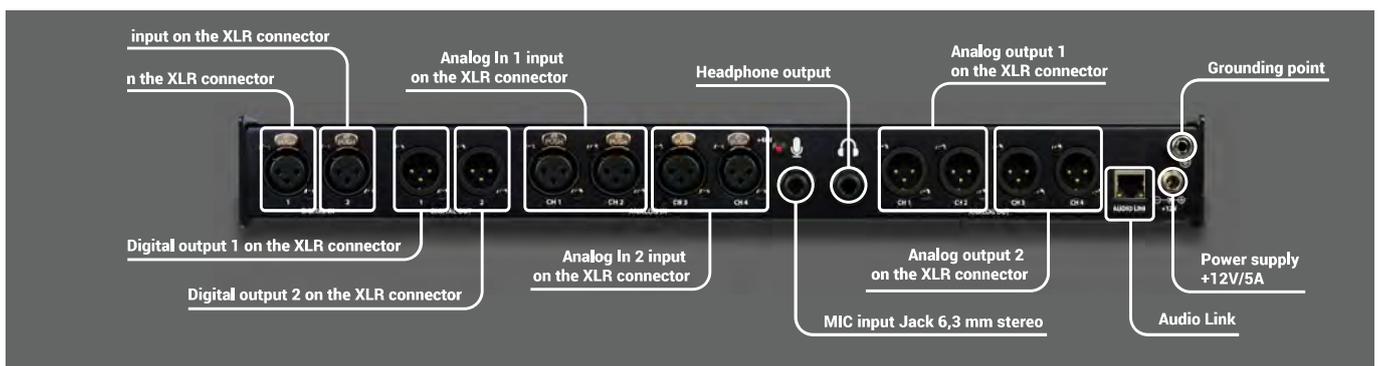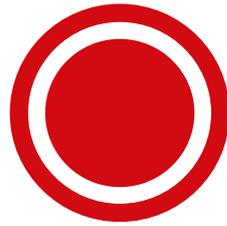
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V3.0 and above - Advance Production and Graphics Features

ADVANCE 3D STUDIO SOFTWARE VERSION

Software version 3.0 is available as a payable software upgrade. It provides more creative freedom, advance graphic features and flexible production options. New features will be beneficial especially to users whose requirements are related to professional applications of our systems.

For more information on pricing and purchasing the upgrade contact your local Reckeen reseller or send us an email: sales@reckeen.com

V3.0 - WHAT'S NEW?

Changes included in software version 3.1.:

Reckeen 3D Studio Cofiguration - TRIGGERS

• Features allowing operations on commands' lists: save, load, copy, cut, paste, etc.
• Multi-triggers: Parallel operations on triggers

Reckeen 3D Studio - Virtual Camera Editor

• Synchronisation of Triggers and Virtual Camera shots: feature allowing for activation of a trigger when calling up a specific Virtual Camera shot.
• Copying and Pasting feature between different Virtual Camera tabs (VC1-VC4).

3D Studio Editor

• Editing of 3D materials such as: Texture coordinates (U, V) scaling, X- & Y-asxis offsets, save and load features
• Converting 3D materials from external environments such as "Adobe Substance 3D" to Reckeen 3D Studio formats - new external application: Reckeen Material Editor
• Importing 3D materials into 3D Studio Editor, creating your custom libraries with assigned labels, tags, and categories
• New FBX importers: AutoDesk Importer - update to version 2020, Godot Importer.
• Saving your own customized objects to Reckeen library allowing easy searching.
• Indicating the path of 3D objects files in the 3D Studio Editor
• Lights: The number of Spot/Point/Directional lights in the scene has been expanded to 8.

Reckeen 3D Studio Cofiguration - SCREENS

• on / off feature for PGM and PRV frames, for signals coming from graphics card outputs.

• Improving system performance.

OPERATIONS ON COMMANDS' LISTS - TRIGGERS

From software version 3.0 new editing features on commands lists become available. The new functions are only available for ADVANCE mode.

There are two ways of calling up the selection of editing functions - by pointing to the gear (see the picture above) or by pressing the right mouse button, then a menu with functions will appear.

NOTE: if a trigger list has been modified, a red warning "Trigger list modified" will appear in the lower part
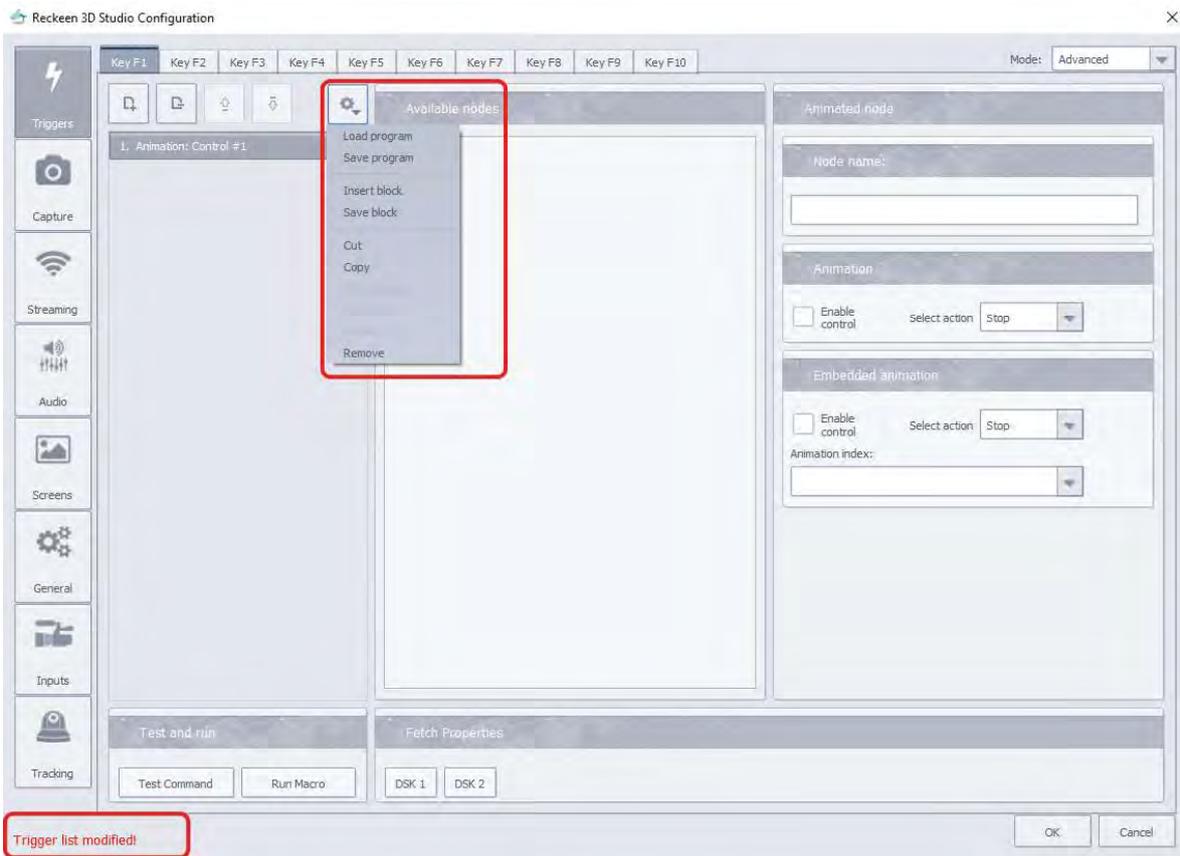
of the window. If you select the "OK" option, the current program will be saved, by pressing "Cancel" the changes are rejected.

Load Program - this function allows you to load a previously saved trigger sequence to the currently selected KEY Fn channel.

Save Program - this function allows you to save a trigger sequence that has been created for the assigned KEY F1 to KEY F10 keys. Only one KEY Fn selected is saved.

Insert Block - The Insert function allows for inserting previously saved trigger blocks or programs at the selected location.

Save Block - The function SAVES the selected fragment of the list to disk.

Cut - The function removes the selected fragment from the list.

Copy - The function stores the selected fragment of the list in the buffer

Paste Before - The function inserts the saved buffer before the selected line in the list of triggers.

Paste After - The function inserts the saved buffer after the selected line in the list of triggers.

Replace - The function replaces chosen trigger(s) in the trigger list with the saved buffer.

Remove - The function removes the selected fragment from the list of triggers.
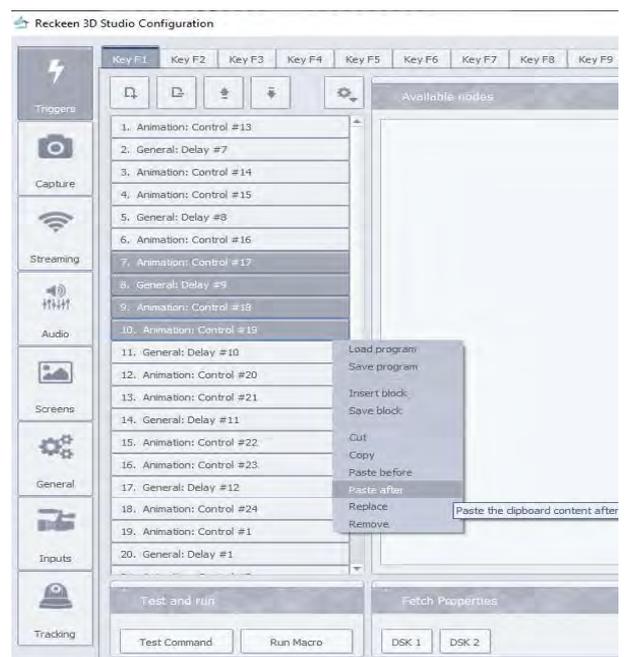
MULTI-TRIGGERS FUNCTIONS

This function allows you to use multiple trigger keys simultaneously. In the previous software versions it was only possible to trigger one key at a time, and until the all commands under that key were completed, no other triggers could have been activated.

NOTE: since the triggering scheme depends on a user's scenario and its execution, it is up to a user to think carefully on using multiple triggers simultaneously, because the scope of triggers' activities may refer to the same areas or variables.

TRIGGERS AND VIRTUAL CAMERA (V/C) EDITOR

New feature has been added to V/C Editor allowing you to assign trigger activation to a specific V/C shot. The trigger will be activated upon calling up the chosen camera shot. This feature is also supported by the Vkey100 or 200 control panel.

You can assign a trigger key to each camera view position created in V/C1 to V/C4. For this purpose, there is a "Trigger" window in the shot editor. To use it, first indicate the specific camera shot which you want to assign a trigger to. Then, you can choose one trigger for when the virtual camera enters the chosen shot, and a different trigger when it exits the shot (see the picture above). This enables the programming of any camera operation scheme together with the activation of extended system functions.
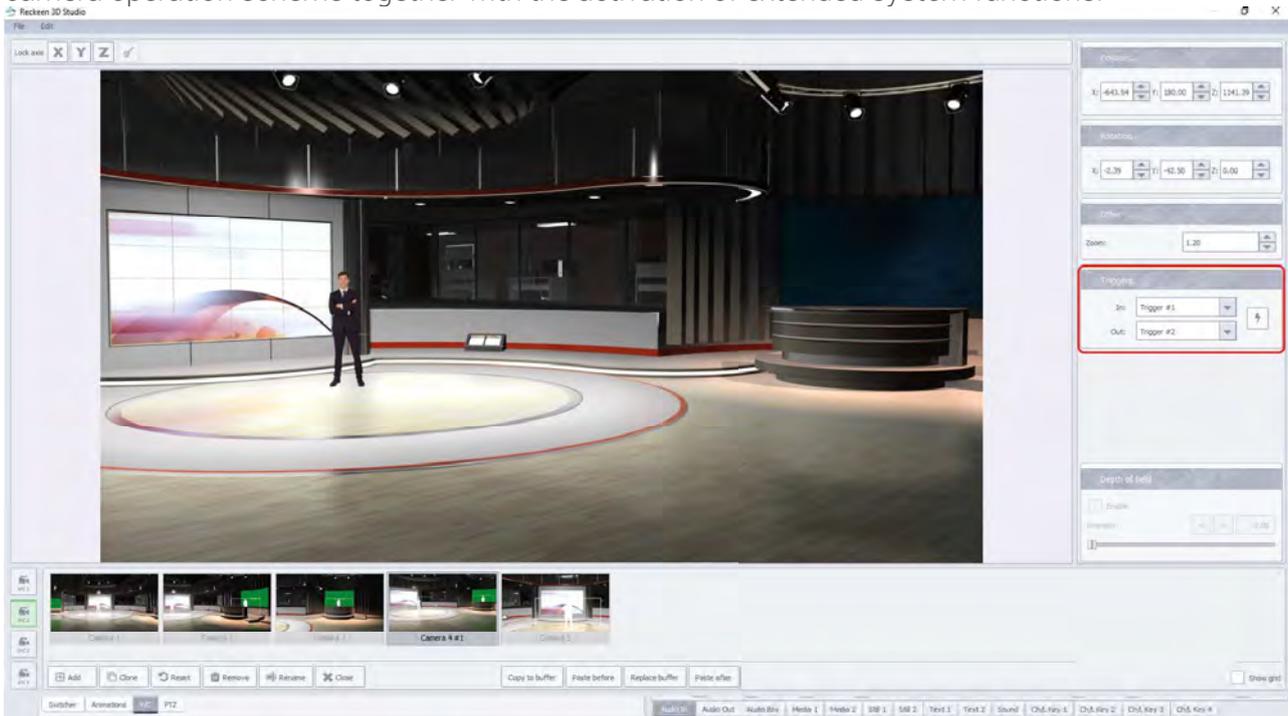
For example, we can trigger a change in camera shot which moves the virtual camera position close to a virtual monitor, in front of which the Talent is placed. Through the trigger function in the V/C editor, we can trigger an animation that will hide the talent, revealing the entire monitor, for the time being when that camera shot is being used.

To select a trigger, select one of the available triggers for the IN or OUT phase of the shot. There is also a lightning bolt icon which brings up the triggers' configuration dialog box.

