ZANUS

PRODUCTION ROBOTICS

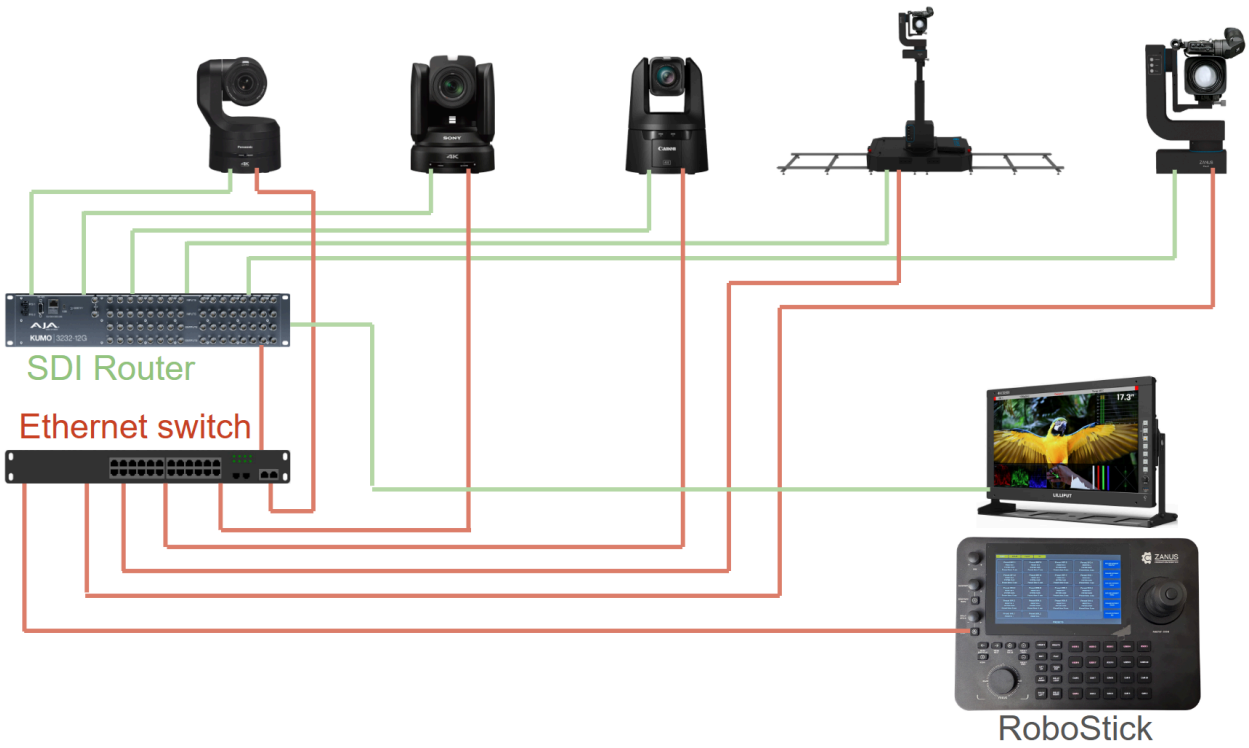
ZANUS ROBOSTICK

User manual

1. RoboStick

RoboStick controller makes it possible to control robotic systems from various manufacturers such as PTZ cameras and pedestals, dollies and sliders as a single robotic unit, making it possible to easily save and execute presets and traces for such complex robotic systems.

1.1. Typical use-case



This is a representation of the typical use-case of the RoboStick controller. RoboStick is connected to the same local network as SDI Router and multiple different devices such as Pan-Tilt Heads, Lifts, Dollies and PTZ Cameras. The operator of these robotic systems has an SDI Monitor which is used for him to see video output from the camera that is currently being controlled.

For more information how to setup RoboStick for this or similar use-case please refer to the next sections:

- RoboStick overview and setup
- Configuration
- Using RoboStick with SDI Router and output monitor

2. Supported devices

Following is the table of supported devices by device types and manufacturers. This table will expand in the future.

Device type	Manufacturer	Device Model
Pan-Tilt Head		
	Zanus Robotics	Pauli
		Pauli B
		Paulinho
		Paulinho B
		Paulinho for Blackmagic studio camera
Lift / Pedestal		
	Zanus Robotics	PTZ Raise
	Polecam	Autopod
Dolly / Slider		
	Zanus Robotics	Move
	Waterbird Systems	MS Pro
		MS Swift
		MS XL
PTZ Camera		
	Canon	All PTZ Camera models with support for XC protocol
	Sony	All PTZ Camera models with support for Sony Visca Over IP protocol
	Panasonic	All PTZ Camera models with support for Panasonic protocol
Camera / Lens Controller		

	Zanus Robotics	Zanus Lens Controller
	Canon	All Camera models with support for XC protocol
	Panasonic	AG-CX350
SDI Router		
	AJA	Kumo 1604
		Kumo 1616
		Kumo 3232
		Kumo 6464
	Blackmagic	Smart Videohub 12x12
		Smart Videohub 20x20
		Smart Videohub 40x40

3. RoboStick overview and setup

Figure 1 - RoboStick controller

3.1. Connectors

In Figure *2* are represented all the connectors on the back side of the Controller.

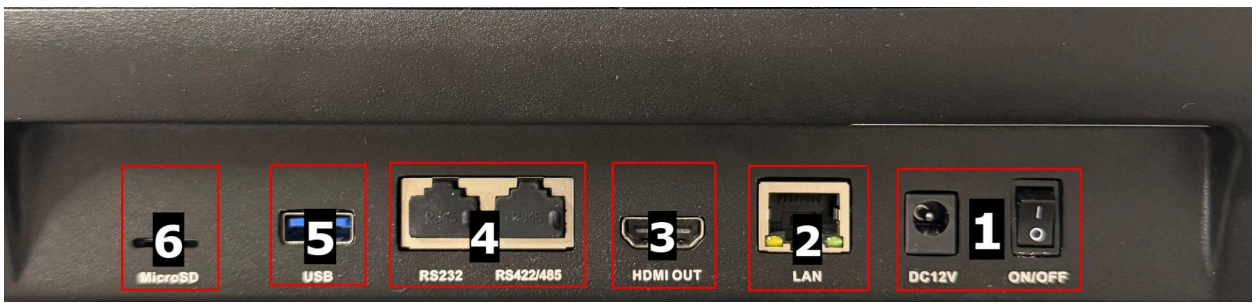


Figure 2 - Connectors

Marked by numbers are following:

1 - Power
2 - Ethernet
3 - HDMI out
4 - Serial
5 - USB
6 - MicroSD

We are going to cover all of them in more detail in the following sub-sections.

3.1.1. Power

The controller is powered with the provided DC12V adapter (*Figure 3)*.

Figure 3 - Power adapter

To power the controller it is necessary to plug the adapter in the DC12V connector and press the power switch from 0 to 1. In order to turn off the controller it is necessary to press the power switch from 1 to 0 and unplug the adapter cable from the DC12V connector.

3.1.2. Ethernet

In order to have the ability to use the controller to control devices over the Ethernet, it is necessary to plug the Ethernet cable in the LAN connector.

⚠ *Note that the controller needs to be in the correct local network as the devices it is designated to control. For more information on this, please check the Setting up network section.*

3.1.3. HDMI out

HDMI out can be used to project a screen image from the controller to the secondary monitor, it is just needed to connect the controller and monitor with the standard HDMI cable.

3.1.4. Serial

Serial connectors RS232 and RS422/485 are reserved for future use.

3.1.5. USB

A USB connector is used to connect an external laptop with the controller in order to update the firmware on the controller itself. For more information on this, please check the Software update section.

3.1.6. MicroSD

The MicroSD slot is reserved for future use.

3.2. Setting up network

In order to set the ip address of the controller in some local network it is necessary to access Ethernet settings of the controller.
To perform that, it is needed to press the network button in the Main menu of the controller. If the main menu is not visible first it is needed to toggle the Main menu with the Menu button of the controller. More on this in the Main menu buttons section. After the Main menu is visible, the Network button should be pressed (*Figure 4)*.

Figure 4 - Main Menu

After the Network button is pressed one needs to follow the instructions below in order to correctly set up the ip address of the controller.

First, the following Ethernet settings page will show up on the controller screen. To set up the IP address, the first step is to click on the Ethernet IP mode (*Figure 5*).

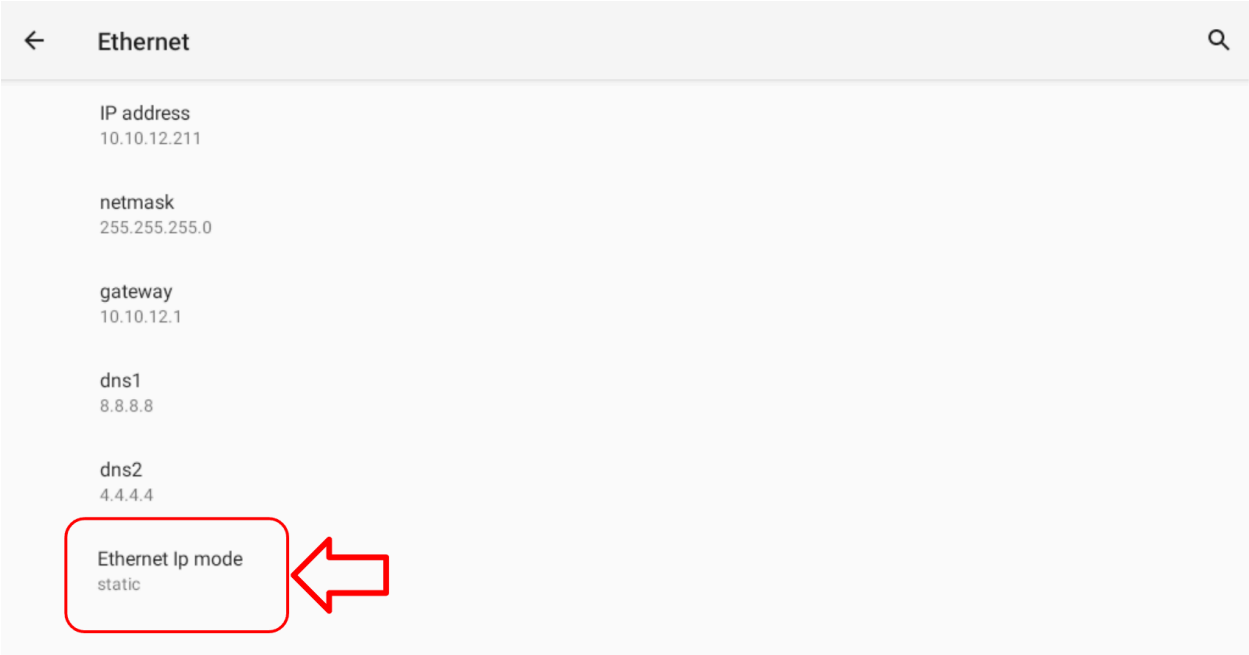


Figure 5 - Setting up network part 1

After clicking on it the following dialog in the *Figure 6* below will appear. There are two options for configuring the network of the controller. The first one is with a static IP address, and the second one is using DHCP. DHCP is an option for automatically assigning the IP address of the controller by the DHCP server. If that option is selected, the DHCP server (if it exists) will assign some available IP address to the controller. Static option gives one full control of the configuring controllers network property. To select the static option one needs to click on the static field if it is not selected, or if it is already selected and it is needed to change the network properties of the controller (*Figure 6*).