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V/C SHOT EDITOR AND THE EDITING FUNCTIONS

The v/c shot editor has been supplemented with additional functions that allow you to copy camera positions and transfer them to another V/C1 to V/C4 shot tray.
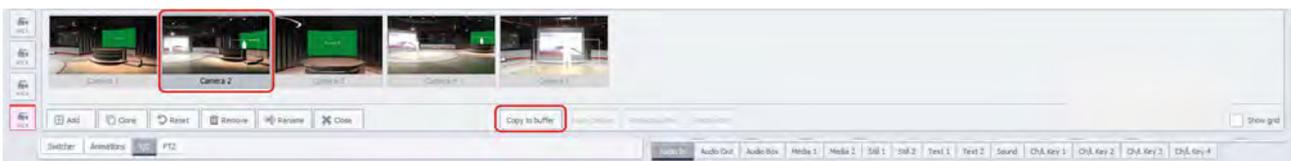
In order to copy the shot, select the shot you want to copy, then select the copy to buffer. The camera
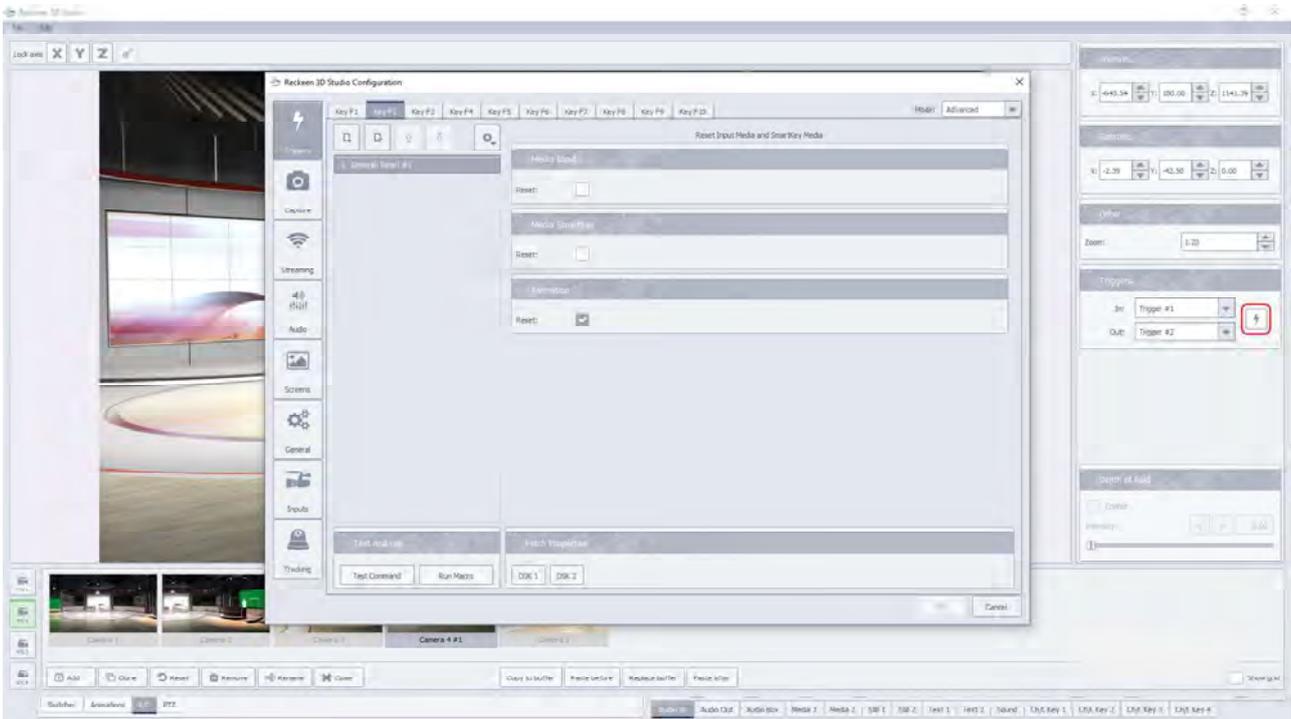
position will be saved in the buffer.

Paste Before - The function inserts the saved buffer before the selected shot.

Paste After - The function inserts the saved buffer after the selected shot.

Replace buffer - The function replaces selected shot with the shot saved in the buffer.

Note: the buffer content is preserved even after changing to a different V/C tab (for example from V/C 1

to V/C 2), which enables moving and copying shots between different V/C 1 to 4 tabs.

3D STUDIO EDITOR: MATERIALS - U,V SCALING AND OFFSET

New featues added to software version 3.0 allow to make more changes and modifications to the materials used in your 3D scene.

Editing of 3D materials: U, V scaling & offsets:

Picture above indicated where in the menu new features has been placed. To make changes to a meterial, click on an object, scroll down the menu on the right hand side until you reach the library of materials. Under the library you will find a section dedicated to modifying textures and scaling.
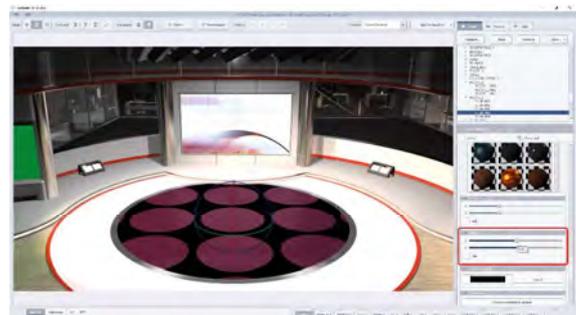
By changing the U V settings you can change the texture's **scale**, both vertically and horizontally.
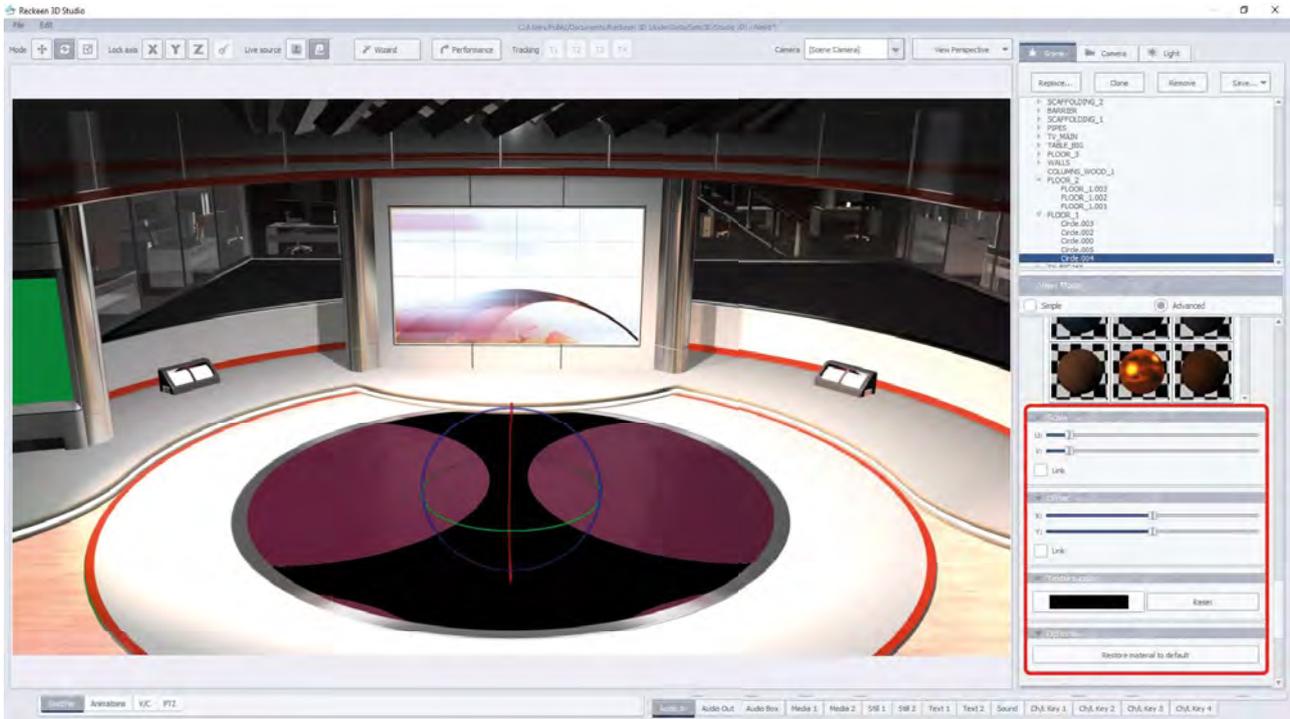
By changing the OFFSET settings, you can change the
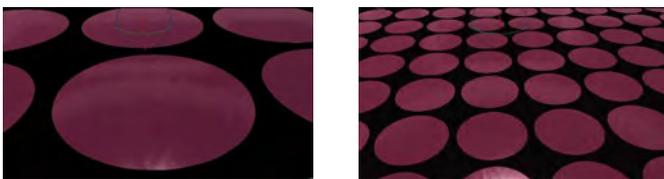
texture's **position**, both vertically and horizontally.

3D STUDIO EDITOR: MATERIALS - IMPORT AND SAVE

Above the library of materials you will now find the options SAVE and IMPORT materials.

SAVE - Modified material or a material that was imported together with a 3D model, can be saved as a separate file in the CUSTOM catalog. The file can be given a custom name, as well as a tag describing the features and category and sub-category of the material, allowing you to browse the database of selected tags in the future.
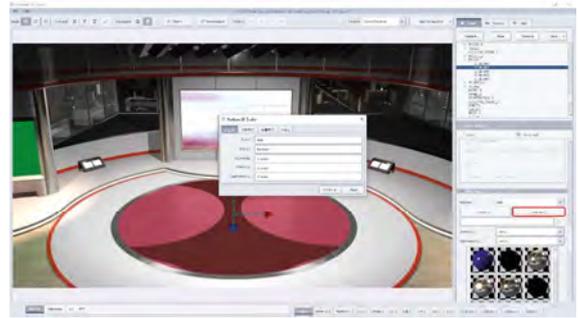
NOTE: Materials in the Reckeen format have their own

extension: *.recMaterial* and are saved in the Custom directory and automatically added to the list of materials available in the application. **The update of the list occurs when the application is re-started.**

IMPORT - materials can be imported from a separate files in the *rec.Material* format, or from node available in a Reckeen set *rec.Set* or from an FBX file. It can be done by selecting a file which contains the material which you want to import from the PC's directory.
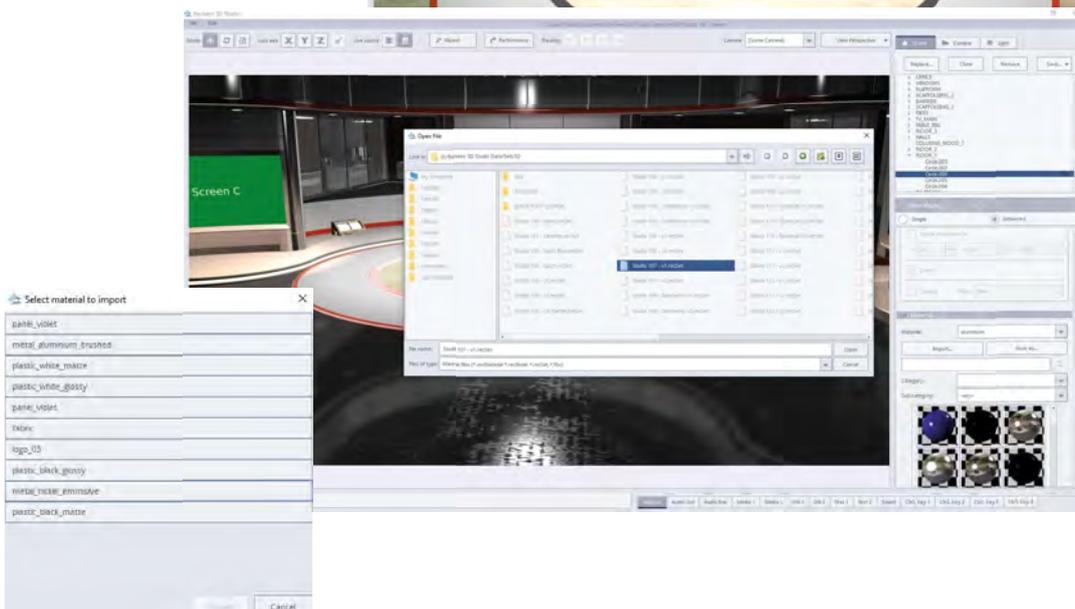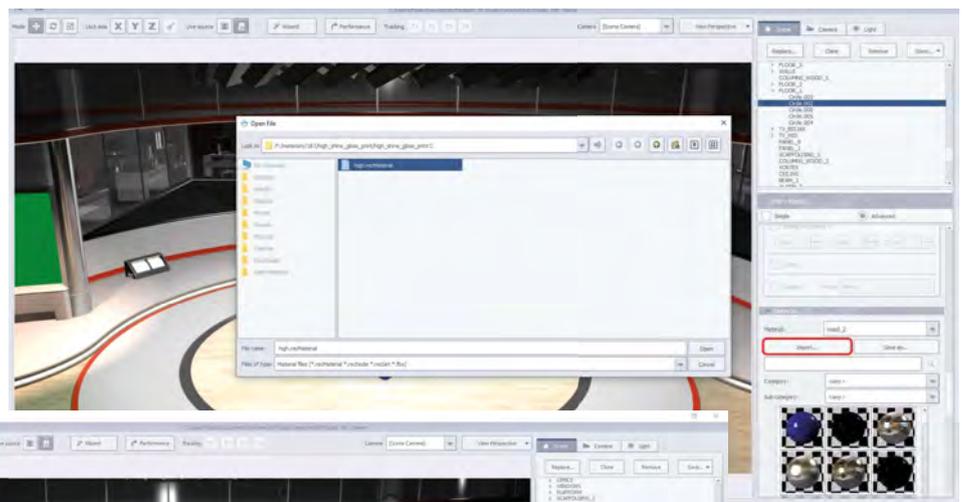

NOTE: when creating your own materials, remember to backup the CUSTOM directory frequently, as you may lose its contents if the PC system would ever needed to be restored. Restoring the system through re-installation will not restore your contents.

MATERIAL EDITOR - UNLIMITED ACCESS TO 3D MATERIALS

The ability to change the scenery and adjust it to your needs is one of the most important features of 3.0 version of the software. Reckenn 3D studio provides an external application for converting materials from various environments to native Reckeen format.

Reckeen Material Editor is an external stand-alone application that allows you to load textures and convert them to the *rec.Material* format. This application is provided with the 3.0 software version and can be installed on Windows 10 or higher on any computer.

Thanks to this, you can prepare material libraries independently of the Reckeen 3D Studio workstation.
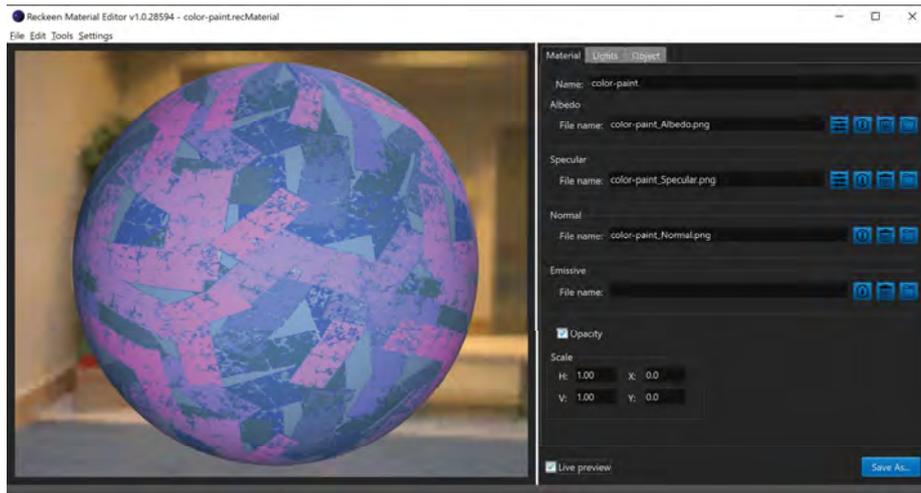

Note: A detailed description of the Reckeen Material Editor application is included in a separate manual titled "Reckeen Material Editor - User Manual"

As an overview, this aplication will enable you to import PBR materials from such environments such as Adobe Substance 3D, cgbookcase, MaterialMaker, Tree It, cgaxis, Quixel Megascans, Quixel Mixer, Armor Paint, and custom PBR materials. Using Reckeen Material Editor you can converter 3D materials from external environments to Reckeen 3D Studio format.