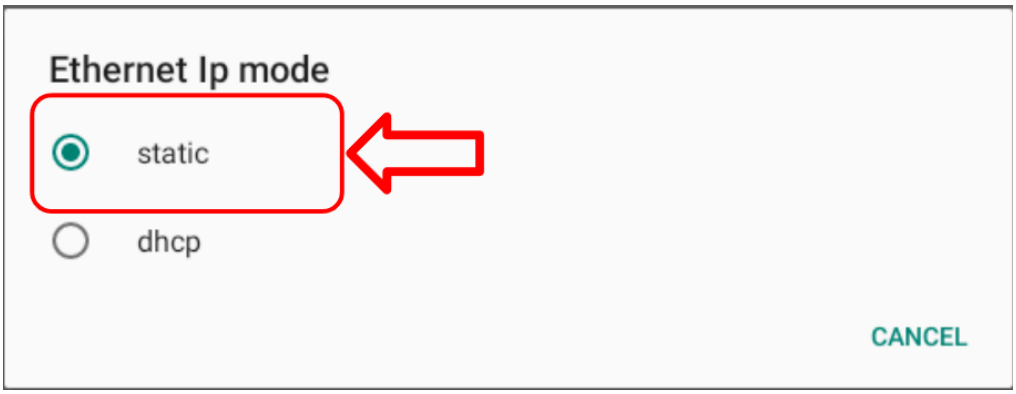


Figure 6 - Setting up network part 2

⚠ *Note that it is advised to use the static local IP address for the controller in order to have more control. In some cases DHCP server can change the IP addresses of the controlled devices over time, and that would also imply that if that happens, one needs to change the network properties for that particular device in Configuration.*

The dialog on *Figure 7* below will show. In that dialog one needs to insert the desired IP address and local network configuration after which one needs to click on the connect button marked in the *Figure 7*.

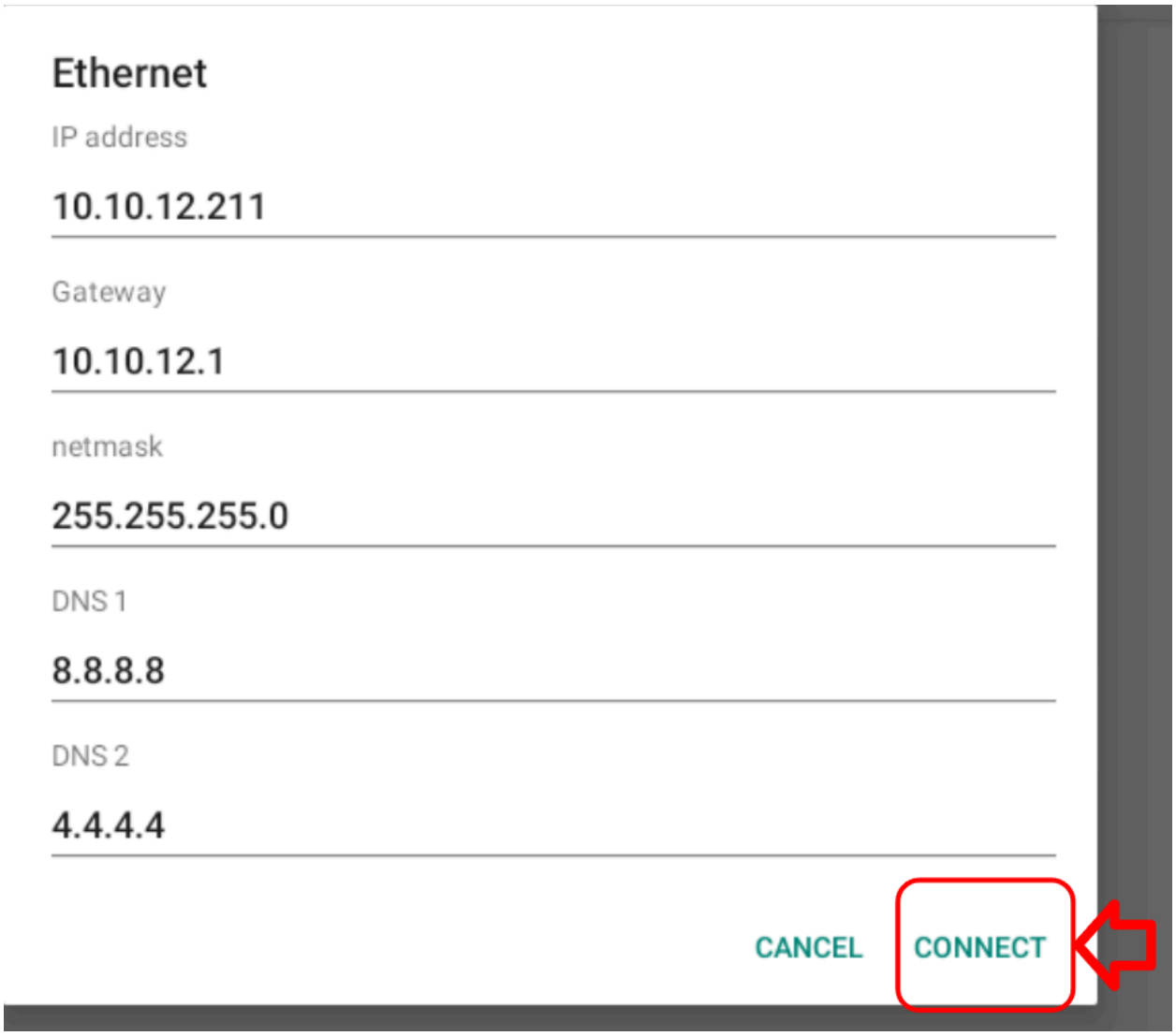


Figure 7 - Setting up network part 3

After which this dialog is closed and we are returned to the general Ethernet overview settings. One needs to check if the IP address is correct and if everything looks correct click on the back arrow (*Figure 8*).

Figure 8 - Setting up network part 4

The controller should be power-cycled every time the IP address has been changed.

3.3. Software update

In order to update the controller's software to the latest version following is required:

- PC running on Windows 10 or higher
- Updater app which you can acquire by contacting us
- USB cable that comes with the controller (*Figure 9)*

Figure 9 - USB cable

The controller should be connected to the PC with the USB cable. Next .zip file of the updater application should be extracted (on the Desktop or somewhere where it is easily accessible). After that download the .apk update file to the same directory where we extracted the updater application, or use the latest version of the firmware (latest firmware folder) that is shipped with the updater app (*Figure 10)*.

Power on the controller and after it fully powers on, start the update process.
To open Updater App navigate to the extracted Updater App folder and double click on the **appZanusJoystickUpdater.exe** executable (*Figure 10)*.

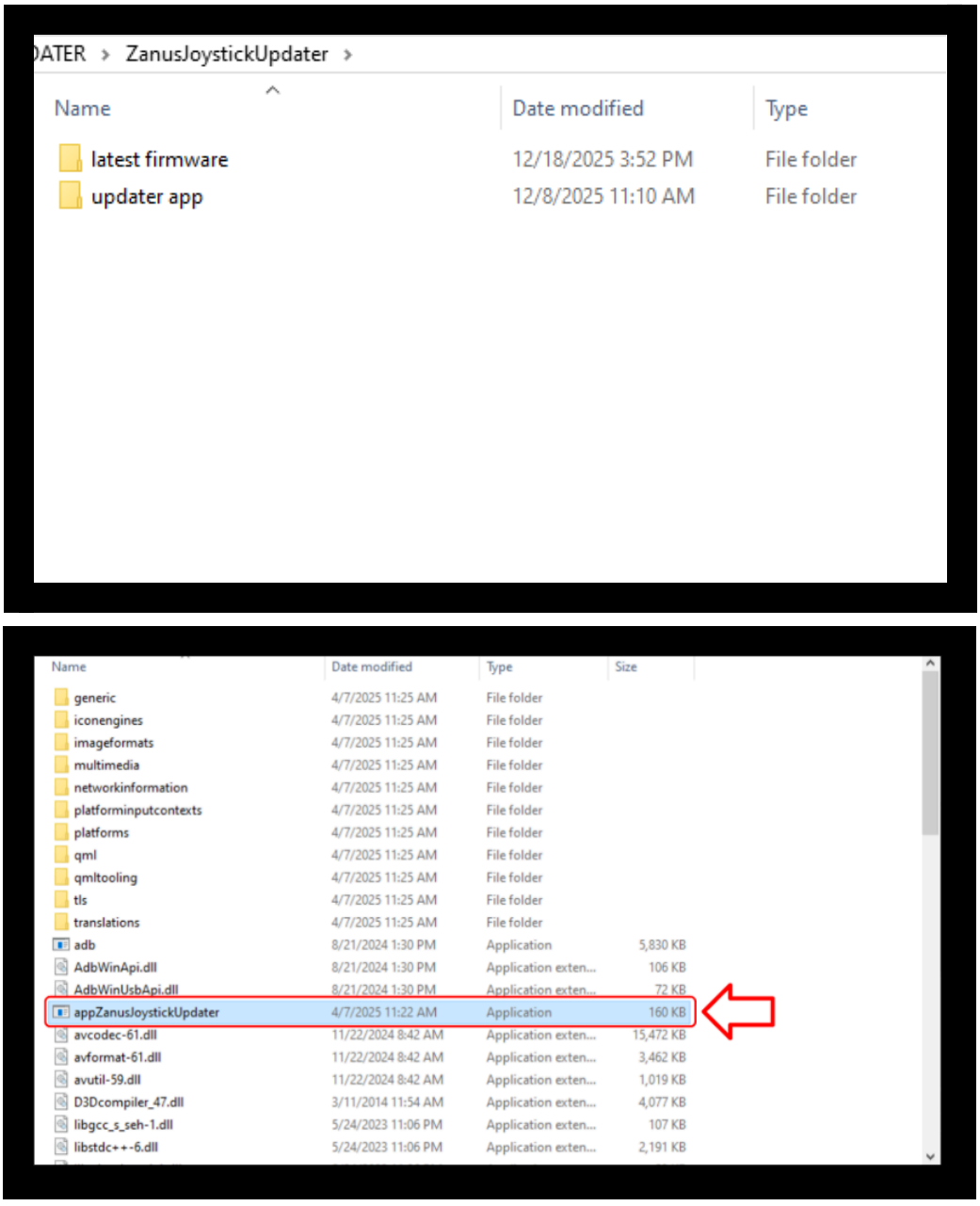


Figure 10 - Software update process - opening the update application

After the updater app starts we will first need to click on the Check Connection button (*Figure 11)*.

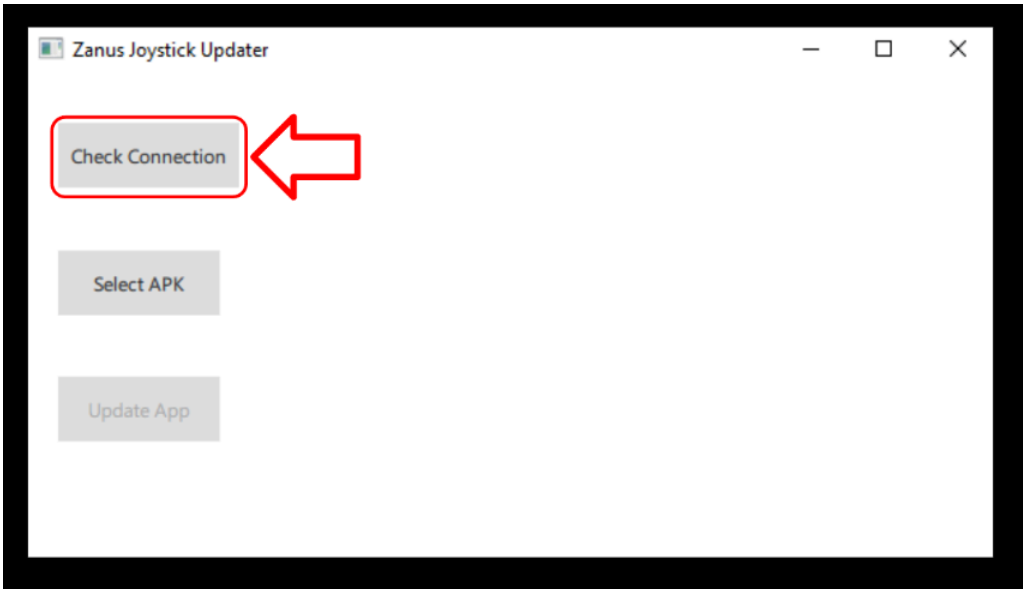


Figure 11 - Software update process checking connection

If the app confirms that the device is connected we can continue. If the message is different please check if the USB cable is correctly connected to the controller and PC, and check if the controller is turned on.