This feature gives you access to unlimited number of materials, so you can freely customize your 3D scenery, make it unique and impressive.
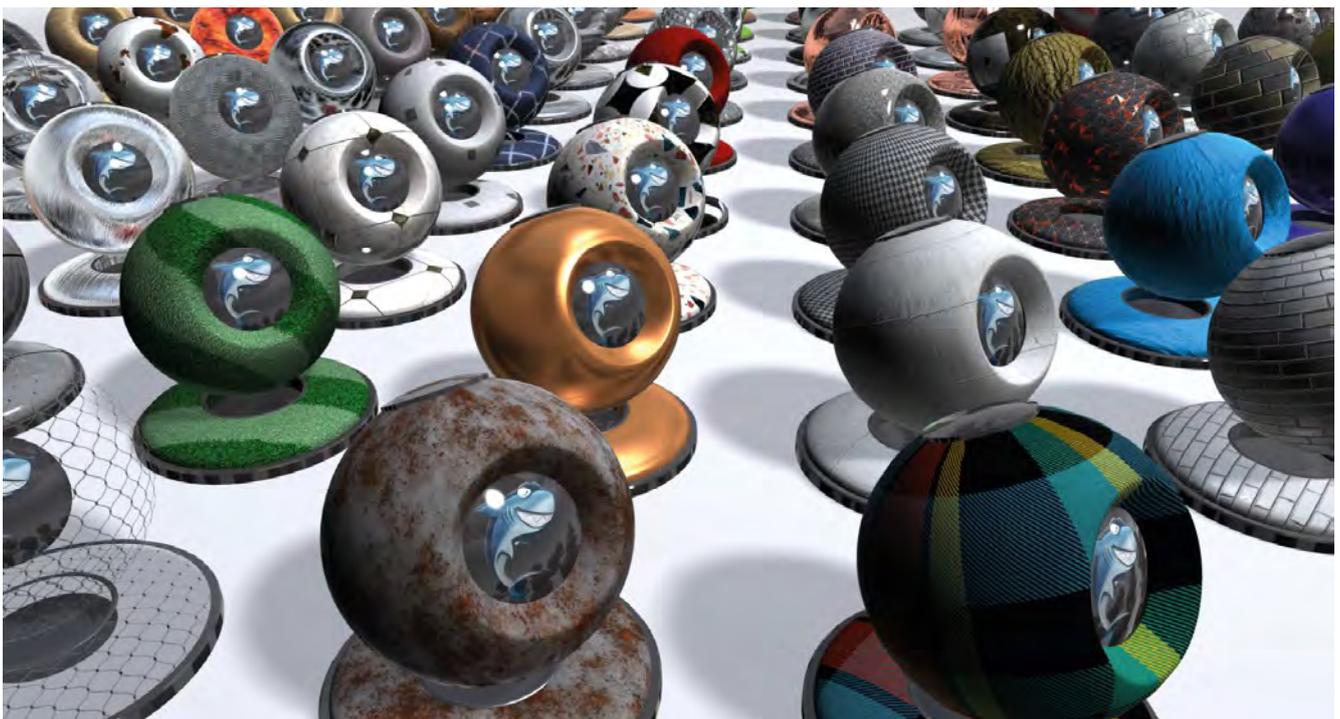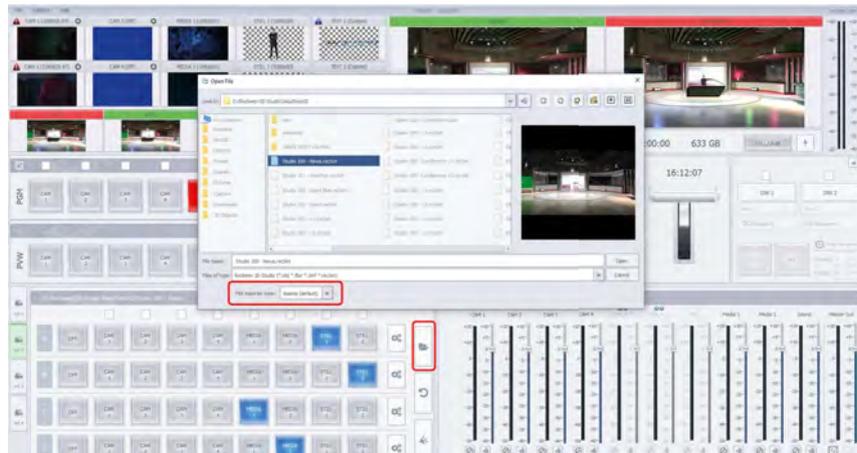

NEW FBX IMPORTERS

From the software version 3.0, the functions of importing 3D elements in the FBX format are expanded.

The new importer supports 3 independent ways to import 3D objects, this is due to the differences between the FBX standards, therefore there is no predetermined information as to which method will allow your object to be imported correctly. Therefore, we recommend that you check the various setting selections during import.

The current functionality of the FBX importer allows you to load both scene and node objects.
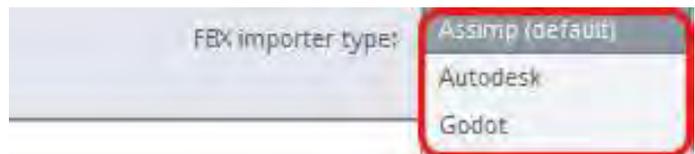
IMPORTING 3D OBJECTS AS A SCENE

To import the object as a scene choose Open Files from the load set. File selection window will open. At the bottom there is a combo box that allows you to change the FBX importer.

Combo box has the following FBX importer options: Assimp, Autodesk, Godot:

Importers Differences:

• Assimp - our own implementation of loading FBX files. The supported file versions are (officially): 2011, 2012 and 2013.

• Autodesk - Official importer of the FBX format that supports all file versions (up to the 2020 version).

• Godot - improved Assimp-based importer that supports almost all FBX file versions. It has an improved polygon triangulation algorithm. Doesn't support built-in animations yet.

In the absence of polygon triangulation in geometry, the importer tries to perform this process, but may not always be successful. Autodesk comes out the worst.

IMPORTING 3D OBJECTS AS A NODE

To import the object as a node choose Scene: "Add" in Reckeen 3D Editor. File selection window will open. At the bottom there is a combo box that allows you to change the FBX importer, similarly to when importing a scene.
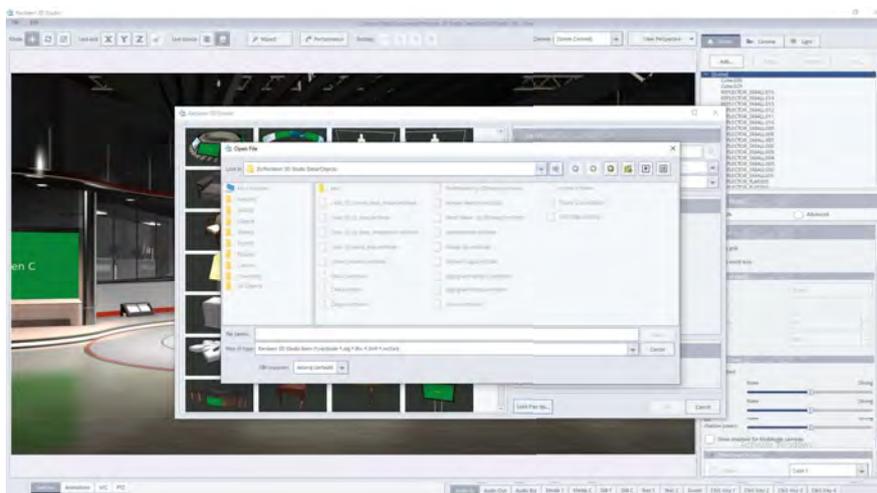
CREATING YOUR OWN LIBRARY OF 3D OBJECTS IN WIZARD

In the current version of the software, you can create your own library of 3D objects. Such objects can be modified in every way, and they can contain any materials available in your library of materials.

1. Import any 3d object into Reckeen 3D Editor. Here you can change its size, colour, etc. You can also choose any materials available in the application, as well as use your own library.
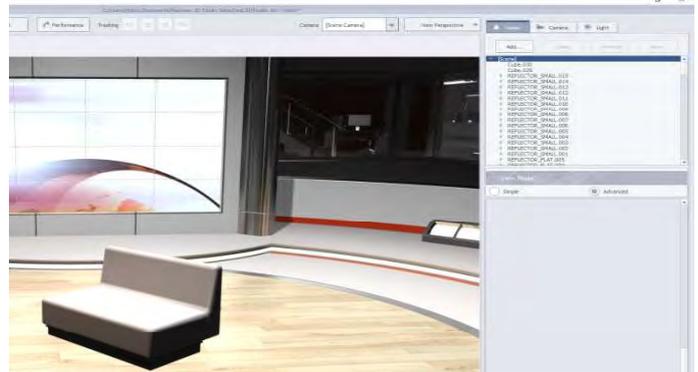
2. Select the option of saving the object. You have the option of saving the object to a file or to a Wizard, which will save the object to a library of objects available in the Application.
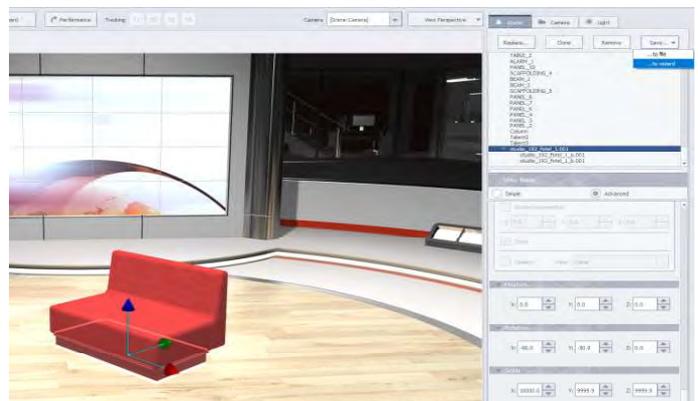
Select SAVE to Wizard option:

3. **SAVE** - The modified 3D object can be saved in the CUSTOM catalogue. It can be given a custom name, as well as a tag describing the features and category and sub-category of the object, allowing you to browse the database of selected tags in the future.
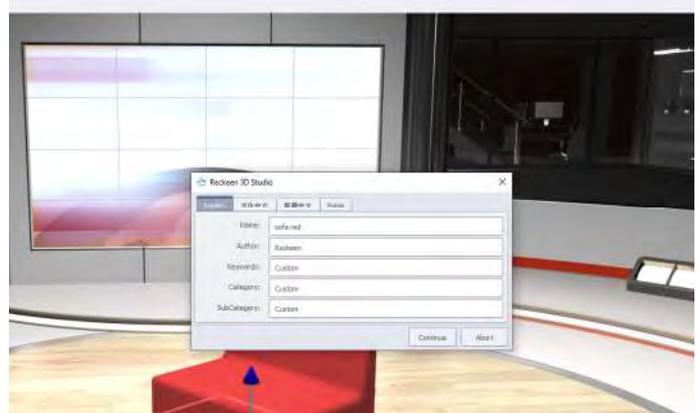
4. The object saved in this way will be available in the preview of the object **IMPORT** Wizard window, and the options for searching the object by previously defined keywords, tags, will also be available here. In the 3D Studio Editor click **ADD** and scroll down the library with the objects' previews. Your custom objects' previews will be added at the bottom.
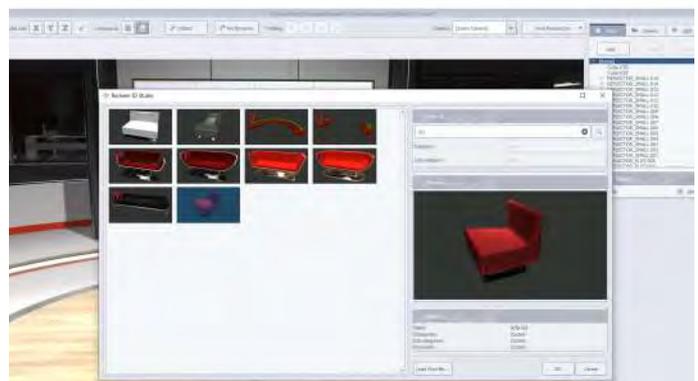
NOTE: when creating your own objects, remember to backup the CUSTOM directory frequently, as you may lose its contents if the PC system would ever needed to be restored. Restoring the system through re-installation will not restore your contents.

INDICATING THE PATH OF 3D OBJECTS FILES

Indicating the path of 3D objects files on the PCelow is an example, after adding an object and pointing to the node list, the file location path will be shown:
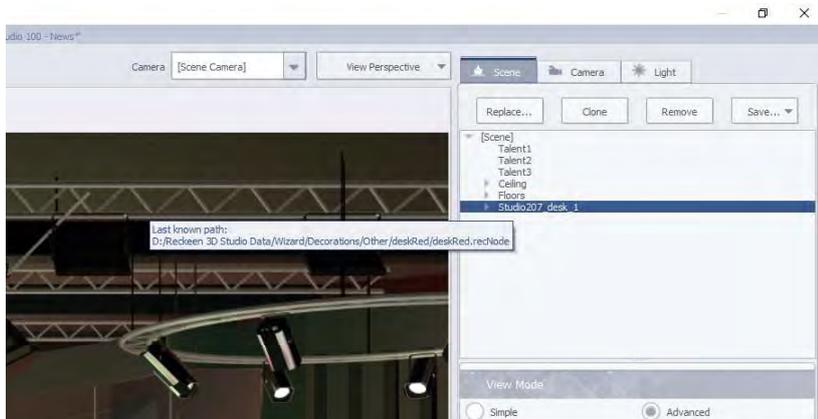
3D STUDIO EDITOR: ADDTIONAL LIGHTS

In the software version 3.0 more lights became available in the Reckeen 3D Studio Editor under the LIGHT tab to improve illuminating 3D scenes. The maximum number of Spot, Point or Directional lights are 8. from version 3.1 are 12.
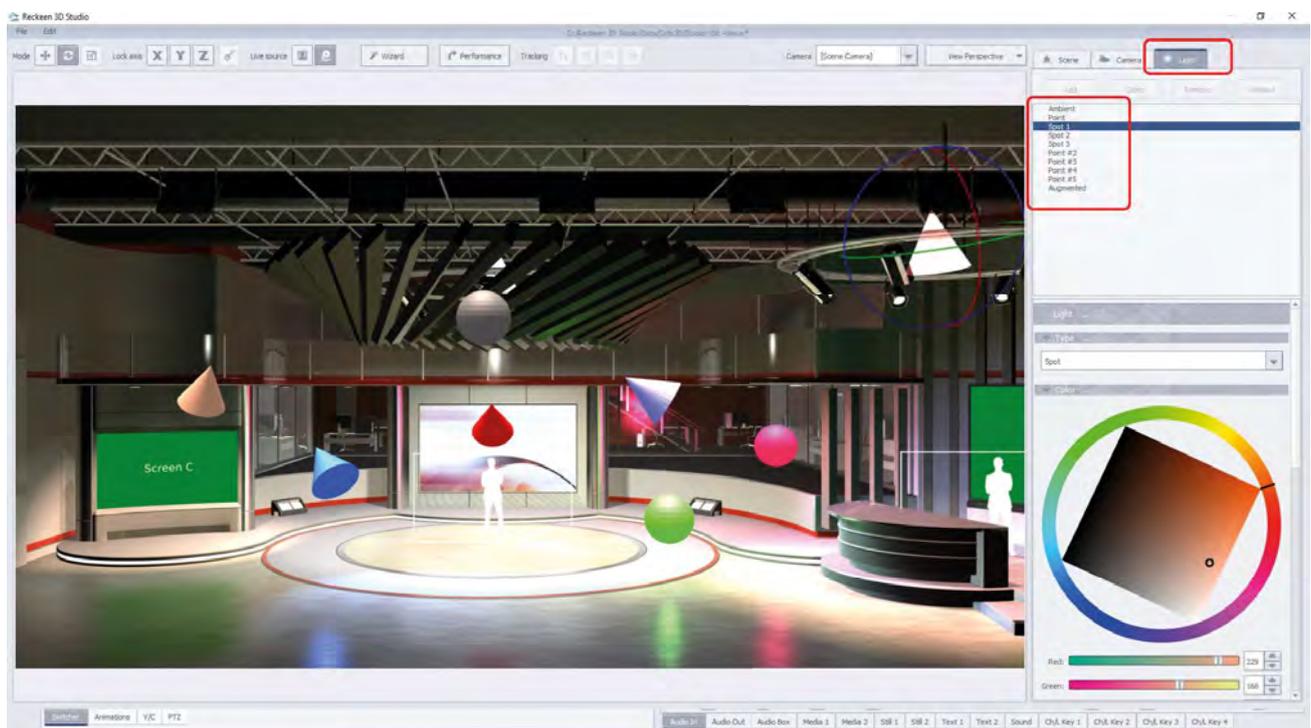
Note: Enable additional lights (5-8) in order. Light number 8 will not illuminate if lights 5, 6 and 7 are NOT is use.

Note: The use of additional lights affects PC performance, so use them carefully.