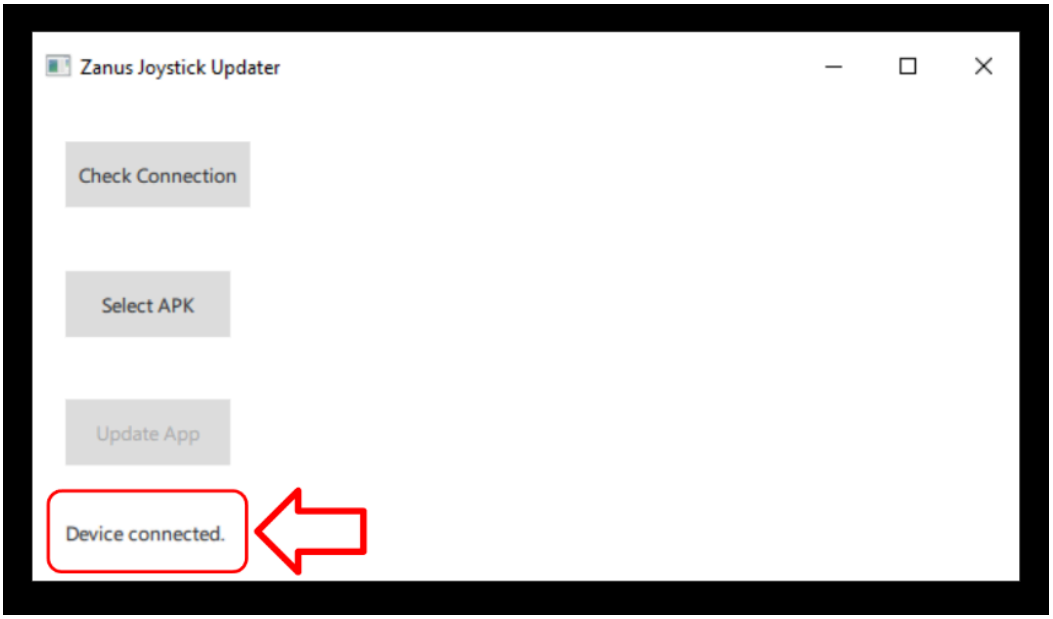


Figure 12 - Software update process - connection successful

If the message says Device connected we can move to the next step and click on the Select APK button (*Figure 13)*.

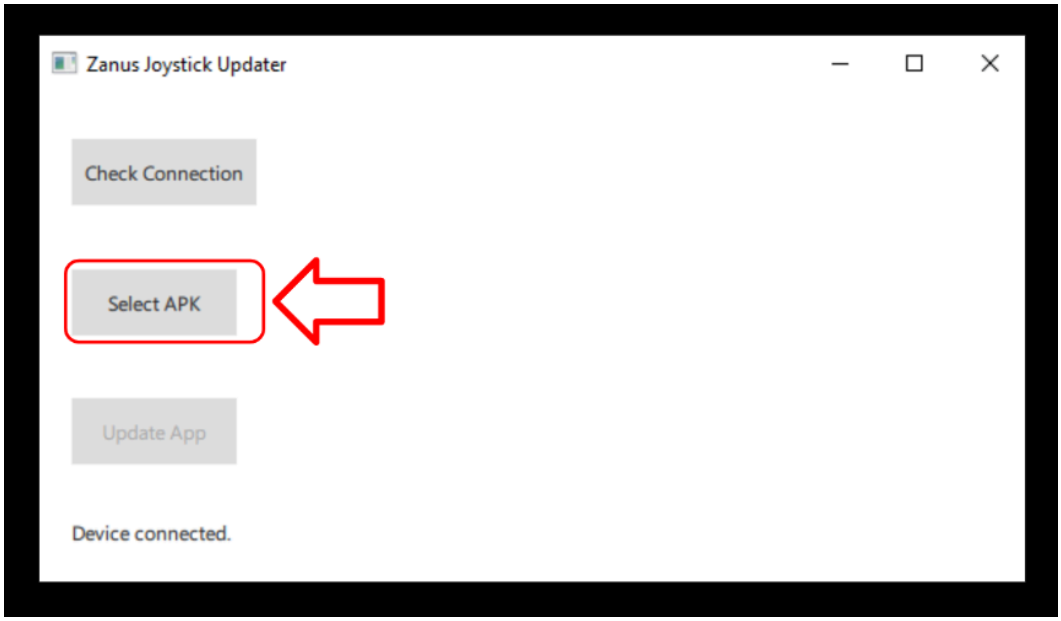


Figure 13 - Software update process - selecting apk file

Windows explorer will open and from there we will need to navigate to the downloaded .apk file or navigate to the latest firmware version that is shipped with the update application, and then select it.

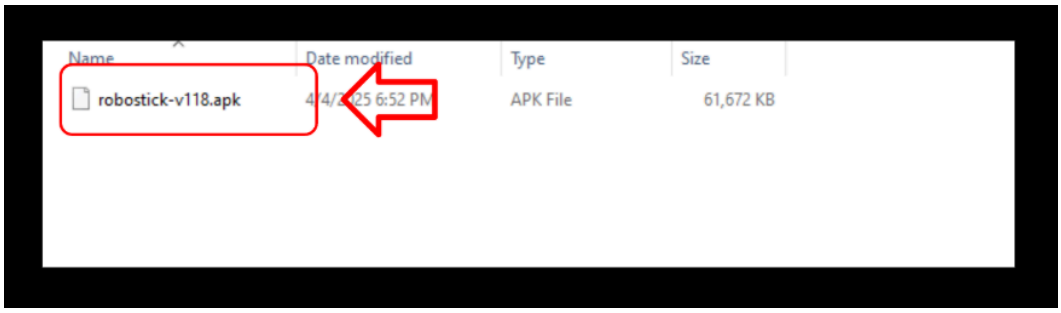


Figure 14 - Software update process - selecting the update file

After the update file is selected a new message will be shown in the updater app (*Figure 15*), and one can move forward in the process.

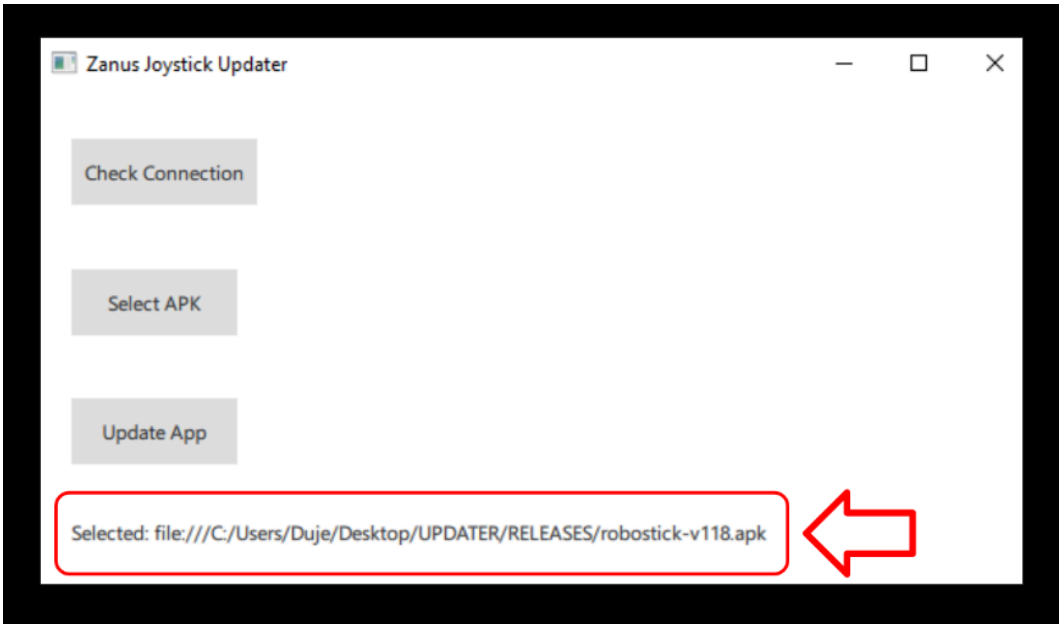


Figure 15 - Software update process - selecting the update file

After the update file is successfully selected the only thing we are left to do is to click on the Update App button (*Figure 16)*.

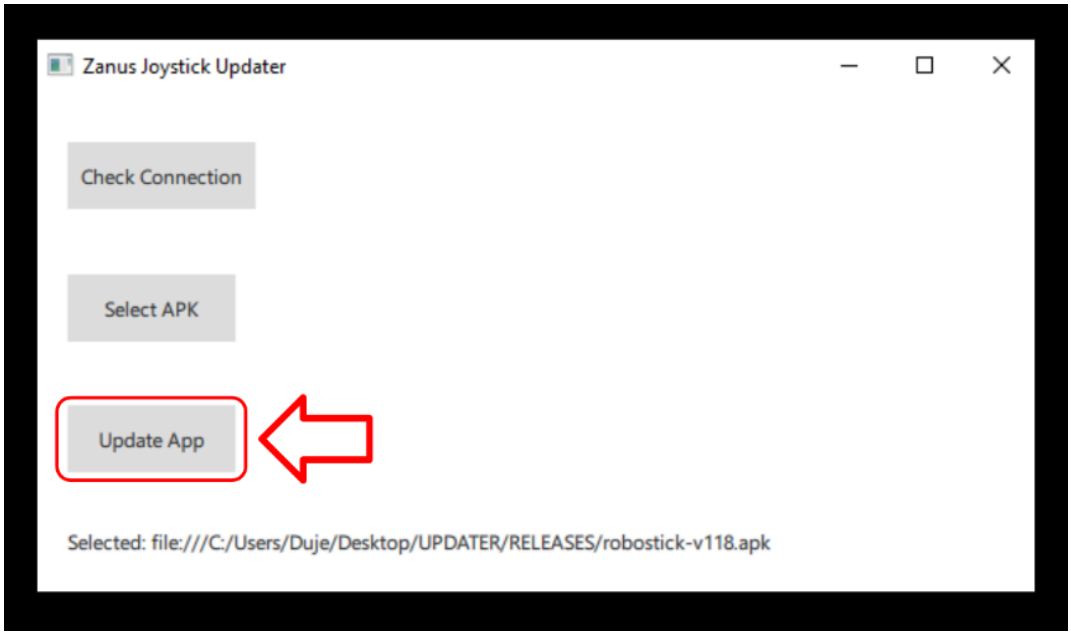


Figure 16 - Software update process - updating

After a short time a new message will be shown saying that the update is successful, and the controller will do a software reset in order to load the newest software version.

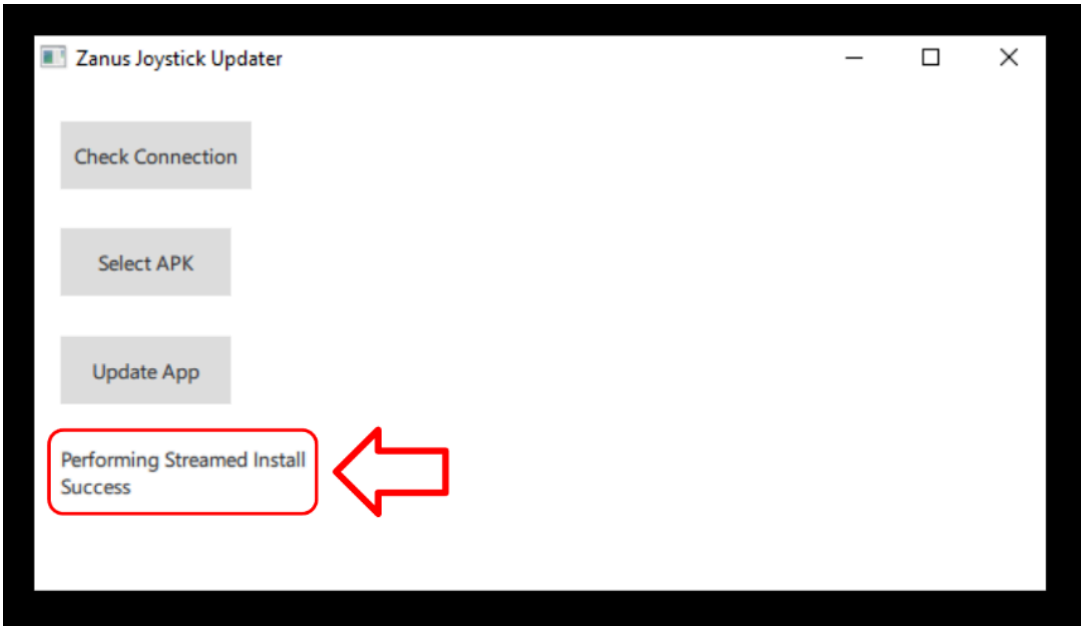


Figure 17 - Software update finished

With this update process is finished.

4. Control elements

In the *Figure 18* below we can see the layout of the controller. The controller has many different hardware components such as buttons, knobs, wheels and a stick that are used for different purposes.

Figure 18 - parts of the controller

Marked by numbers are following:
1 - Pan-Tilt Zoom control stick
2 - Focus control wheel
3 - Iris control knob
4 - Lift control buttons
5 - Dolly control elements
6 - Main menu buttons
7 - Sensitivity menu control elements
8, 9, 10 - Action buttons
11 - Touch screen

4.1. Pan-Tilt Zoom control

Stick is assigned for controlling pan, tilt and zoom for devices.

Pan and tilt are controlled by moving the stick left-right and up-down respectively.

Zoom is controlled with rotation of the stick ring clockwise and counterclockwise.

Figure 19 - Pan/Tilt Zoom stick

4.2. Focus control

Focus is controlled with the focus wheel by rotating it clockwise and counterclockwise towards the near and far side (*Figure 20*).

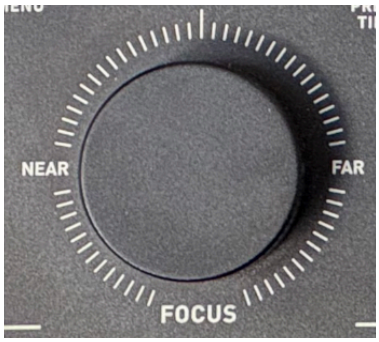


Figure 20 - Focus wheel

4.3. Iris control

Iris is controlled by the Iris knob. The iris is opened by rotating the knob to the + side, and closed by rotating the knob to the - side (*Figure 21)*.

Figure 21 - Iris control

4.4. Lift control

Lifts or motorized pedestals are controlled with the two buttons (*Figure 22)*. When either Lift Up or Lift Down are pressed, lift will move up or down respectively. When the currently pressed button is released, lift will stop its movement. Speed of the lift can be configured by increasing or decreasing the sensitivity of the lift in the Sensitivity menu.

Figure 22 - Lift up and down buttons

4.5. Dolly control

Dollies or sliders are controlled with different control elements shown in *Figure 24*. On the right side in *Figure 24* are three buttons Dolly Left, Dolly Right and Dolly Loop. On the left side in *Figure 24* is Dolly speed knob, and Dolly Stop button. Buttons for dolly control are toggle buttons which mean that we only press them once and they become active. To move dolly left one needs to to press Dolly Left button, it will become active (it will start glowing red) and dolly will move left. The button remains active until we press another dolly control button, the same button that is currently active or Dolly Stop button. Keep in mind that if the Dolly Left button is pressed dolly starts moving left. Then if the Dolly Right button is pressed dolly will immediately change direction and start moving right. If we then press the Dolly Right button again or the

Dolly Stop button the dolly will stop. We can also change dolly speed dynamically while dolly movement is already active with Dolly Speed knob. We can move the knob to the minus direction to slow down the dolly, or to the plus direction to speed it up. The current speed percentage will be shown in the bottom left part of the touch screen while we turn the knob (*Figure 23)*.

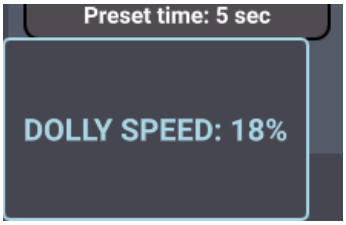


Figure 23 - Dolly speed percentage

The Dolly Loop button is used to put the dolly in another mode of movement which some manufacturers support. That movement is automatic from one side of the tracks to the other. The speed of the dolly can be adjusted while the Dolly Loop button is active.

Figure 24 - Dolly control elements

4.6. Main menu buttons

The main menu is controlled with the Menu buttons (*Figure 25)*.

Figure 25 - Main menu buttons

Main Menu can be toggled on or off with the Menu button (*Figure 26*).

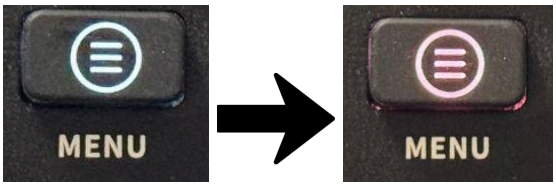


Figure 26 - Menu button

When the Menu button is pressed the Main menu becomes visible on the touchscreen (*Figure 27).* Main menu current active page will be highlighted and current active camera will be displayed on the right side.

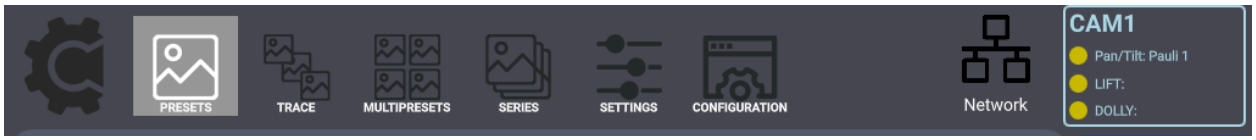


Figure 27 - Main menu toggled on

When it is toggled off, the Main Menu is no longer visible on the touch-screen. Instead, in the top of the touch-screen all existing cameras are visible and in the bottom of the touch-screen label with the current menu item name is displayed (*Figure 28*).

Figure 28 - Main menu toggled off

We can switch to different pages of the main menu using touch gestures on the touch-screen when the menu is toggled on with the click on the desired menu item, or we can use Menu Previous and Menu Next buttons on the controller itself (*Figure 29).*

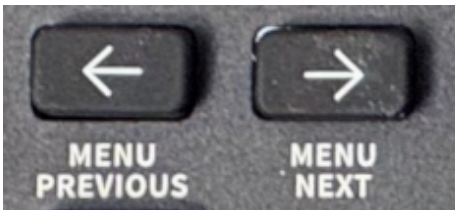


Figure 29 - Main menu buttons

Using Menu previous and menu next buttons to cycle through the menu items works in a cyclic manner by moving the currently selected menu item by one left or right. Which means that if the current menu item is the first item and the Menu previous button is pressed, the next selected item will be the last menu item, and in the other direction if the current menu item is the last item

and the Menu next button is pressed, the next selected item will be the first menu item (*Figure 30)*.

Figure 30 - Going through the menu using controllers buttons

4.7. Sensitivity menu control elements

Control sensitivities of the control elements can be accessed and adjusted with the Sensitivity Menu button (*Figure 31)*.

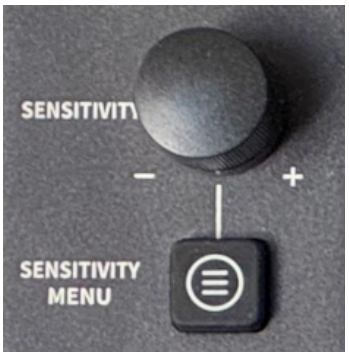


Figure 31 - Sensitivity menu control elements

When the sensitivity menu button is pressed the sensitivity menu will be shown on the left side of the touch screen. We can use knob to adjust the sensitivity for specific axes of control. The currently selected axis is outlined with a border around it (*Figure 32)*.

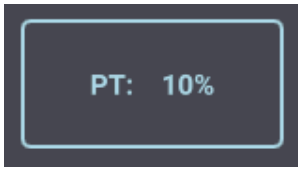


Figure 32 - Currently selected axis example

To change the sensitivity percentage of the currently selected axis of control we just need to turn the knob to the + or - side so we can increase or decrease the percentage respectively.

To change the currently selected axis of control one needs to press the knob.
Alongside sensitivities here we can adjust movement direction of specific axes. We can leave movement direction. This is done by pressing buttons with Normal / Inverted text on them in the Invert Control Column on the touch-screen (*Figure 33)*.

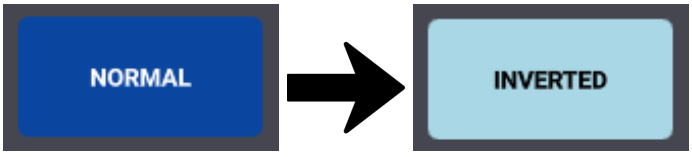


Figure 33 - Toggling axis movement direction

Figure *34* depicts one example of changed sensitivities and control directions from the default values.

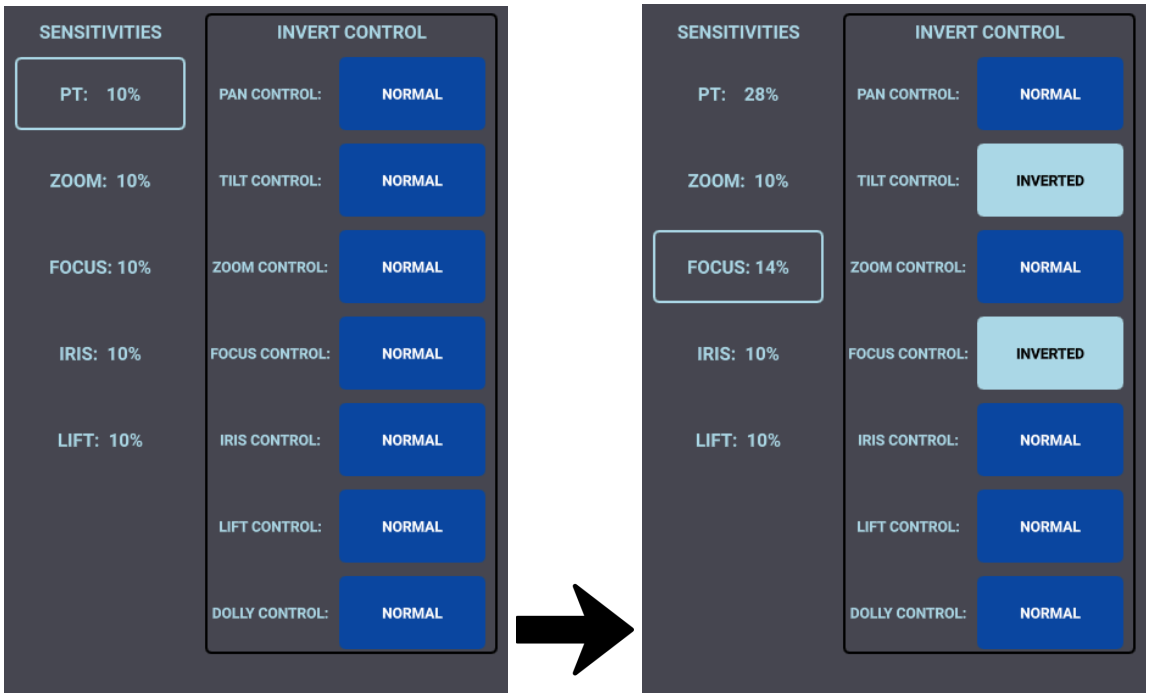


Figure 34 - Example of changes

4.8. Action buttons

Action buttons of the controller are not directly connected with controlling the movements of the devices but to initiate some other functionalities of the controller (*Figure 35*).

Figure 35 - Action buttons parts

Marked by numbers are as follows:
1 - Create button
2 - Delete button
3 - Edit button
4 - Play button
5 - Trace record button
6 - Auto focus button
7 - Preset time buttons
8 - User buttons
9 - Camera buttons

4.8.1. Create button

The Create button has specific functionality depending on the Main menu page that is currently active (*Figure 36*). In general it is used to create the presets, multipresets, series and traces.

Figure 36 - Create button

The create button will open a specific create dialog for the currently active main menu page. More on the specific create workflow in the Create Presets, Create Multipresets, and Create Series section.

4.8.2. Delete button

The delete button has specific functionality depending on the Main menu page that is currently active (*Figure 37)*. In general it is used to delete the presets, multipresets, series and traces that have been made.

Figure 37 - Delete button

The delete button will start the deletion process for the currently active main menu page. More on the specific delete details in Delete Presets, Delete Multipresets, Delete Series, Delete Trace sections.