CONFIGURATION - SCREENS' BARS AND FRAMES

Reckeen 3D Studio Cofiguration - SCREENS

In the SCREENS configuration tab, additional option have appeared that enables configuring bar and frame of a Preview and Program output signals coming from a graphics card. Users can choose whether they want the frame and a bar of the output being rendered was visibke or not.

• on / off feature for PGM and PRV frames, for signals coming from graphics card outputs.
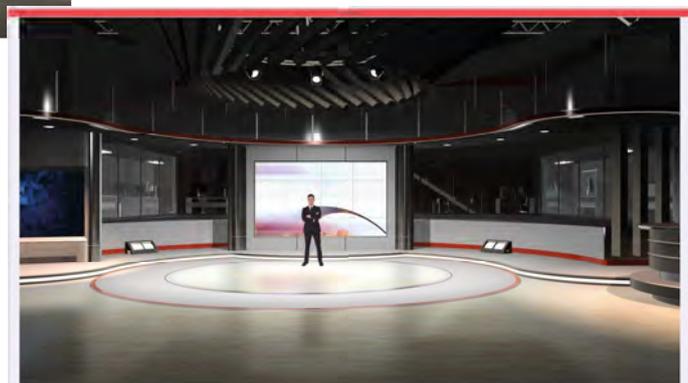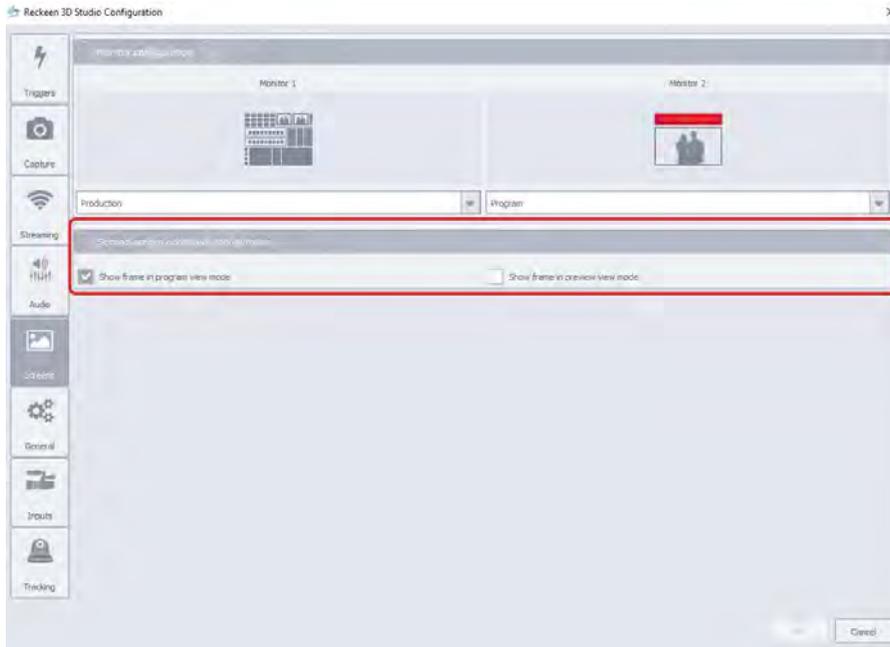
CONFIGURATION - LAUNCHER

Reckeen 3D Studio Cofiguration - Startup aplication:

After installing software version 3.0 or newer, the previous version 2.0 and all acquired license rights remain in the system (it is not overwritten). This means that it is possible to use both versions with different license entitlements. If a license for version 3.0 is not purchased, it will run in demo mode, in which case the system outputs will contain a watermark.
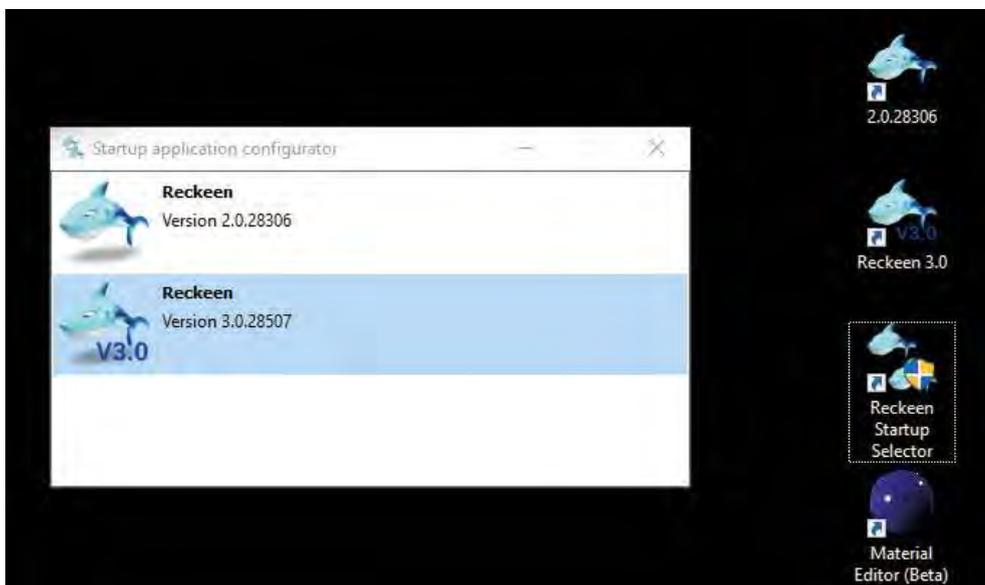
To select which version should be started when the workstation is turned on, it is required to use the "Reckeen Startup Selector" program.

"Reckeen Startup Selector", as well as "Reckeen Material Editor" are installed automaticaaly with the software version 3.0 or higher.

Launching the "Reckeen Startup Selector" program allows you to select which version of the software should be started automatically after turning on the Reckeen PC workstation.
To select the Reckeen software version, it is enough to point to the available options in the program window. After restarting the system, the indicated version will automatically run.

V3.1 - WHAT'S New?

Changes included in software version 3.1:

Reckeen 3D Studio Cofiguration - TRIGGERS

• Added functions of **creating scripts with the use of conditions and variables** - this allows you to create simple programs containing variable locales for a single trigger as well as global variables for all triggers, which enables synchronization of programs for Multi-triggers.
• functions have also been added to facilitate the creation of triggers, such as - **RESET Trigger** and **monitor of Global variables**
• **triggers to control single light** - On/Off, Direction, Power, Position, Color, and creating animations.
• **triggers to control multi-lights** - creating advanced light animations.
• **triggers to control - post production setings in chroma key** and creating animations.
• **time trigger** - Triggering a trigger at a given time
• **PTZ trigger** - recalls the preset settings in the PTZ camera

New camera support in PTZ tracking:

• Support for **Panasonic AW-UE100 and AW-UE150** cameras,
• Support for **Canon** CR-N300, N500 and N700 cameras,
• New intuitive simplified **calibration for tracking** cameras.

Object garbage mask in AR & Virtual Studio

• **AR object mask** enabling the inclusion of a chromatic key in a given area
• **Chromatic key Garbage object mask (mesha)** for precise key control in a tracked virtual studio.

3D Studio Editor - Production

• Improved **search for materials** in the gallery,
• **An indicator confirming that the 3D object has Precise reflections**
• Lights: The number of Spot/Point/Directional lights in the scene has been **expanded 12.**
• Lights: **Save and load from light settings file**
• ARGB format support for MOV

Reckeen 3D Studio Cofiguration

• **Auto backup - sesja and set**
• **Support 4K monitor** for prompts with a width greater than FullHD
• Improving system performance.
• **NDI** update (2023 - **5.5.4**)
• full support **Vkey200**
• Support XT6900XT and 6950XT

Reckeen 3D Studio - Material Editor

• New version **Material Editor: 1.1.29403**
• Creating an emission from the **sRGB format**,
• material library has been extended with **new 1000 materials**
• **new 3d scenery**

Reckeen 3D Studio - Slideshow controler:

• **Slideshow controler:** in the new **version1.2.**
• Direct command support F1-F10,

TRIGGERS VARIABLES AND CONDITIONS

From 3.1 version added functions of **creating scripts with the use of conditions and variables** - this allows you to create simple programs containing variable locales for a single trigger as well as global variables for all triggers, which enables synchronization of programs for Multi-triggers.

Types of variables: bool, integer, string, real.

bool

A bool variable is a Boolean variable that can only take one of two values: `` `True` or `False` ``. they allow you to implement conditional statements, loops, and other programming constructs that require booleans.

integer

An integer variable is a variable that stores a numeric value without a decimal point, such as **1, 2, -5, -10,** etc. It is declared just like any other variable, such as `` `x = 5` ``.

string

is a variable that holds a string, for example "**Hello World!**"

> **x = "Hello World!"**
> **y = "Ala has a cat"**

real

A real (float) variable is used to store real numbers, i.e. numbers that can have a decimal part, for example, 1.5, -0.25, 3.1415.
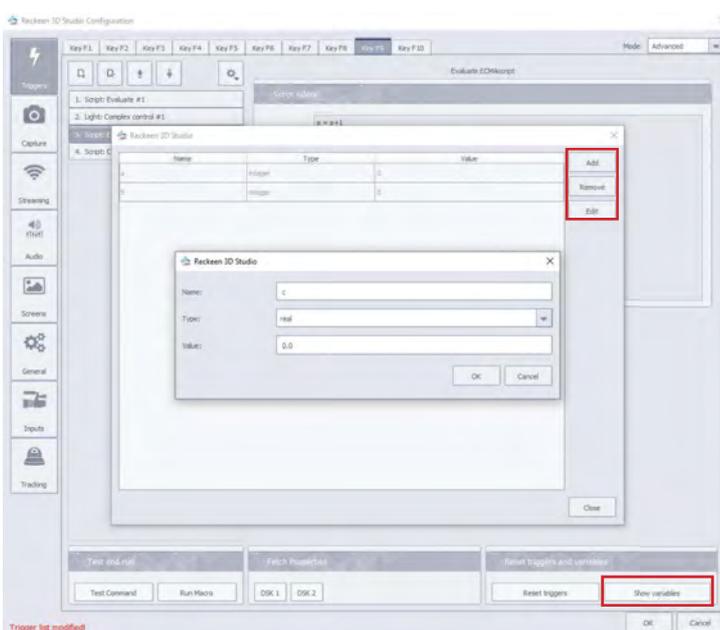
> **x = 3.1415**
> **y = 2.5**

There are 2 scope of variables:

Local variables - declared within the script of each trigger .
we create them by declaring variables in the syntax trigger, e.g. **a=0**
Global variables - available for all triggers with the possibility of operations on them.
Note: global variable data is saved with the session.

To declare a global variable, select the options in the trigger window **Show Variables.**

A variable preview window will open, which has options for creating global variables and modifying them, such as: **ADD, REMOVE** and **EDIT.**

In this window, at the bottom, there is the **Reset Triggers** function - this function restores the initial settings of the variables and initial states of the trigger **GLOBAL RESET.** Button **Reset Triggers** function to reset all - media input, media smart key, animation and **Global variables.** This makes it easier to test new features.

Note: it is possible to open the window **Show Variables** while executing triggers or running a macro, this allows you to monitor their changing states during trigger execution.

SCRIPT: EVAULATION

allows you to write a simple program like declaring variables, performing mathematical operations on variables: **a=0 ; a=a+1; a=a+b-20** ect.
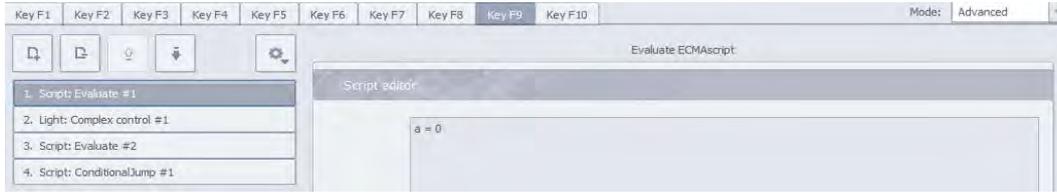
SCRIPT: CODITIONALJUMP

This feature allows you to perform a conditional jump within current trigger.

Condition **a>5 jump to line 1**

Trigger / Demo directory - there are examples of using triggers, just load sample triggers in advance mode to check their operation:

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Script_Evaluate_Jump.recTrigger3D

SINGLE TRIGGERS SETTING THE FUNCTIONS OF THE LIGHTS

Full control of single light parameters has been introduced to software version 3.1. For this purpose, 9 triggers have been created, we will present their functioning in turn, and in the Trigger / Demo directory you will find examples of their use.

**Below is a list of functions that are available in single light triggers:**

Light index - in the light triggers, the rule was adopted that each of the triggers can be assigned to separate lights selected from the lists, in the example below, 1:Poin was selected.

Duration time - in the light triggers, the rule has been adopted that we can change the lights over time, for this purpose the time of this change is declared in ms. in the example it is 1000ms. The beginning of this change is the current value of a given light and the end is the parameters set in the trigger.

Easing cuve - in the light triggers, the principle was adopted that we can change the lights over time, with the selected characteristic from the list of 54 available.

Get from: - in the light triggers, this function makes it possible to read the current value of a light selected from the list and rewrite these values to the present trigger - e.g. 1:Poin was selected.

Light color - in the light triggers, allows you to set the color

504
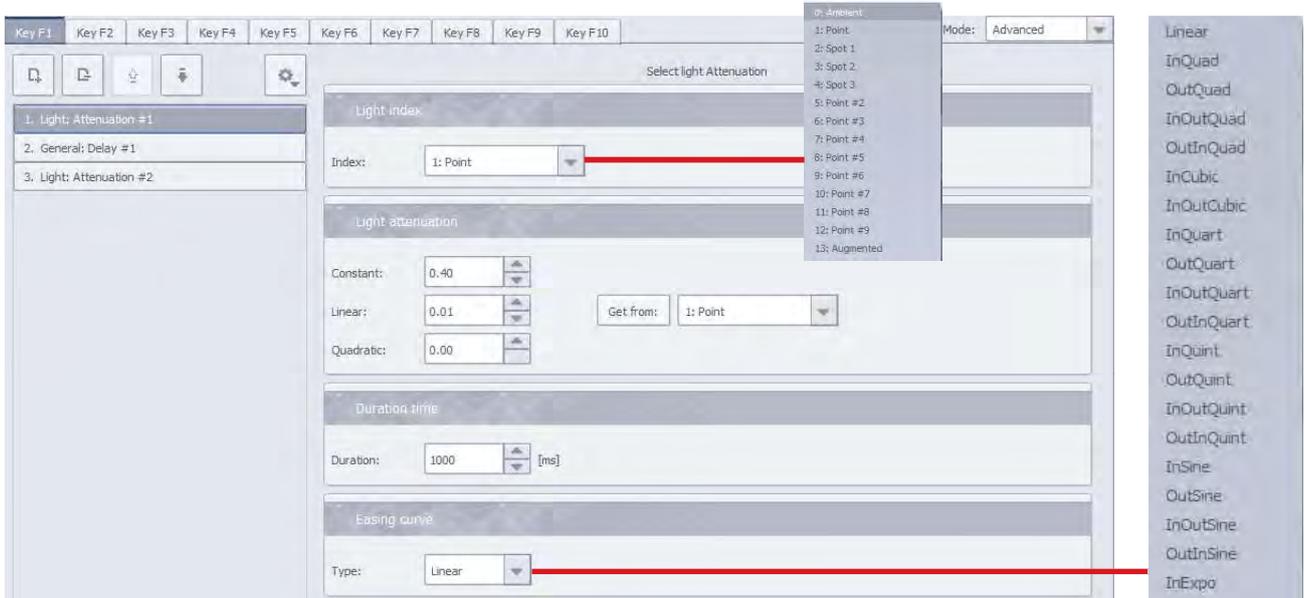
LIGHT: ATTENUTION

**Light Attenuation** - can set the type of attenuation of this light:

- • **Constant** - constant light attenuation coefficient,
- • **Linear** - linear light attenuation coefficient,
- • **Quadratic** - square light attenuation coefficient.