4.8.3. Edit button

The edit button has specific functionality depending on the Main menu page that is currently active (*Figure 38)*. In general it is used to edit the presets, multipresets, series and traces that have been made.

Figure 38 - Edit button

The edit button will start the edit process for the currently active main menu page.
More on the specific editing details in Edit Presets, Edit Multipresets, Edit Series and Edit Trace sections.

4.8.4. Play button

The play button has specific functionality depending on the Main menu page that is currently active (*Figure 39)*. In general it is used to execute the presets, multipresets, series and traces that have been made.

Figure 39 - Play button

More on the specific playing details in Play Presets, Play Multipresets, Play Series and Play Trace sections.

4.8.5. Trace Rec button

Trace Rec button is used to start and finish recording traces for some device or devices. When the button is active (glowing red) trace is being recorded and when the button is inactive recording of the trace is finished or not in progress (*Figure 40)*.

Figure 40 - Trace rec button

For further details on trace recording, please see the trace recording section.

4.8.6. Auto Focus button

When Auto Focus is pressed, a device with the capability for Auto Focus will get the command to do the auto focus (*Figure 41)*.

Figure 41 - Auto focus button

4.8.7. Preset time buttons

Preset buttons are used for adjusting preset times. They are shown in *Figure 42*.

Figure 42 - Preset time buttons

In order to adjust the preset execution time, one first needs to select the desired preset on the touch screen, and then use plus and minus buttons to increase or decrease execution time.

4.8.8. User buttons

User buttons are shown in *Figure 43*. There are ten user buttons on the controller labeled with User 1-10.

Figure 43 - User buttons

For the time being user buttons are used to store presets from the currently selected camera. In the future it will be possible for the user to assign desired functionalities to each button.

4.8.9. Camera buttons

Camera buttons are shown in *Figure 44*. They are labeled with Cam 1-10.

Figure 44 - Camera buttons

Camera buttons are used to select the currently active camera in order to control it.

The camera in this document represents a **robotic system** or **control system** that is usually composed from different parts like Pan-Tilt head, lift and dolly. Some or all of those parts may be independent physical devices, and are configured to work together as a single device. For configuring control systems please see the add control system section.

Cameras are selected by pressing the specific camera button. The currently selected camera will glow red.

4.9. Touchscreen

The touchscreen is shown in *Figure 45*.

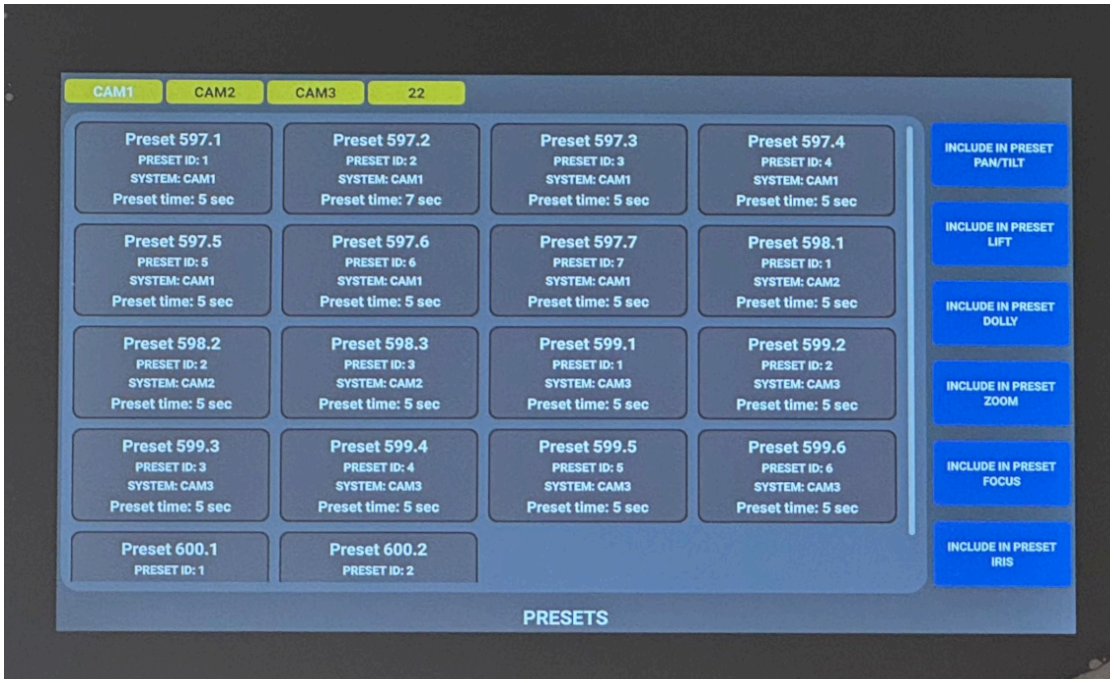


Figure 45 - Touchscreen

Using a touchscreen we can access all the other software functionalities of the controller. Software functionality details are explained in the rest of this document.

5. Selecting active camera and camera properties

In the section Camera buttons is shown how the camera can be selected for control. In this section active camera properties are explained.

Currently selected camera and details about it can be found in two places depending on the main menu visibility.

If the main menu is on and visible on the screen, the current active camera can be seen in the top right corner of the screen with details about parts of its control system (*Figure 46)*.

Figure 46 - Camera status 1

If the main menu is off and not visible on the screen, the current active camera can be seen in the top of the screen as shown in *Figure 47*. If the control system of that camera is online it will be marked dark blue with white camera name, and if the control system of that camera is offline it will be marked yellow with white camera name. More on the online / offline status later in this section.

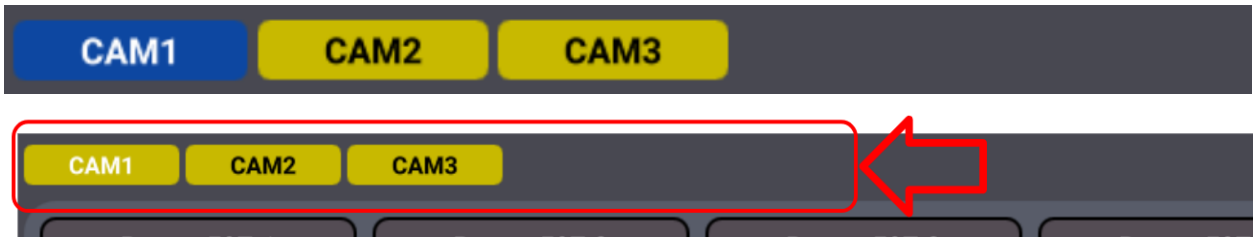


Figure 47 - Camera status 2

5.1. Control system and camera status

As it was mentioned before, the camera or its control system is usually composed from different parts like Pan-Tilt head, lift and dolly. Some or all of those parts may be independent physical devices that can be online or offline on the network.

When all or some parts of the system are offline the camera itself will be flagged as offline. This is depicted in *Figure 48* for both options when the main menu is visible and not.

Figure 48 - Camera status 3

When all parts of the system are online the camera itself is flagged as online which is shown in *Figure 49*.

Figure 49 - Camera status 4

If during the control after some time any part of the system goes offline for any reason the camera itself will then be flagged as offline. This can be seen in *Figure 50*. Keep in mind that while the main menu is visible apart from which camera is currently active we can also see status indicators for all of its parts For example in *Figure 50* we can see that only the Pan/Tilt part of the system is offline and that other parts are online. This can be used to debug that particular device and check it for malfunctions.

Offline status can happen for a number of reasons but in this case it happens if that particular device does not respond to messages from the joystick after a certain timeout, and problems could be anything from bad network connection, device being turned off to the firmware crashes on the device itself.

Figure 50 - Camera status 5

6. Presets

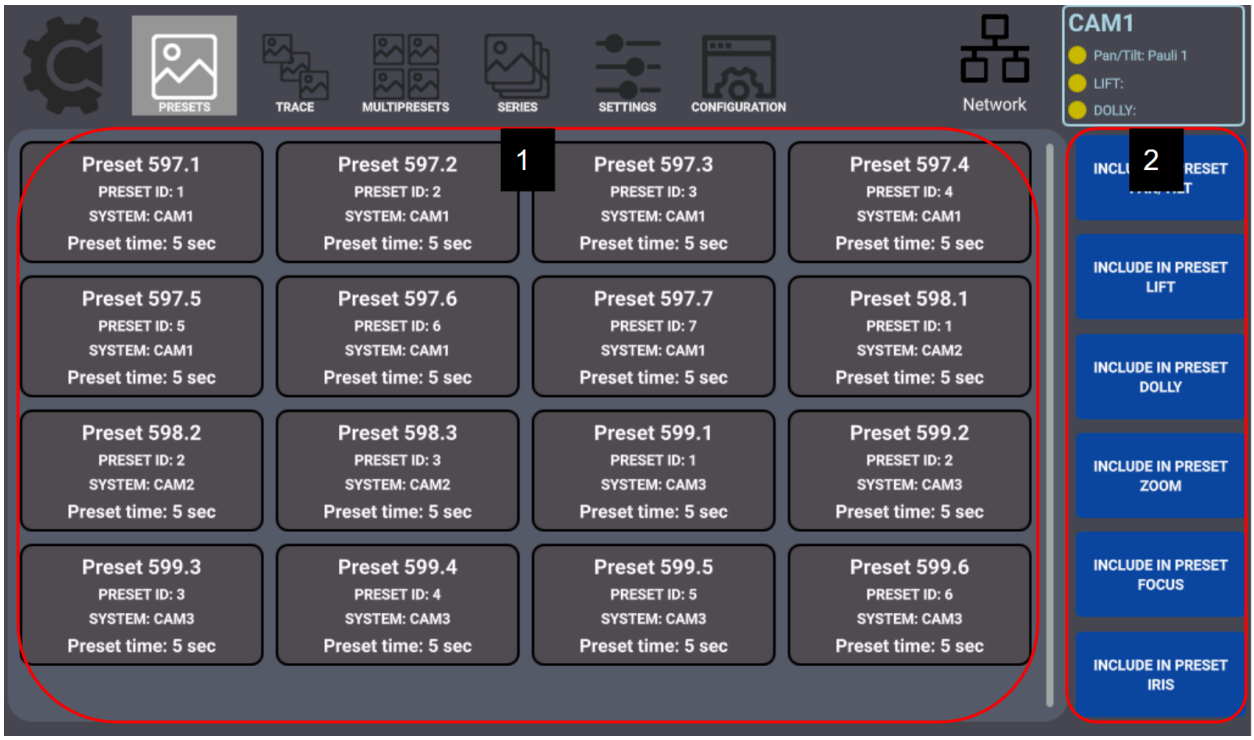


Figure 51 - Presets page overview

Marked by numbers in *Figure 51* are the following:
1 - Main part of the presets page is the list of saved presets, it occupies the central part of the page, this is explained in the Preset list view section
2 - Toggle buttons for controlling which parts of the system are saved in the preset which is explained in the Include Axes in preset section.

6.1. Preset list view

Figure 52 - Preset list view

The preset list view (*Figure 52)* is used to show all presets that are currently saved on the controller. Presets are arranged in a grid.

6.2. Include Axes in preset

Figure 53 - Preset include axes

Specific axes may be included or excluded from preset by using the toggle buttons on the touch-screen (*Figure 53.* The axes that will be used and saved as a part of the preset one needs to be toggled on (dark blue color) (*Figure 54)*.

Figure 54 - Included axis example

Axes that one doesn't want to use one needs to toggle off (light blue color) (*Figure 55)*.

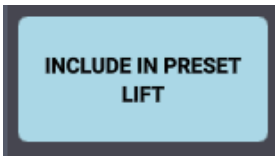


Figure 55 - Excluded axis example

After presets are created or edited only axes that are toggled on at the time of creation or editing will be saved for that particular preset.

For example if Pan-Tilt, zoom, focus and iris are needed to be saved in preset one needs to toggle them on, and if dolly and lift need to be excluded from executing in that preset one needs to toggle them off. This example is given in *Figure 56*.

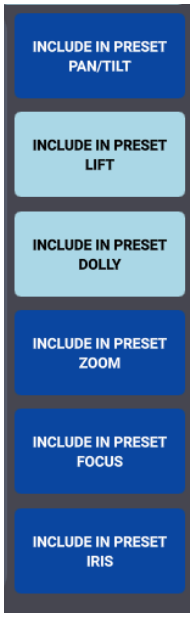


Figure 56 - Example of included axes

6.3. Create presets

In order to create a preset one first needs to navigate to the Presets page in the main menu. Presets can be created by clicking the Create button (*Figure 57)*. Preset is created for the current active camera and axis positions of the camera at the moment of preset creation are being saved. Not all axes need to be included while creating the preset, but only those axes that are will be saved for that preset, which we explained in the Include Axes in preset section.

Figure 57 - Create button

After clicking on the Create button the dialog box in *Figure 58* appears.

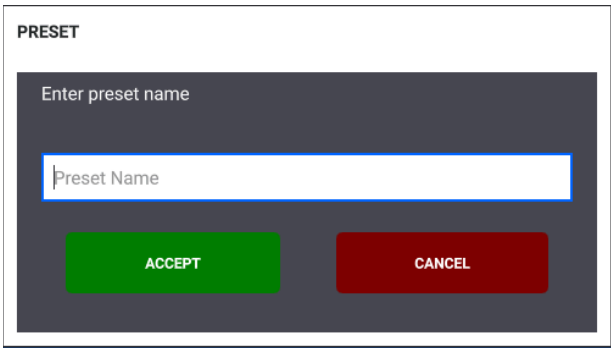


Figure 58 - Create preset dialog

In this dialog one needs to enter a preset name using a virtual on-screen keyboard and click accept to create the preset.

The newly created preset can be then seen in the Preset list view.

Each preset carries with it some relevant information which can be seen in *Figure 59*.

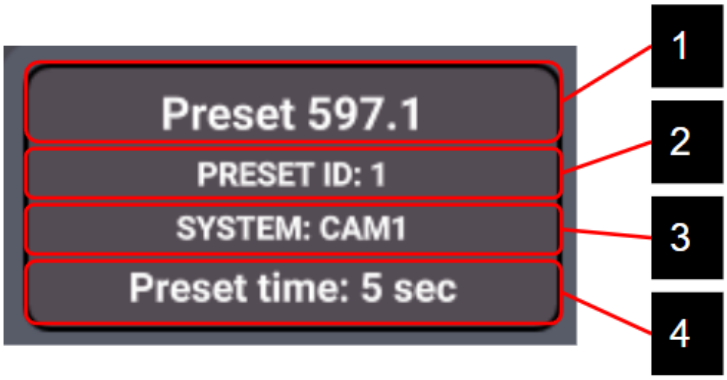


Figure 59 - Single preset instance

Marked by numbers is following:
1 - Preset name
2 - Preset id on devices that are part of the cameras control system
3 - Name of the control system for which preset is created
4 - Preset time

6.4. Edit presets

In order to edit a preset one first needs to navigate to the Presets page in the main menu, select the preset by clicking on it on the touch-screen and then click on the Edit button on the controller, after which the edit dialog will open (*Figure 60)*.

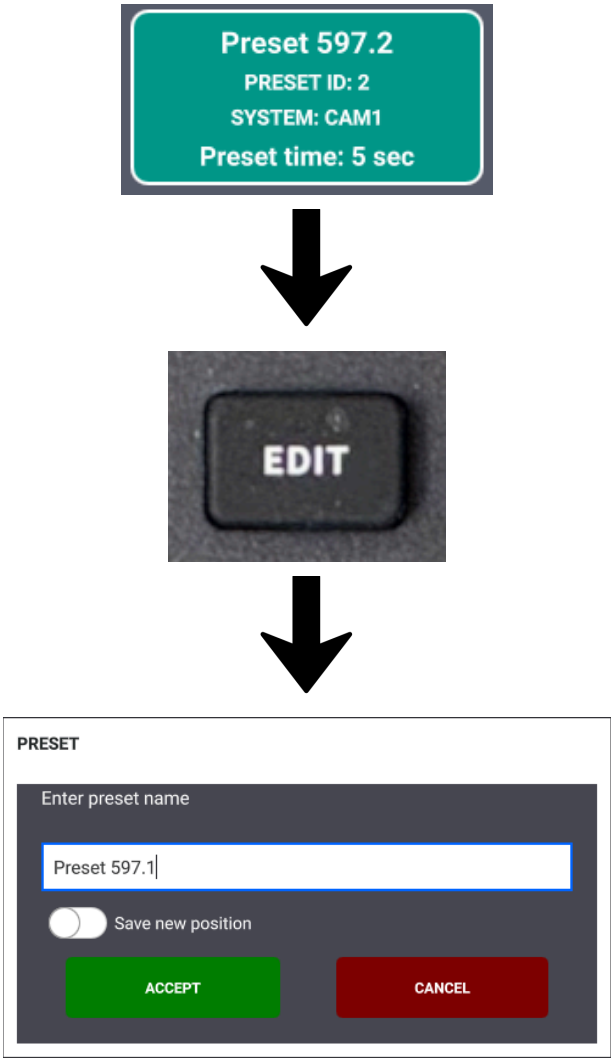


Figure 60 - Editing preset process

In this dialog we can edit preset name but also we can edit preset positions. Editing preset position can be achieved by checking Save new position switch, which will in turn save current axes positions instead of old ones for that preset. Note that the new axes positions will be saved only if they are toggled on in the Include Axes in preset section.

6.5. Delete presets

In order to delete a preset one first needs to navigate to the Presets page in the main menu, select the preset by clicking on it on the touch-screen and then click on the Delete button on the controller (*Figure 61)*.

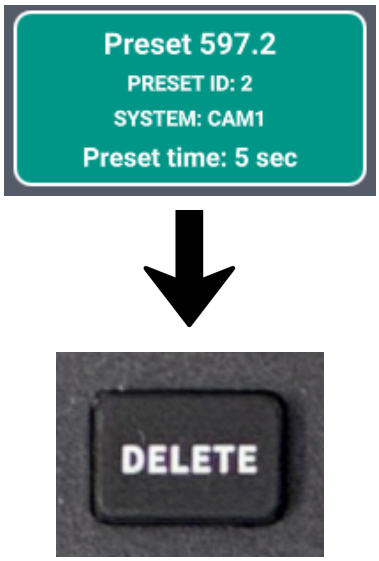


Figure 61 - Delete preset process

When a preset is deleted, multipresets and series that contain that preset will also be deleted.

6.6. Play presets

In order to play a preset one first needs to navigate to the Presets page in the main menu, select the preset and if needed adjust the preset time. Preset execution time is adjusted by selecting the preset and adjusting the time using Preset time + and preset time - buttons on the controller (*Figure 62)*.

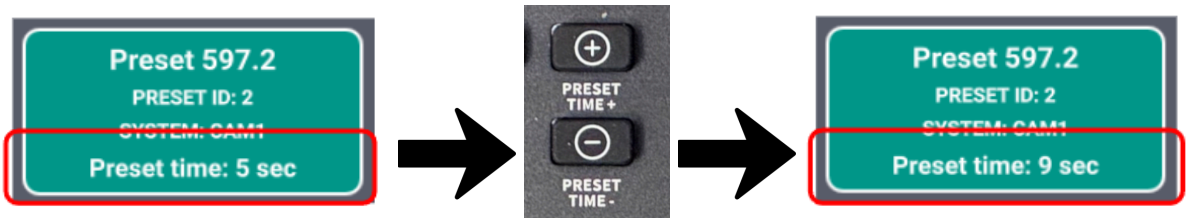


Figure 62 - Adjusting preset time process

After preset execution time is adjusted, one needs to click on the Play button on the controller in order to start executing the preset (*Figure 63)*.

Figure 63 - Executing preset process

The preset that is currently running will change color to the green color.

7. Multipresets

Multipresets are the type of advanced presets where presets can be placed in and then called together at the same time. All the presets that are part of a single multipreset will start execution together and the execution will last for the time specified for that multipreset. This feature is very useful for some cases where some or all cameras should be moved to specific next positions at the same time. *Figure 64* gives the overview of the Multipreset page.

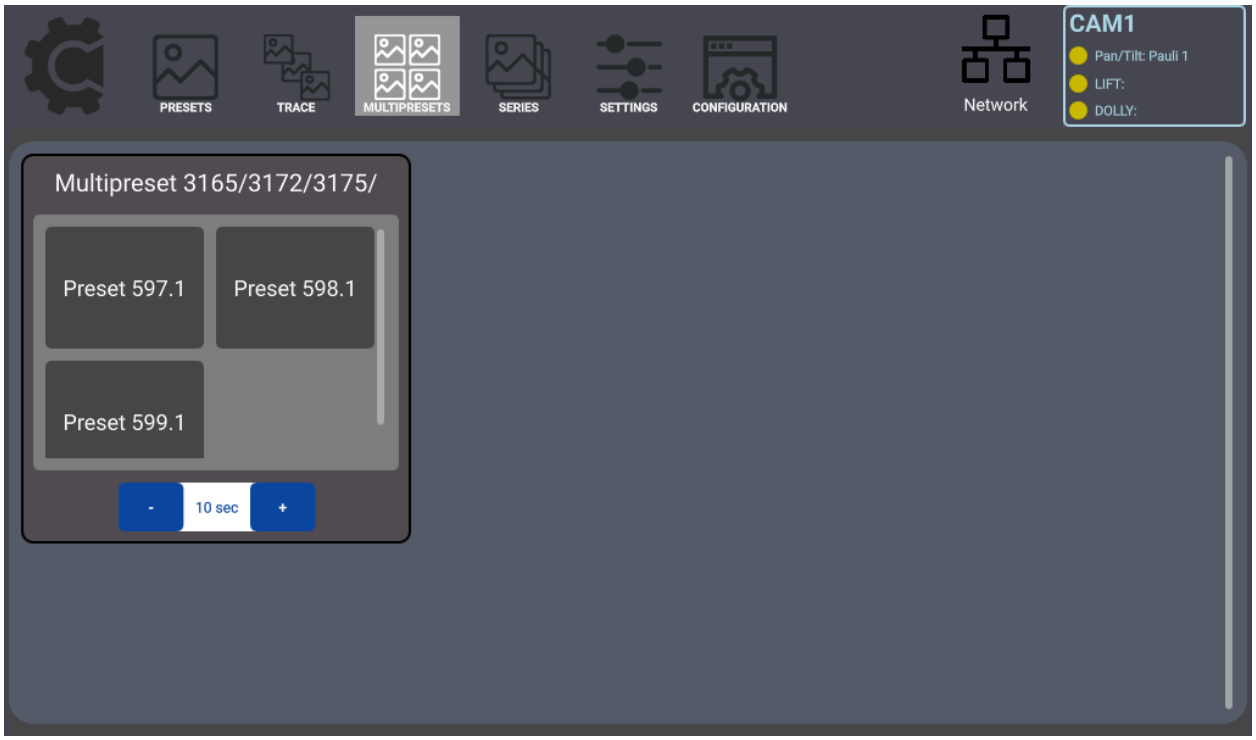


Figure 64 - Multipresets page overview

7.1. Multipreset list view

Multipreset list view is used to show all multipresets that are currently saved on the controller. Multipresets are arranged in a grid.

Figure 65 - Multipresets list view

Below is the image of a single multipreset instance.

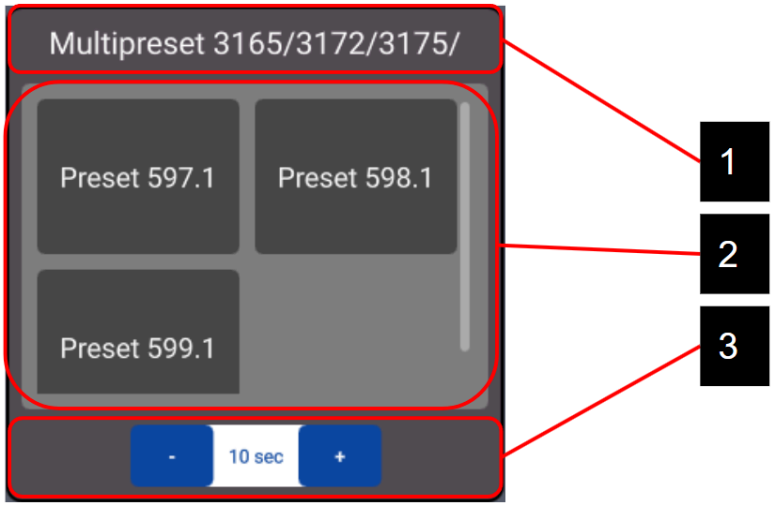


Figure 66 - Single multipreset instance

Marked by numbers are following:

1 - Multipreset name

2 - List of the presets that are included in the multipreset.