Maximum attenuation of light is reached when entering a value of 2.00, please see Chapter 13 for more information.

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Attenuation.recTrigger3D

LIGHT COLOR

This trigger changes the color value of the selected light from the current value to the value set in the color trigger at a given time and selected characteristic.
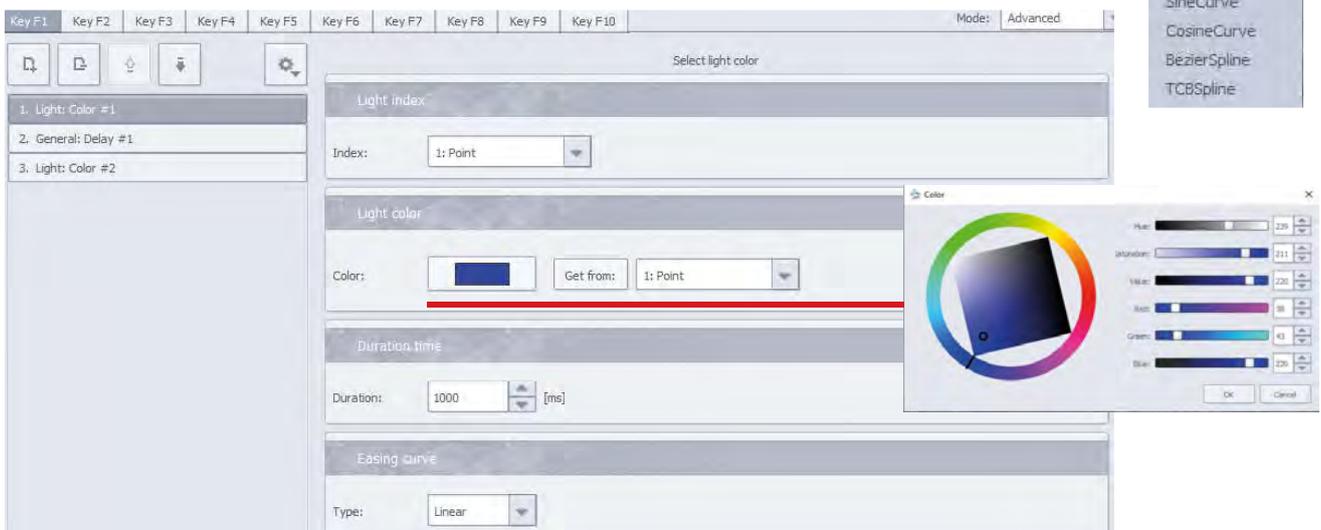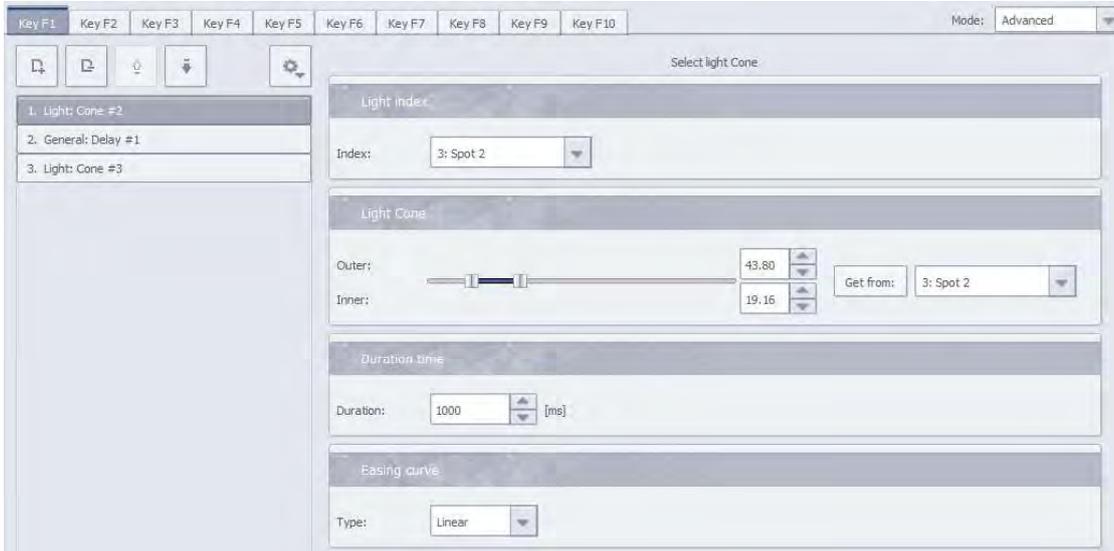
D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Color.recTrigger3D

LIGHT: CONE

This trigger changes the cone value of the selected light from the current value to the value set in the this function. Changes the cone value of a given light for the outer and inner values. The value 150 (expressed in degrees) is the maximum angle of this cone. In the example below, 3: Spot 2 was selected. Picture below.
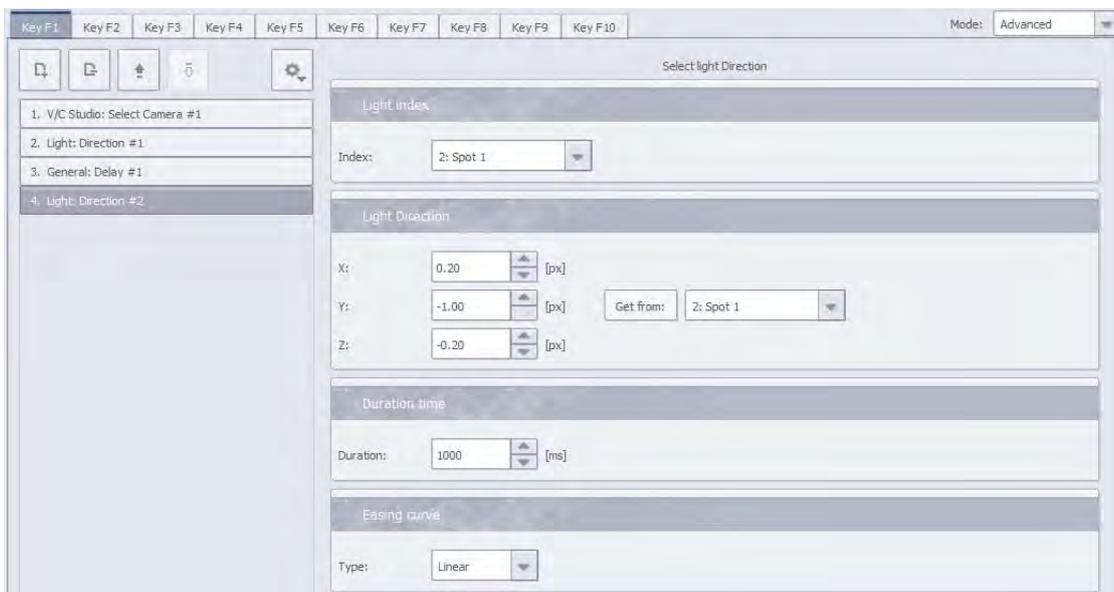
D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Cone.recTrigger3D

LIGHT: DIRECTION

This trigger changes the direction value of the selected light from the current value to the value set in the this function. The Directional light has only a direction parameter. This source emits a parallel light, which means it travels across a stage in the same direction. Sunlight is the best example of such light. In the example below, 2: Spot 1 was selected, we change the setting of Y: from the initial value from 0 to -1. We can change all axes of light X,Y,Z at the same time.

Picture below. Please see Chapter 13 for more information.

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Direction.recTrigger3D

LIGHT: ENABLE

This trigger changes the state value of the selected light from On /OFF. Other values like color position etc. remain unchanged. In the example below, 3: Spot 2 was selected.

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Swiches_Enabling.recTrigger3D

LIGHT: FROM FILE

This trigger changes the state value of all lights at once. loading a file with saved lights with extension -recLight. Such files are created in the 3D Studio Editor in the Lights tab.
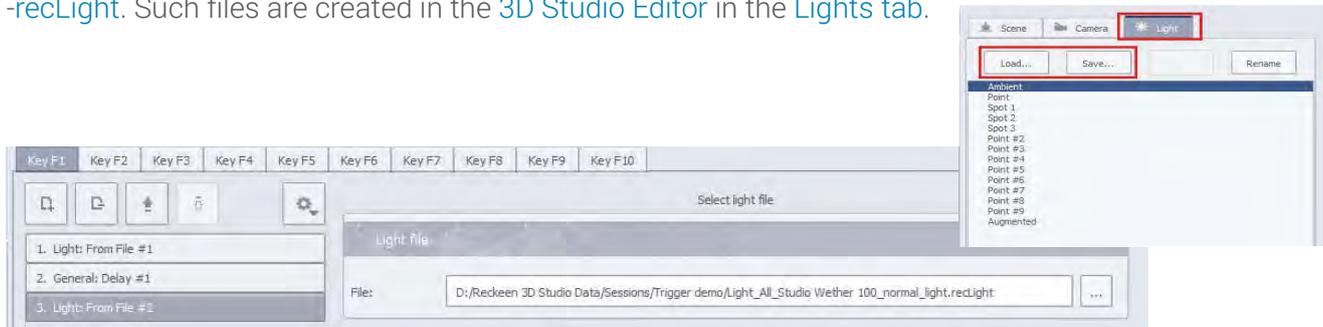
D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Select_File.recTrigger3D

In the directory, there are two files with different light settings for testing purposes, these files are used by the demo trigger.
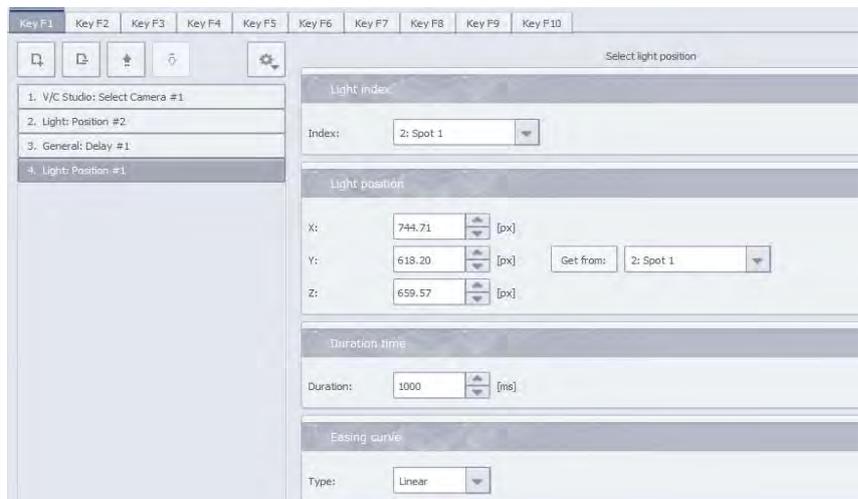
LIGHT: POSTION

This trigger changes the direction value of the selected light from the current value to the value set in the this function.

The Postion light has only a postion parameter.

In the example below, 2: Spot 1 was selected, we change the setting of X,Y,Z: from the initial value.

We can change all postion of light X,Y,Z at the same time.

Please see Chapter 13 for more information.

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Postion.recTrigger3D

LIGHT: POWER

This trigger only changes the AMBIENT light power value. Ambient light is a special light that illuminates the entire scene, it cannot be turned off with the eneable function you cannot change its color or position, but only set its Power value from 0.00 to 2.00. Picture below. Please see Chapter 13 for more information.
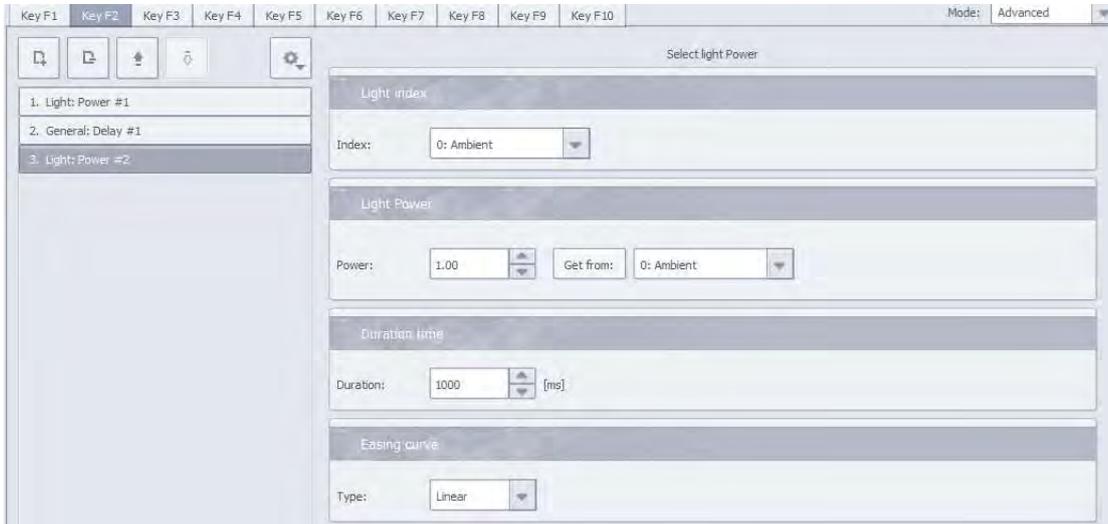
D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Power.recTrigger3D

LIGHT: TYPE

This trigger changes the type of selected light from three available options - SPOT, DIRECTIONAL, POINT. In the example below, 2:Spot 1 is selected: We change the type of this light from SPOT to POINT. Picture below.

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Light_Type.recTrigger3D

# TRIGGERS SETTING THE MULTI FUNCTIONS OF THE LIGHTS

Full control of multi light parameters has been introduced to software version 3.1. For this purpose, 3 triggers have been created, **Light: Complex Control, Key: Complex Control, General: Complex Control**. This type of trigger allows full control over all lights by creating sequences of settings of all lights. This gives you the opportunity to create many very interesting effects that will increase the value of your production.

We will present their functioning in turn, and in the Trigger / Demo directory you will find examples of their use.