3 - Multipreset execution time

7.2. Create multipreset

In order to create a multipreset one first needs to navigate to the Multipresets page in the main menu and click on the Create button on the controller. After that dialog for creating multipreset will appear (*Figure 67)*.

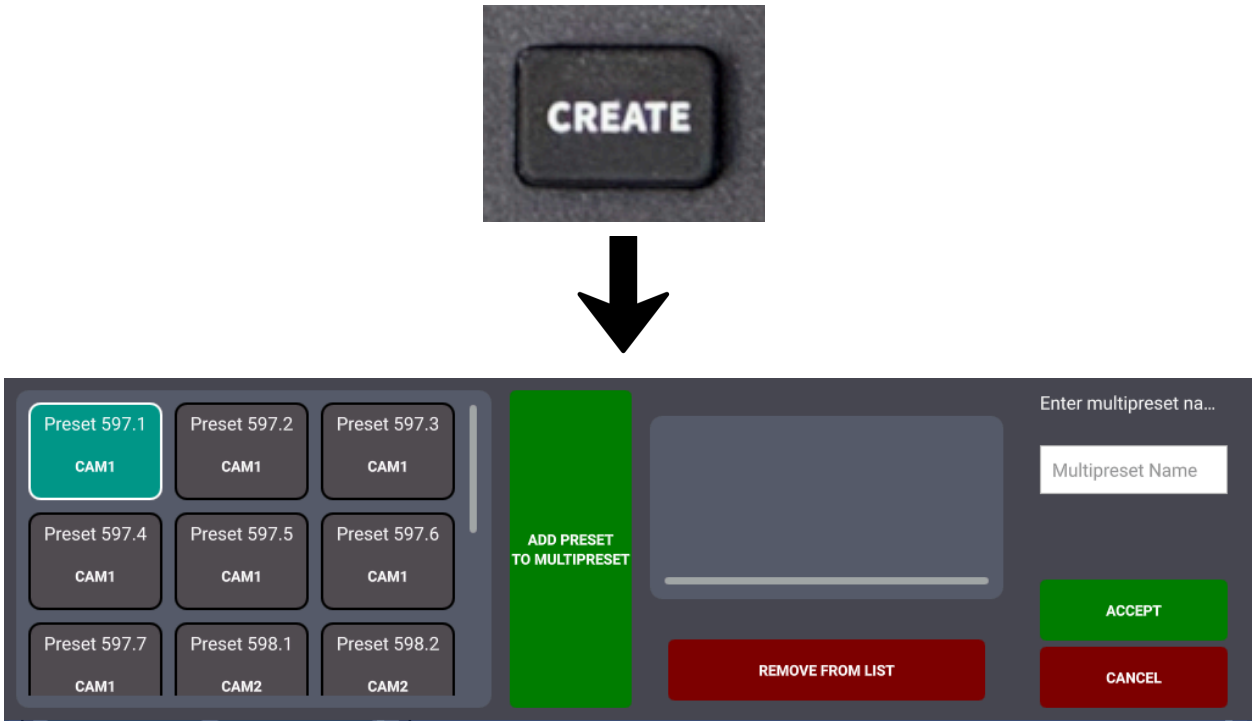


Figure 67 - Create multipreset dialog

Preset can be added to the list by selecting it and clicking on Add preset to Multipreset button (*Figure 68*).

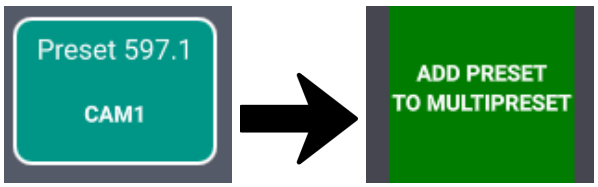


Figure 68 - Adding preset to the list

Preset can be removed from the list by selecting it and clicking on the Remove from list button (*Figure 69)*.

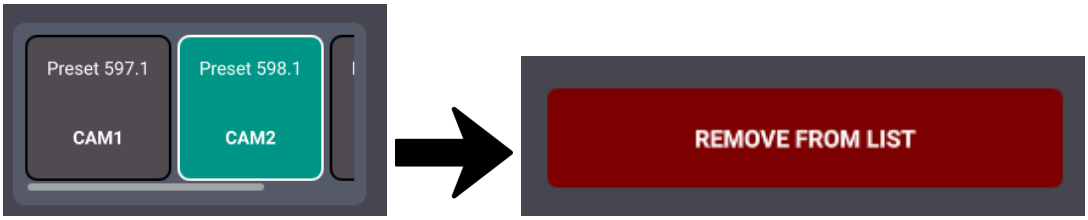


Figure 69 - Removing preset from the list

When one is finished with adding presets to the Multipreset one can click on the Accept button to create the multipreset.

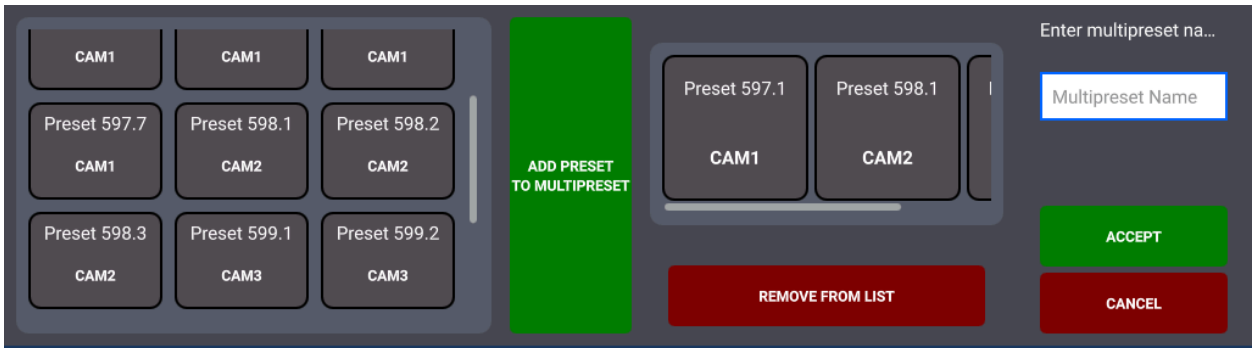


Figure 70 - Finishing creating multipreset

7.3. Edit multipreset

In order to edit a multipreset we first need to navigate to the Multipresets page in the main menu, select the multipreset by clicking on it on the touch-screen and then click on the Edit button on the controller, after which the edit multipreset dialog will open (*Figure 71)*.

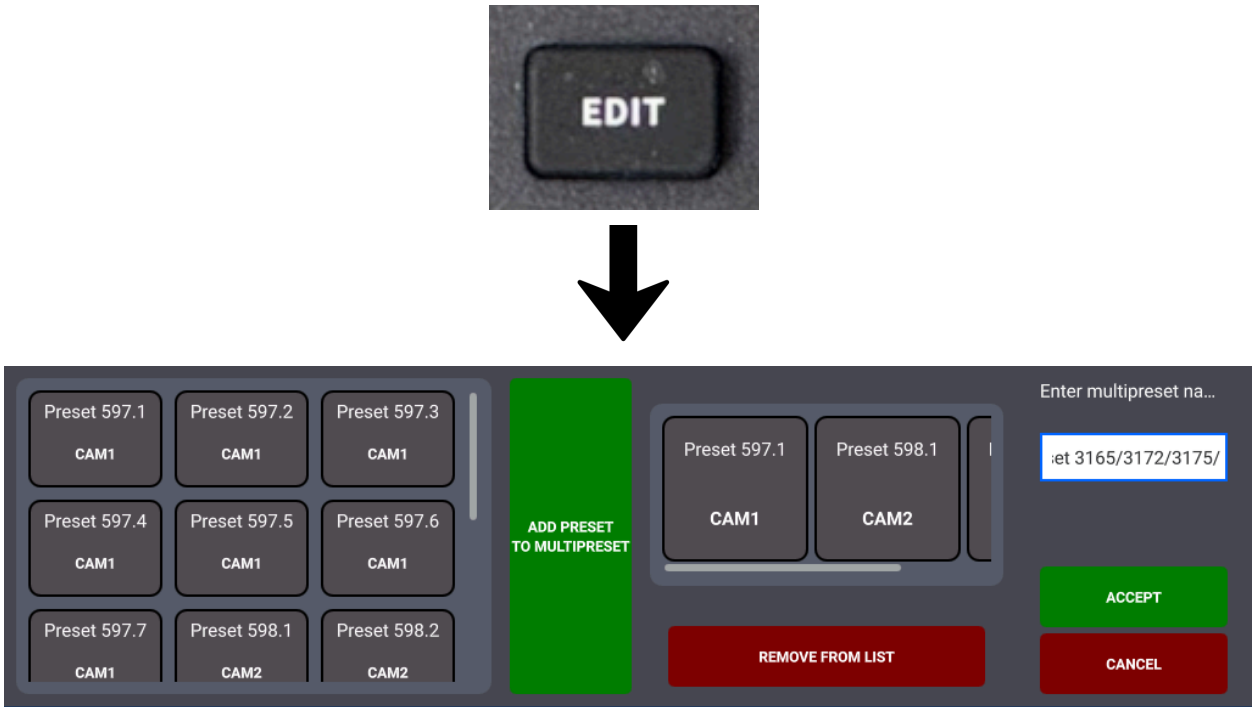


Figure 71 - Editing multipreset

Multipreset name can be changed and also presets can be added or removed from the multipreset. This process is explained in detail and is the same as creating a multipreset process.

7.4. Delete multipreset

In order to delete a multipreset one first needs to navigate to the Multipresets page in the main menu, select the multipreset by clicking on it on the touch-screen and then click on the Delete button on the controller (*Figure 72)*.

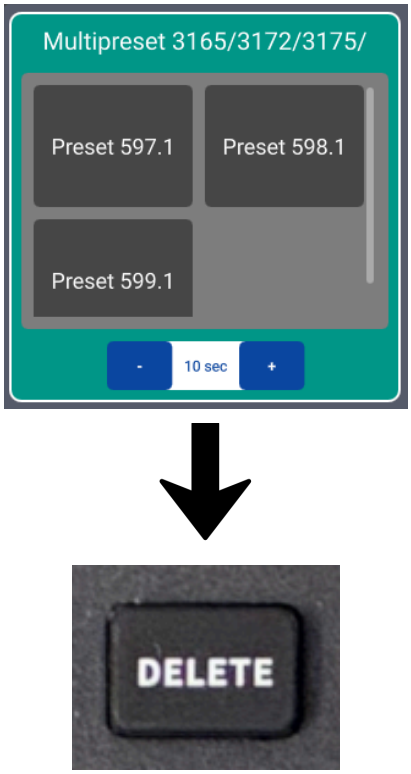


Figure 72 - Deleting multipreset

7.5. Play multipreset

In order to play a multipreset one first needs to navigate to the Multipresets page in the main menu, select the multipreset and if needed adjust the multipreset time. Multipreset execution time is adjusted by selecting the multipreset and adjusting the time by clicking or holding the plus and minus buttons at the bottom of the selected multipreset, or by clicking Preset time + and Preset time - buttons on the controller (*Figure 73)*.