LIGHT: COMPLEX CONTROL

This trigger is used to create a sequence of behavior of all available lights in the scene.
It consists of 2 sections: Light Program editor and Light Properties.
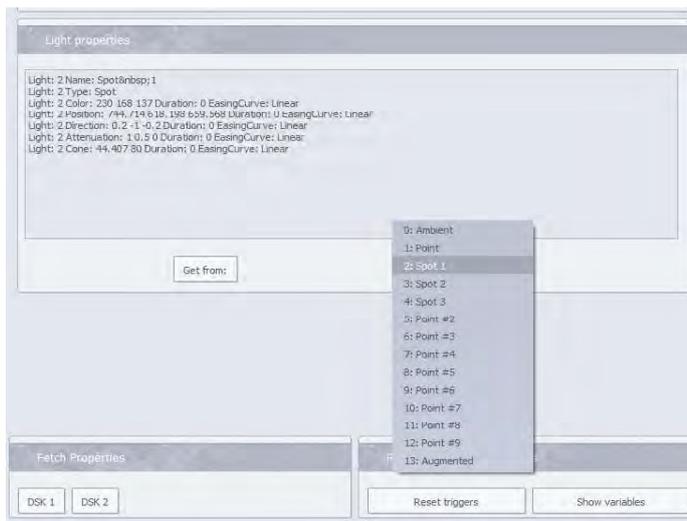Picture below.
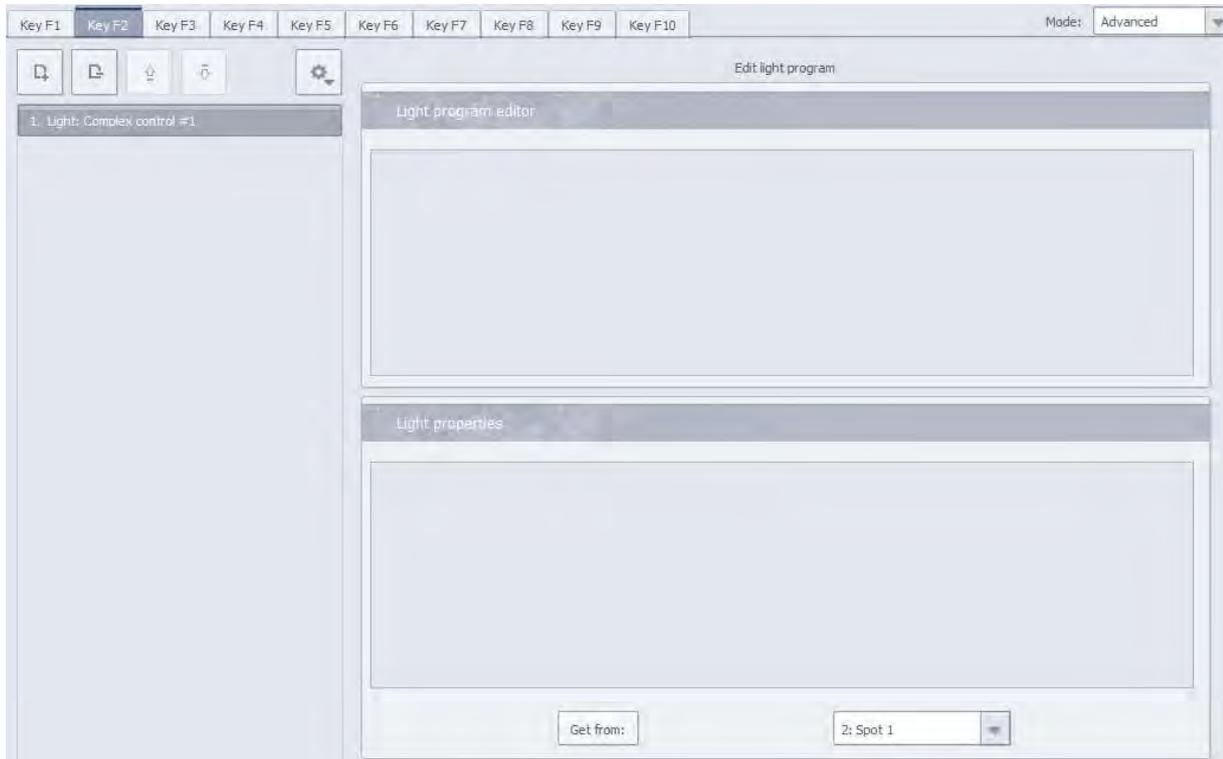
Light Program editor:

It is used to create traffic light behavior programs.

Light Properties:

it is used to read and copy the parameters of any light from the list of available ones.

Get from: - in the section of Light Properties, this function makes it possible to read the current value of a light selected from the list and rewrite these values to the present trigger - e.g. 2: Spot 1 was selected.

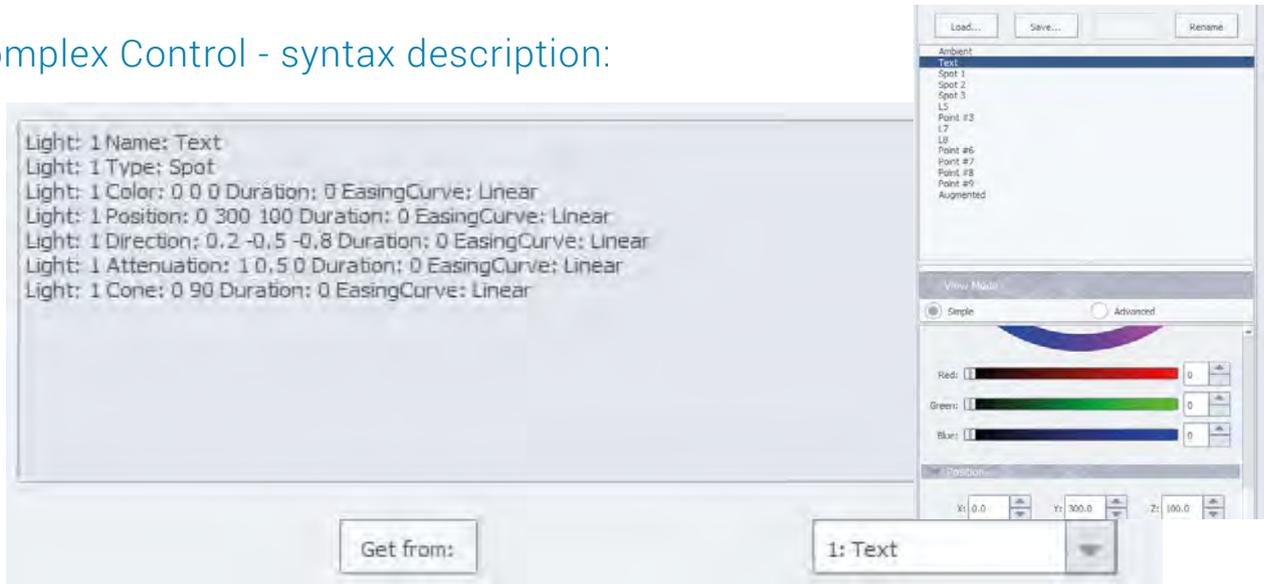After selecting a light from the list, press the Get from buttom. The data structure for the selected light will appear in the window.

The created data structure in the form of 7 lines contains the parameters of the indicated light, each line actually corresponds to the previously described Single triggers setting the functions of the lights chapter.

Such a structure can be modified by changing its parameters and thus controlling the sequence of parameters for the selected light. Then just select individual lines or all of them and put in the window above Light Program editor: to execute it as a program.

Note: it is very important to keep the writing syntax, i.e. spaces between parameters.

Complex Control - syntax description:


```
Light: 1 Name: Text
Light: 1 Type: Spot
Light: 1 Color: 0 0 0 Duration: 0 EasingCurve: Linear
Light: 1 Position: 0 300 100 Duration: 0 EasingCurve: Linear
Light: 1 Direction: 0.2 -0.5 -0.8 Duration: 0 EasingCurve: Linear
Light: 1 Attenuation: 1 0.5 0 Duration: 0 EasingCurve: Linear
Light: 1 Cone: 0 90 Duration: 0 EasingCurve: Linear
```

Light: 1 - light number.

Light: 1 Name: **Text** - name of the light, it can be changed in the 3D Editor in the light tab"

Light: 1 Type: **Spot** - light type - Spot, Directional, Point.

Light: 1 Color: **0** (red) **0** (green) **0** (blue) Duration: **0** (ms) Easing cuve: **Linear**

0 0 0 - **R G B** color components in the RGB scale in the value 0-255,
Duration: **0** - light change time ms.
Easing cuve - **Linear** the selected characteristic from the list.

Light: 1 Postion: **0** (x=0) **300** (y=300) **100** (z=100) Duration: **0** (ms) Easing cuve: **Linear**

x y z - the position of the light on the stage
Duration: **0** - light change time ms.
Easing cuve - **Linear** the selected characteristic from the list.

Light: 1 Diection: **0.2** (x=0.2) **-0.5** (y=-0.5) **-0.8** (z=-0.8) Duration: **0** (ms) Easing cuve: **Linear**

x y z - the light direction on the stage
Duration: **0** - light change time ms.
Easing cuve - **Linear** the selected characteristic from the list.

Light: 1 Attenuation: **1.0** (c=1.0) **0.5** (l=0.5) **0** (q=0.0) Duration: **0** (ms) Easing cuve: **Linear**

Constant, Linear, Quadratic - the light attenuation parameters
Duration: **0** - light change time ms.
Easing cuve - **Linear** the selected characteristic from the list.

Light: 1 Cone: **0.0** (inner=0) **90.0** (outer=90.0) Duration: **0** (ms) Easing cuve: **Linear**
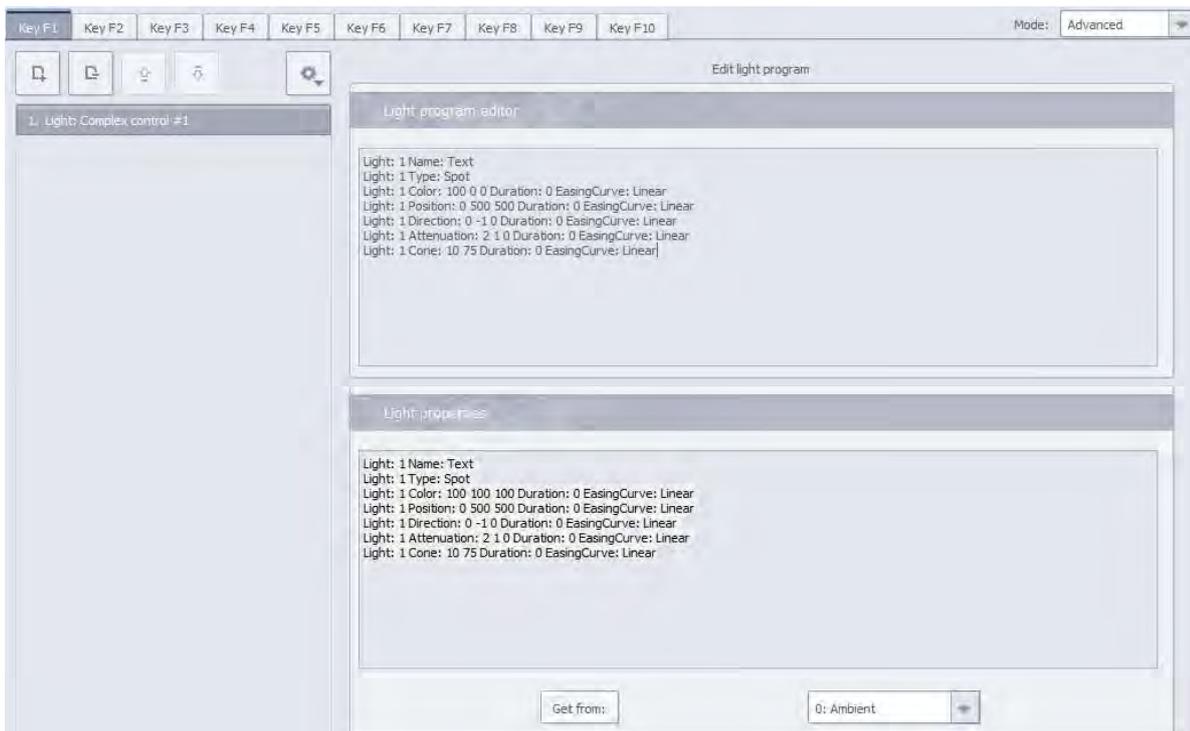
Inner, Outer - the light cone parameters
Duration: **0** - light change time ms.
Easing cuve - **Linear** the selected characteristic from the list.

Light Program editor:

It is used to create traffic light behavior programs.

Light Program editor:

Such from Light Properties: structure can be modified by changing its parameters and thus controlling the sequence of parameters for the selected light. Then just select **individual lines** or **all** of lines and put in the window above Light Program editor: to execute it as a program.
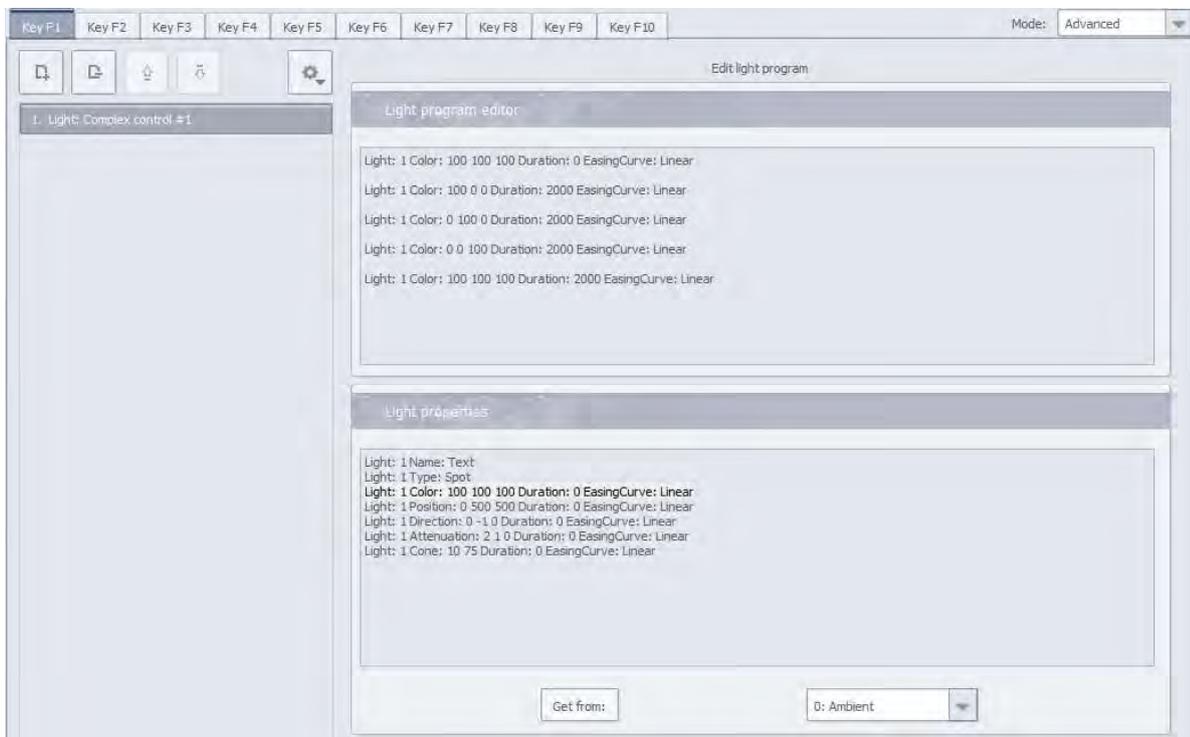
Above, only the lines of changing the color value have been copied, the parameters have been modified to change the color components from 0-100 in 2000ms, the above program can be found in the examples:
D:/Recken 3D Studio Data/Trigger/DEMO/Demo_Complex_Control_Color.recTrigger3D

KEY: COMPLEX CONTROL

This trigger is used to create a sequence of talent post production value changes in the chromatic key setting parameters. This function allows you to change the value of talent parameters, which can be combined with changing the lighting of the scene. Picture below.
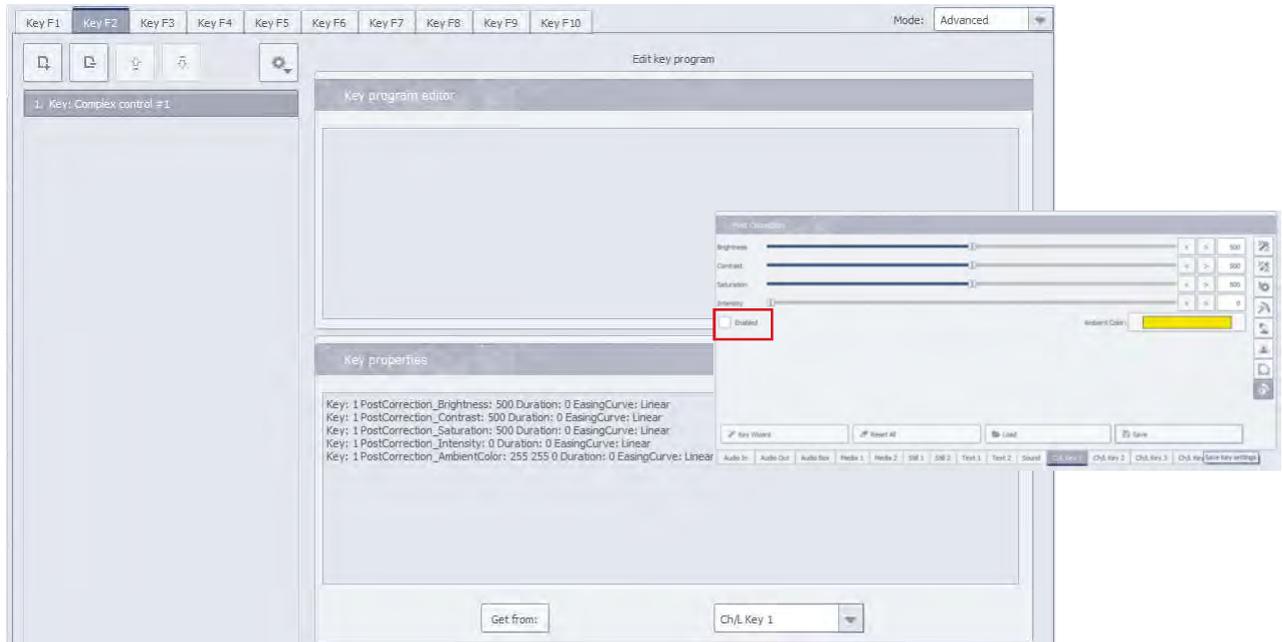
Key: **1** - Key number from Ch\L Key 1 to 4.

Key: 1 PostCorrection_Brightnss: **500** - parameter value. Duration: **0 (ms)** Easing cuve: **Linear**

         500 - talent brightness parameter value scale in the value 0-1000,

         Duration: **0** - parameter change time ms.

         Easing cuve - **Linear** the selected characteristic from the list.

Key: 1 PostCorection_Contrast: **500** - parameter value. Duration: **0 (ms)** Easing cuve: **Linear**

         500 - talent contrast parameter value scale in the value 0-1000,

         Duration: **0** - parameter change time ms.

         Easing cuve - **Linear** - selected characteristic from the list.

Key: 1 PostCorection_Saturation: **500** - parameter value. Duration: **0 (ms)** Easing cuve: **Linear**

         500 - talent saturation parameter value scale in the value 0-1000,

         Duration: **0** - parameter change time ms.

         Easing cuve - **Linear** - selected characteristic from the list.

Key: 1 PostCorection_Intensity: **500** - parameter value. Duration: **0 (ms)** Easing cuve: **Linear**

         500 - talent intensity use ambient color parameter value scale in the value 0-1000,

         Duration: **0** - parameter change time ms.

         Easing cuve - **Linear** - selected characteristic from the list.

Key: 1 PostCorection_AmbietColor: **255 255 0** - R G B value. Duration: **0 (ms)** Easing cuve: **Linear**

         255 255 0 - **R G B** ambient color components in the RGB scale in the value 0-255,

         Duration: **0** - parameter change time ms.

         Easing cuve - **Linear** - selected characteristic from the list.

Note: Changing the Intensity & Amber Color parameters will only be applied if the function **check box** is **Enabled in the Chroma Key post-production tab.**

Note: You can see also Chapter 23 - *"Post correction - input signal and chroma key"*.

GENERAL: COMPLEX CONTROL

This trigger is used to create a sequence of changes to the light values in the scene and a post production talent in the chromatic key setup parameters. Allows you to trigger the simultaneous change of lights in the scene and the lighting parameters of your talent, Helps to achieve realistic lighting behavior in the scene and talent. Picture below.
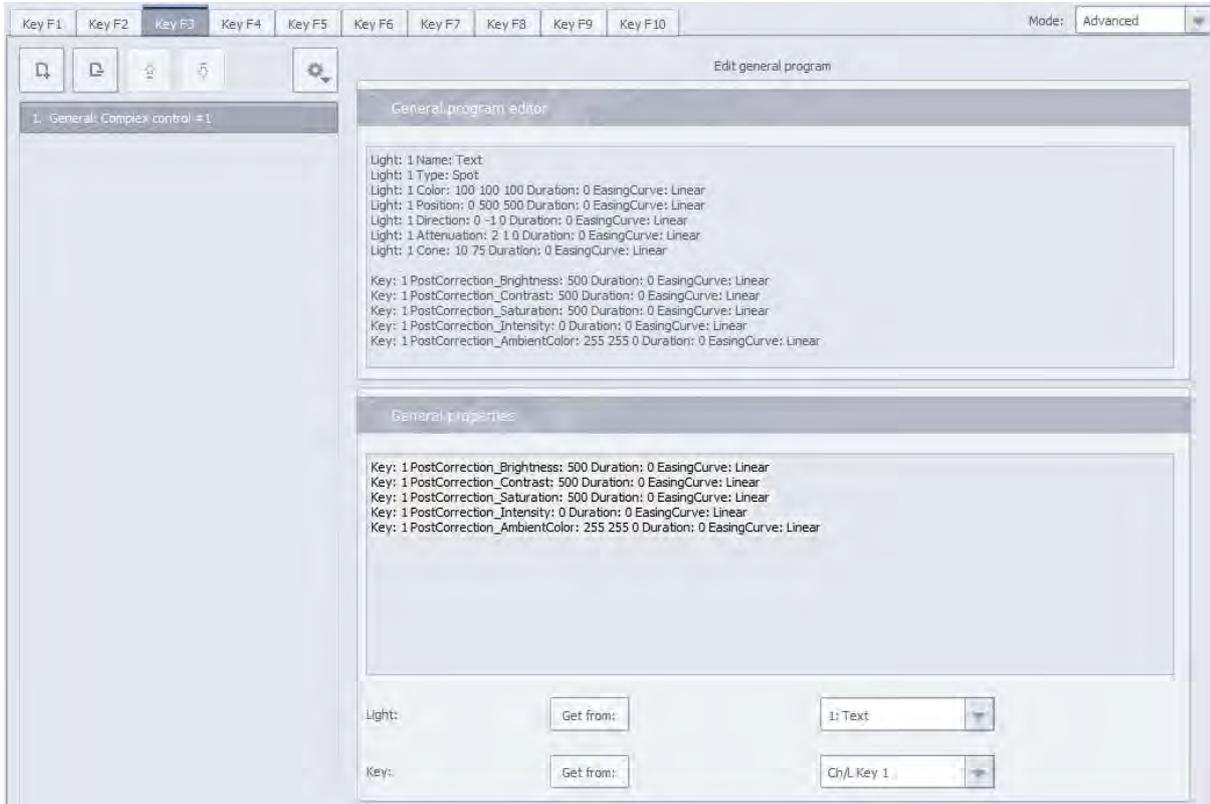
Operation of this trigger and its parameters are identical to those of the two previous triggers Light: Complex Control and Key:Complex Control.
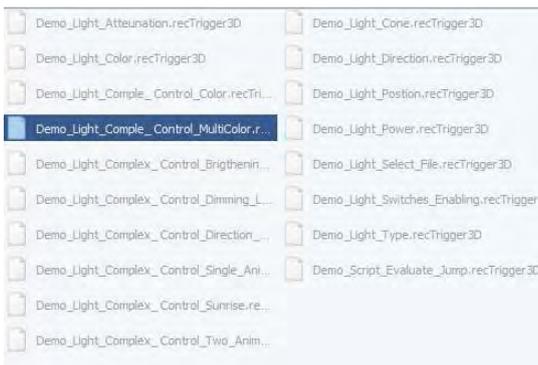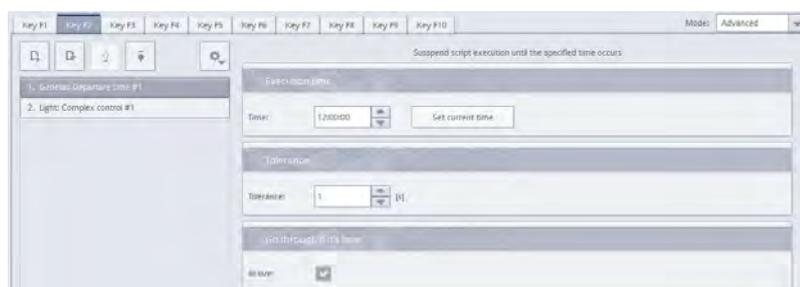

You can find an application example here:

D:/Recken 3D Studio Data/Trigger/DEMO/Demo_General_Complex_Control.recTrigger3D

D:/Recken 3D Studio Data/Trigger/DEMO - in the catalog you will find many different examples of trigger applications.

GENERAL: DEPARTURE TIME

Allows you to execute successive triggers depending on the current time.

PTZ: SELECT PRESET

Recalls preset settings from 1 to 15 in PTZ camera 1-4 and set the speed.

Calling a preset may include changing the speed of the PTZ camera movement in the range of 1-100. The "Enable" checkbox activates the speed change in the PTZ trigger. If it is disabled, the PTZ movement speed is taken from the current system settings.

NEW CAMERA SUPPORT IN PTZ TRACKING

• Support for **Panasonic AW-UE100 and AW-UE150** cameras,
• Support for **Canon CR-N300 and N500, N700** cameras.
Note: Please see chapter 16 - "PTZ" for more information.

• New intuitive simplified **calibration for tracking** cameras.
Note: Please see chapter 17 - "PTZ Tracking" for more information.

OBJECT GARBAGE MASK IN AR & VIRTUAL STUDIO

• **AR object mask** enabling the inclusion of a chromatic key in a given area
• **Chromatic key Garbage object mask (mesha)** for precise key control in a tracked virtual studio.

Note: Please see Chapter 23 - *Setting the mask's area - objects garbage mask* for more information.

green studio
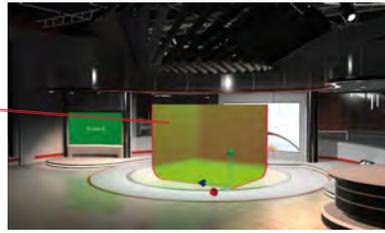

3d object in the shape of your green studio

we give the 3d object the mask feature

in the chroma key we turn on the object mask

3D Studio Edytor mask settings:

1. Object - area where the chromatic key works
2. "Use AR mask" designation defines the working area of the chromatic key.
3. Active "Use AR mask" function hides the object.
4. Object is not visible in the rendered scene, but is rendered every frame.
5. For each camera 1-4 has a different area size of mask window depending on the shot.
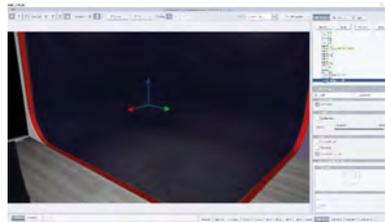6. If active, the object name is marked in "green" in the list of objects.
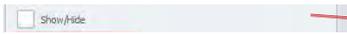
1. Show/Hidden reveals the contours of the mask object for viewing by the user.

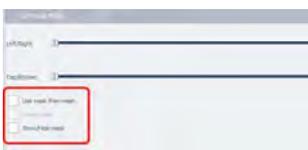2. In a 3d scene, the object with this feature pulsates red in transparency

1. Area of the chromatic key mask window
2. Object is rendered every frame.
3. 3D Object for each camera 1-4 defines a different area depending on the shot.
4. Marking "Use as Garbage mask" gives the feature of a chromatic key mask.
5. Active "Use as Garbage mask" function hides the object, the object is not visible in the rendered scene, but is rendered.
6. If active, the object name is marked in green in the list of objects

Chroma key object mask settings:

1. Object area of the chromatic key mask window

2. Requires the "Use as Garbage mask" feature to be marked so that the key receives the mask data.

3. Marking the "Use mask from mesh" feature attaches the mask data from the object to the key.

4. The active function locks the settings of the manual adjustment of the mask area in the garbage mask options in the key.

1. area of the chromatic key mask window object negates the mask of the key

1. Show/Hidden reveals the contours of the mask object for viewing by the user.

2. In a 3d scene, the object with this feature pulsates red in transparency

3D STUDIO EDITOR: SEARCH FOR MATERIALS

• Improved **search for materials** in the gallery, Picture below.


3D STUDIO EDITOR: OBJECT SUITABLE FOR REFLECTIONS

• By pointing to any object in the 3D Studio Editor, the editor confirms whether the object is in the correct height range to enable precise reflections. Precise reflections are possible if the height of the object is less than 10cm. It is recommended to set objects with reflections at position Y=0. The status updates when position, rotation or scale changes. Green means you can use precise reflections. Picture below.

3D STUDIO EDITOR: INFORMATION ABOUT THE OBJECT

More information has been added to the property information:
  • "Mesh geometry present": information that the object has geometry.
  • "Size": the size of the object, i.e. the cube describing the object.
  • "Sub nodes info": information about sub-objects.
  • "Sub nodes count": number of sub-objects.
  • "Size": size of sub-objects.
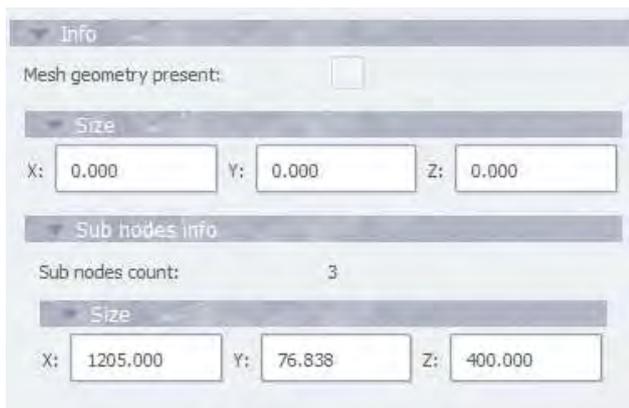
3D STUDIO EDITOR: 12 LIGHTS

In the software version 3.1 more lights became available in the Reckeen 3D Studio Editor under the LIGHT Tab to improve illuminating 3D scenes. The maximum number of Spot, Point or Directional lights are 12.

Note: The use of additional lights affects PC performance, so use them carefully.
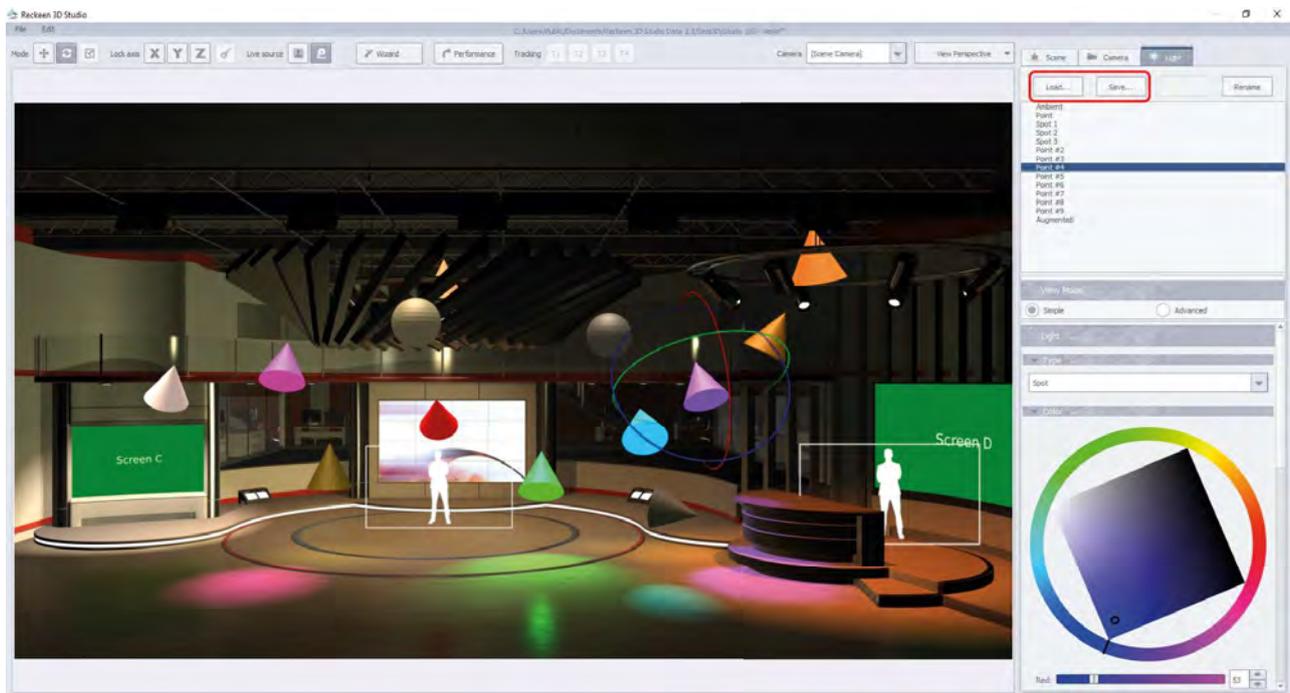
• Lights: The number of Spot/Point/Directional lights in the scene has been **expanded 12.**
• Lights: **Save and Load from light settings file:**

the above light seting you can load as examples:
D:/Recken 3D Studio Data/Trigger/DEMO/12 lights.recLights
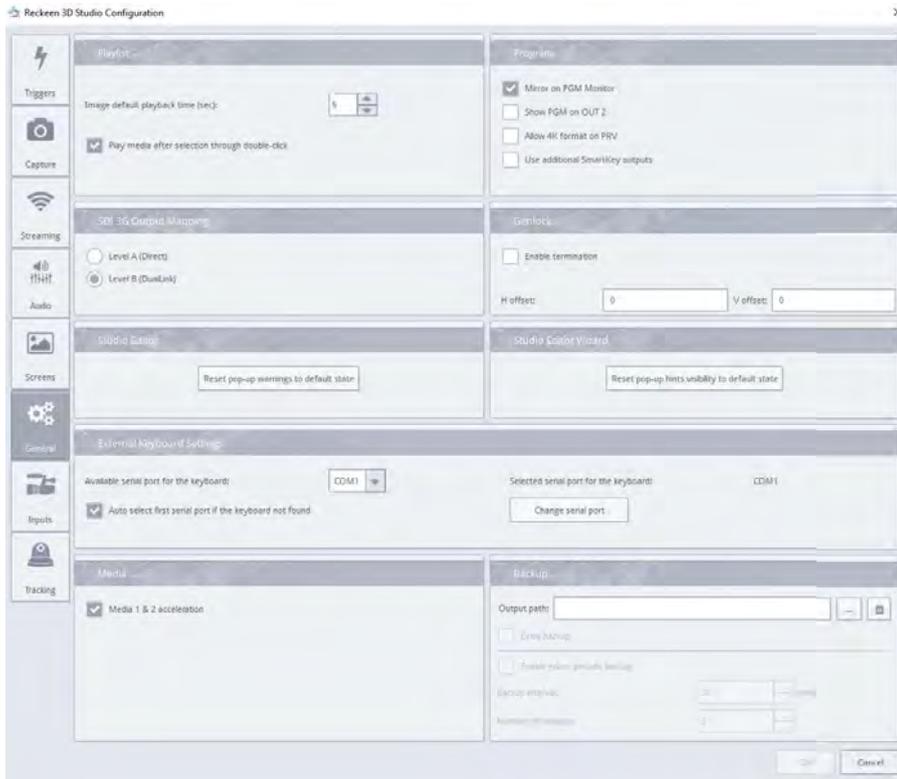
Reckeen 3D Studio Cofiguration

the following features have been added in the studio setup areas:

• **Auto backup**
• **Support for 4K monitor** for prompts with a width greater than FullHD
• **NDI version 5.6**,
• full support for **Vkey200/200+**
• Support for XT6900XT and 6950XT GPUs

CREATING BACKUP FILE

To enable session auto-backup, steps included below need to be executed:

1. Open "Reckeen 3D Studio Configuration" window
2. Go to section "General"

3. In the right-bottom side of the Window find section "Backup".

Parameters which need to be configured:

• Output path – it's a path to location on computer where backup should be stored (We strongly recommend using disk where the Reckeen 3D Studio Data (default disk D://) are stored). To set a new path to save backup's click button with 3 dots, new window will appear. If the disk runs out of space, it will display a warning about unsuccessful save.
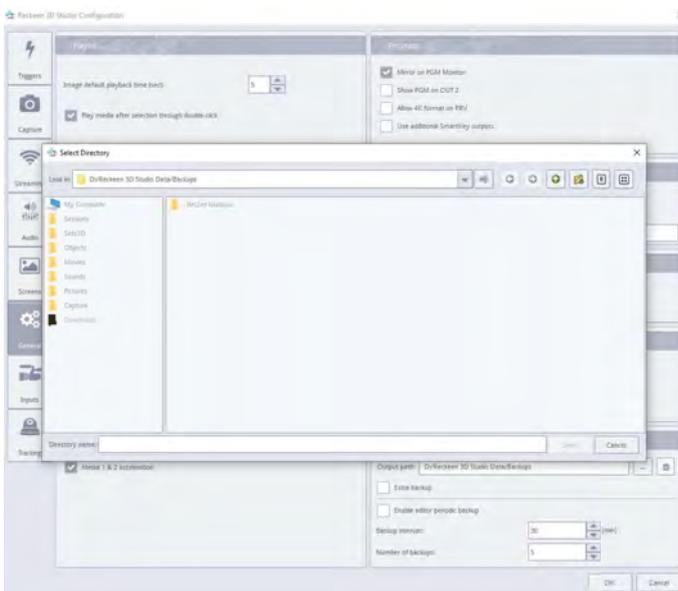
Then select the directory where backup's will be saved and click button "Select".

• Extra backup – This checkbox activates extra backup of session, which is created during saving session manually (File -> Save Session As...).

• Enable editor periodic backup – This checkbox activates periodic backup, which is executed during work in "Reckeen 3D Studio" scene editor.

• Backup interval – Specifies time between backups. This time is counted only in "Reckeen 3D Studio" e.g. If backup interval was set to 5 min and time spent in "Reckeen 3D Studio" scene editor was 4 minutes **Note: backup will not be executed / saved!!**
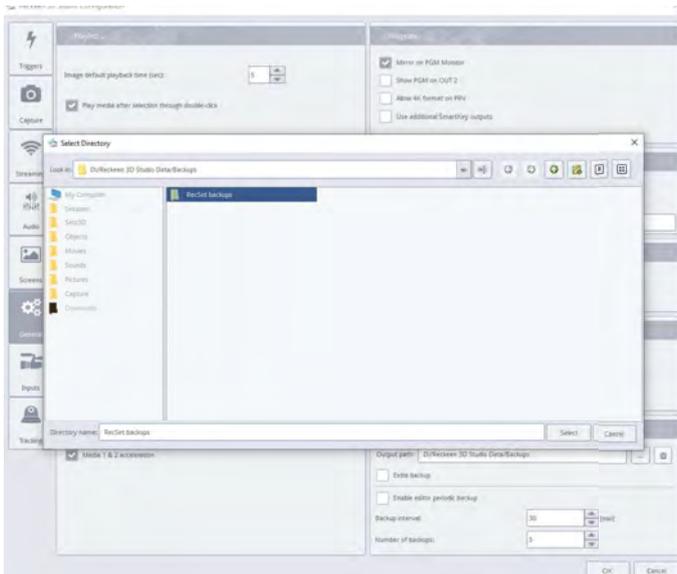
• Number of backups – limit number of backups. This parameter should be used carefully, because if the user has 10 backups saved, and the parameter "Number of backups" will be changed to 2, then the last 8 backups will be deleted. If you run out of disk space then user will be notified that the disk write has failed.

4. After successful setup, to save backup settings click "Ok" and that's it. From now autobbackup is active.

Additional information:

• Autobackup counts the time of the "backup interval" parameter only when the 3D Studio Editor is running (if, for example, the editor is left after 3 minutes, the time is reset and counts again after re-entering the editor).

• If the user has 10 auto-backups and sets the (number of backups: = 1) parameter, the 9 oldest backups will be deleted and one will remain.

• Both the "extra backup" and "Enable editor periodic backup" checkboxes do NOT have to be checked in order to perform temporary backup, it is enough that the "Enable editor periodic backup" option is checked.

• During the backup, the mouse changes the icon to a circle and a red pop-up should be visible at the top of the screen, indicating that the backup is being performed

Note: After fresh installation of version 3.1, enter the destination path for the backup. Otherwise the backup session file won't be created.

SUPPORT FOR 4K MONITORS
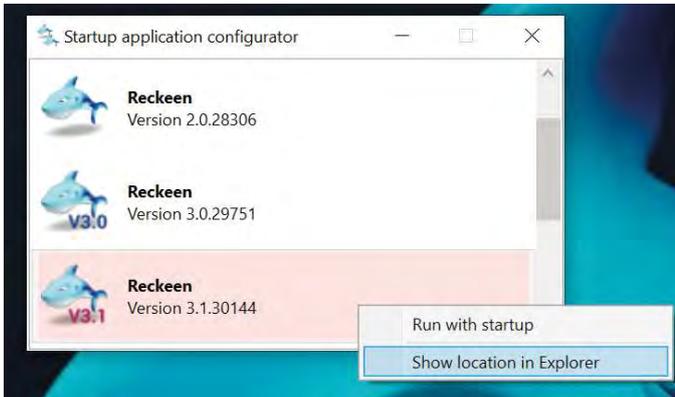
Reckeen 3D Studio Cofiguration - Startup aplication:
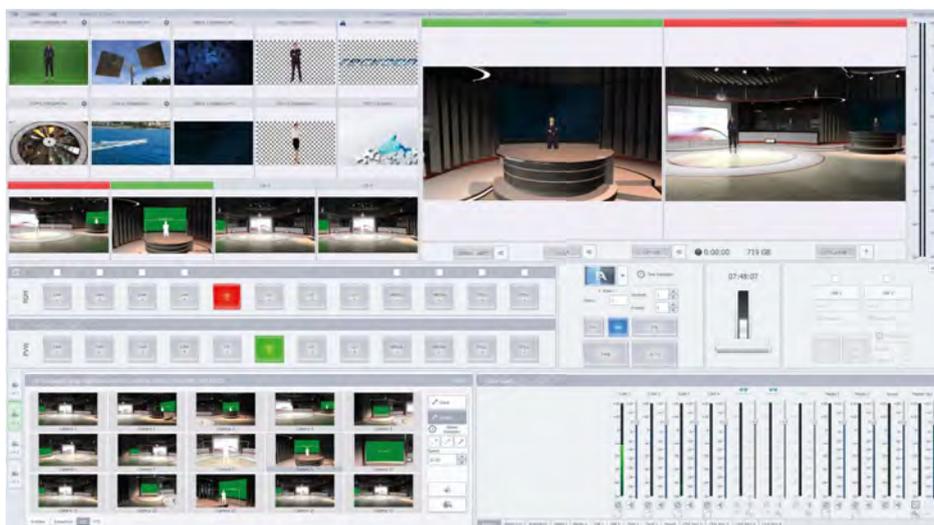
• **Support for 4K monitors** for prompts with a width greater than FullHD

CONFIGURATION - LAUNCHER 3.1

Reckeen 3D Studio Cofiguration - Startup aplication:

After installing software version 3.0 or newer, the previous version 2.0 and all acquired license rights remain in the system (it is not overwritten). This means that it is possible to use both versions with different license entitlements. If a license for version 3.0 is not purchased, it will run in demo mode, in which case the system outputs will contain a watermark.

To select which version should be started when the workstation is turned on, it is required to use the "Reckeen Startup Selector" program.

"Reckeen Startup Selector", as well as "Reckeen Material Editor" are installed automaticaaly with the software version 3.0 or higher.

Launching the "Reckeen Startup Selector" program allows you to select which version of the software should be started automatically after turning on the Reckeen PC workstation.

To select the Reckeen software version, it is enough to point to the available options in the program window. After restarting the system, the indicated version will automatically run.
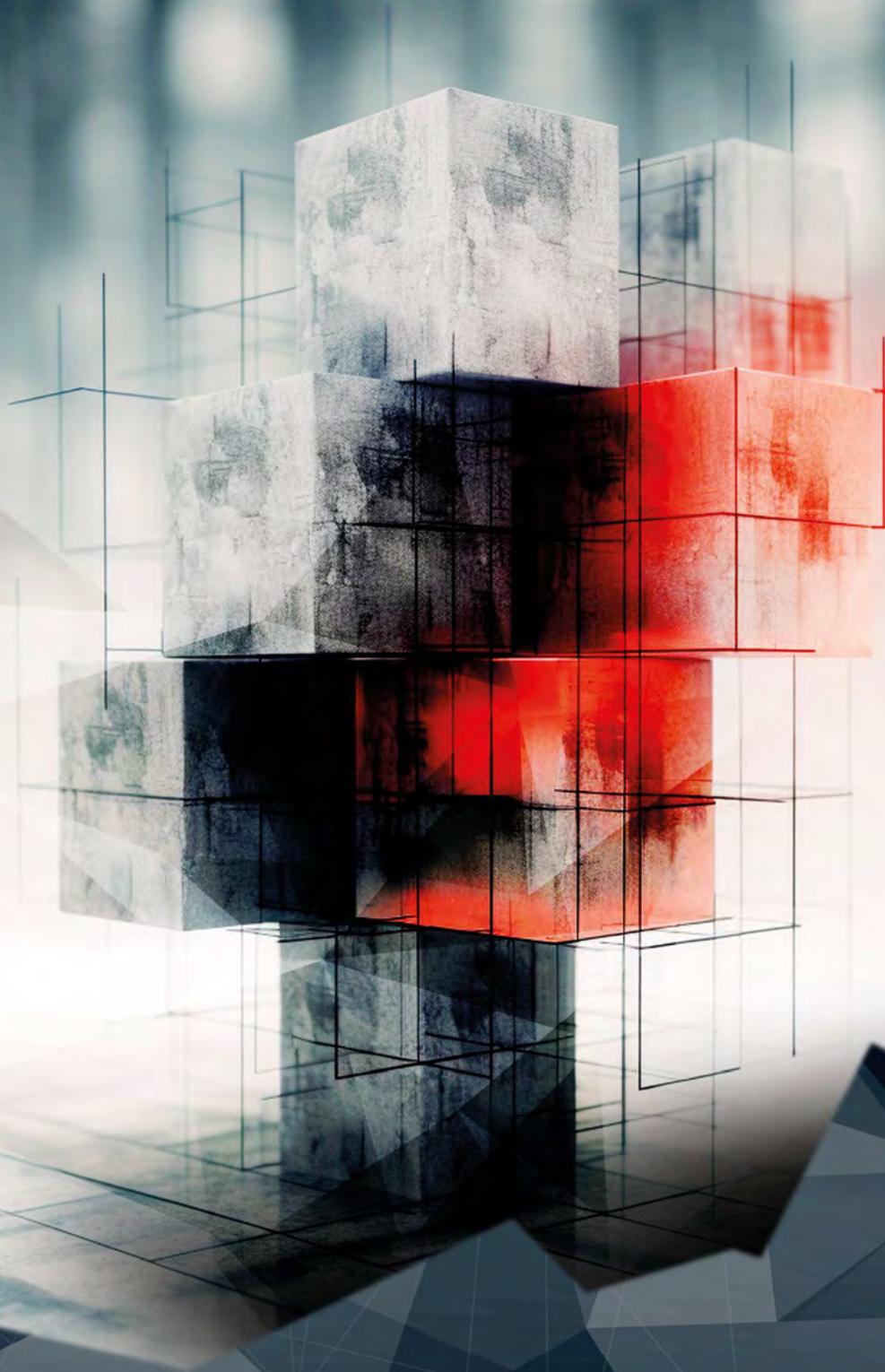
It is also possible to navigate to application source files – click PPM on desired version of Reckeen and select "Show location in Explorer" after this, new window will appear with source files of application.

Reckeen 3D Studio - Material Editor

• New version **Material Editor: 1.1.29403**
• Creating an emission from the **sRGB format**,
• material library has been extended with **new 1000 materials**
• **new 3d scenery**

Reckeen 3D Studio - Slideshow controler:

• **Slideshow controler:** in the new **version1.2.**
• Direct command support F1-F10,