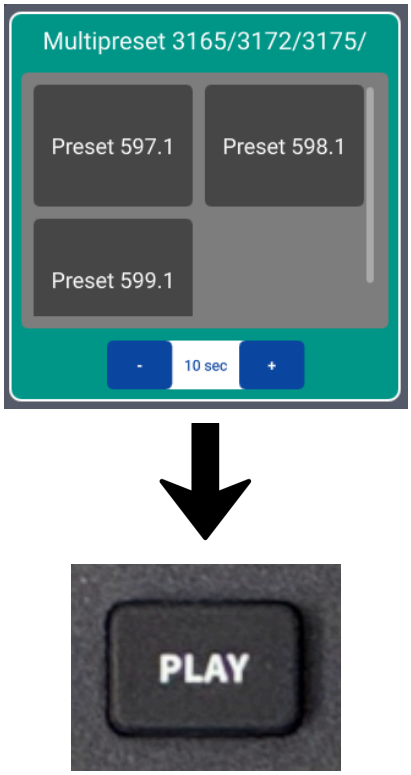


Figure 73 - Executing multipreset

8. Series

Series are the type of advanced presets that combine single presets which will be executed one after the other with times that are specified for each one of them. *Figure 74* shows the overview of the Series page.

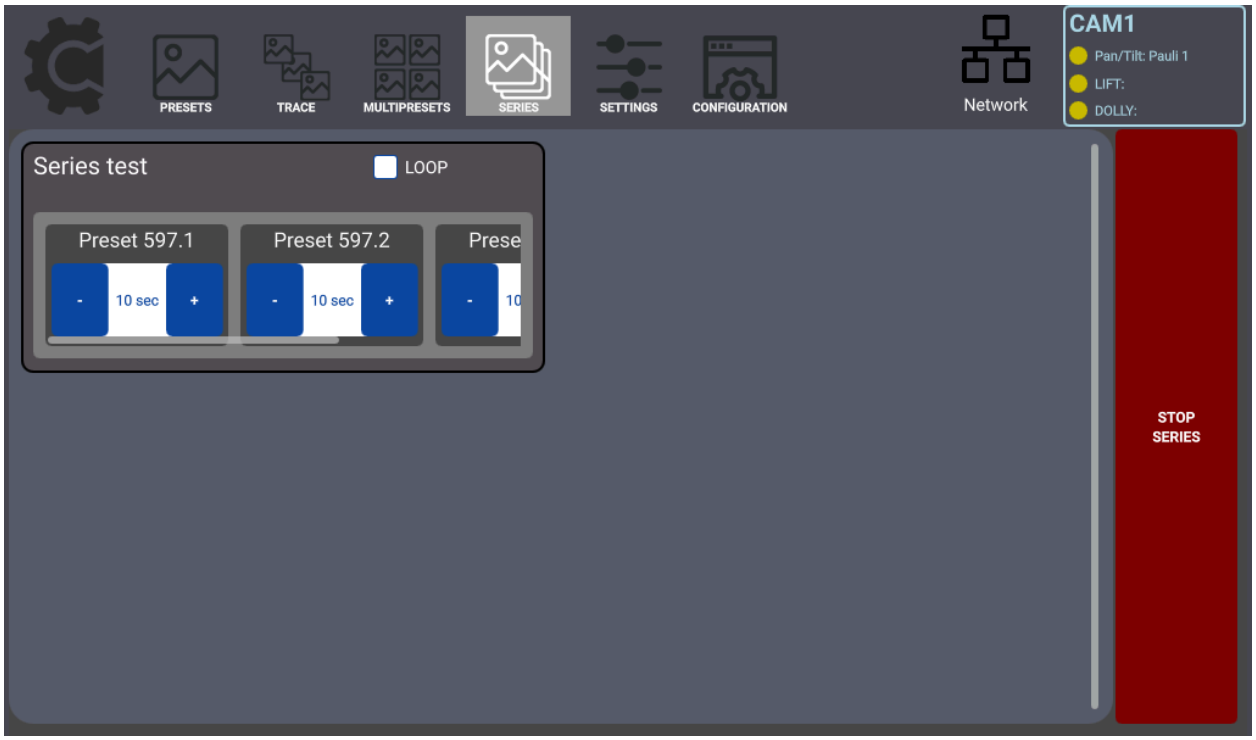


Figure 74 - Series page overview

Presets can have their duplicates inside the series. Also, series can be made with presets from only one camera or with combinations of presets from multiple cameras in any order.

8.1. Series list view

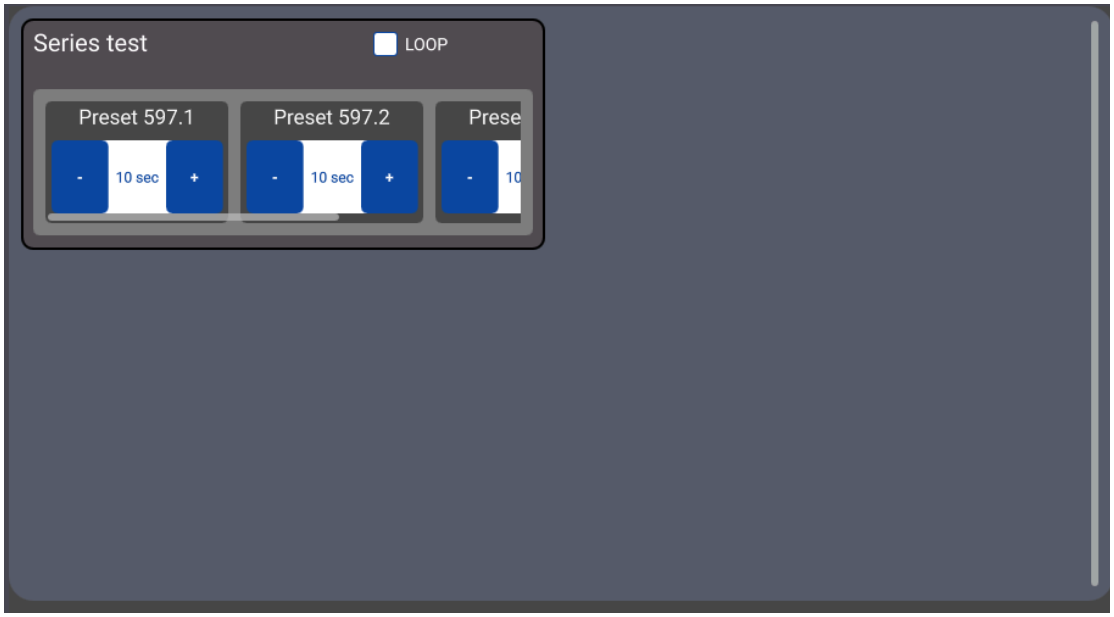


Figure 75 - Series list view

Series list view is used to show all series that are currently saved on the controller. Series are arranged in a grid.

Below is the image of a single series instance.

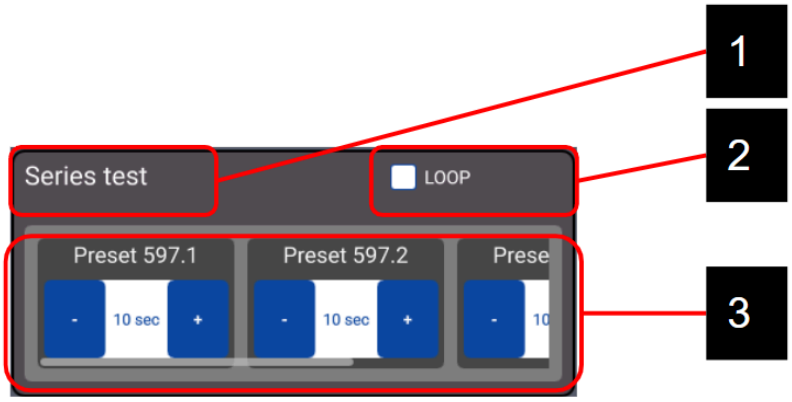


Figure 76 - Single series instance

The single series instance has its name marked by 1 in *Figure 76*. Beside the name is the loop box used for running the series in the loop marked by 2. After that is a list of the presets that are placed in that series marked by 3 in *Figure 76*. Each preset has its own time that can be adjusted by clicking/holding on the - and + buttons. Series can be selected or deselected by clicking on the series instance.

8.2. Create series

In order to create a series one first needs to navigate to the Series page in the main menu, click on the Create button on the controller. After that dialog for creating series will appear (*Figure 77)*.

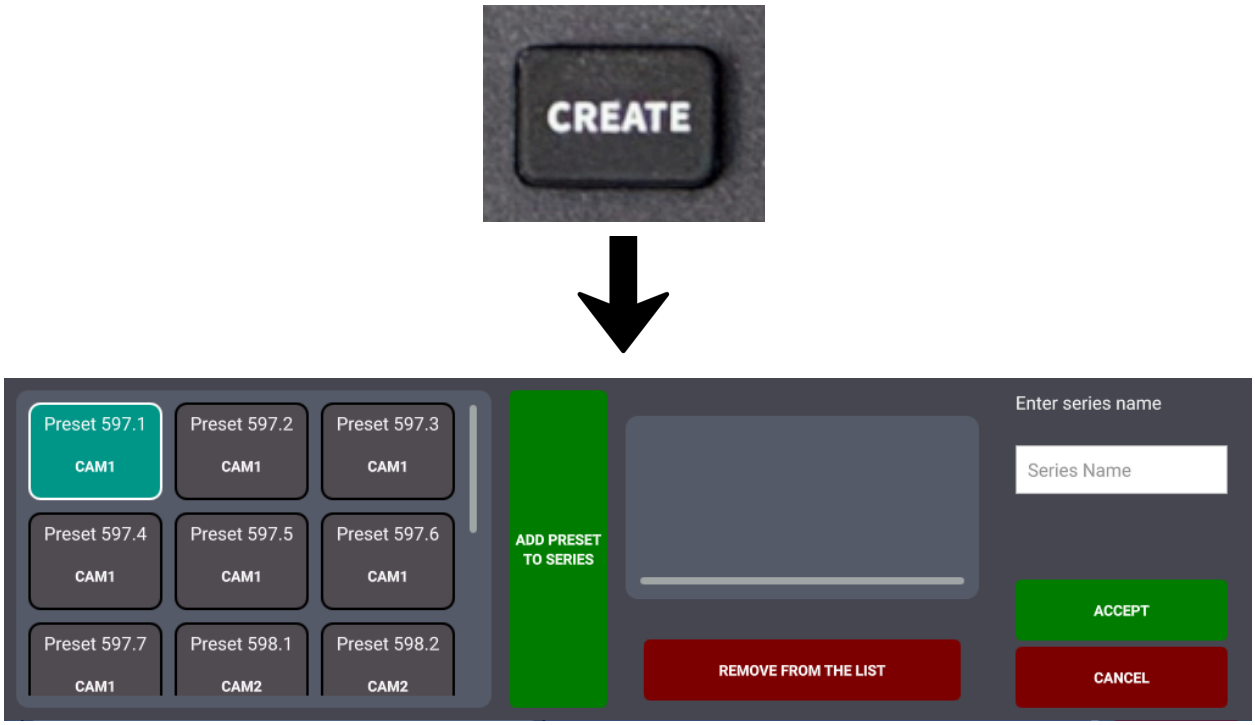


Figure 77 - Create series dialog

Preset can be added to the list by selecting it and clicking on Add preset to Series button (*Figure 78)*.

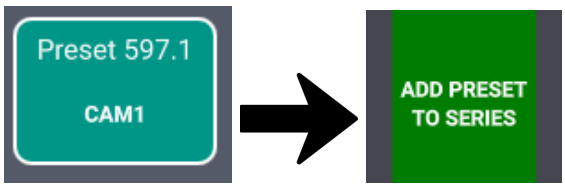


Figure 78 - Adding preset to the list

Preset can be removed from the list by selecting it and clicking on the Remove from list button (*Figure 79)*.

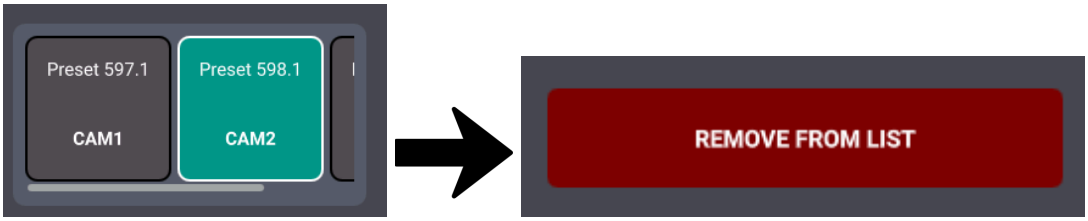


Figure 79 - Removing preset from the list

When one is finished with adding presets to the Series one can click on the Accept button to create the series.

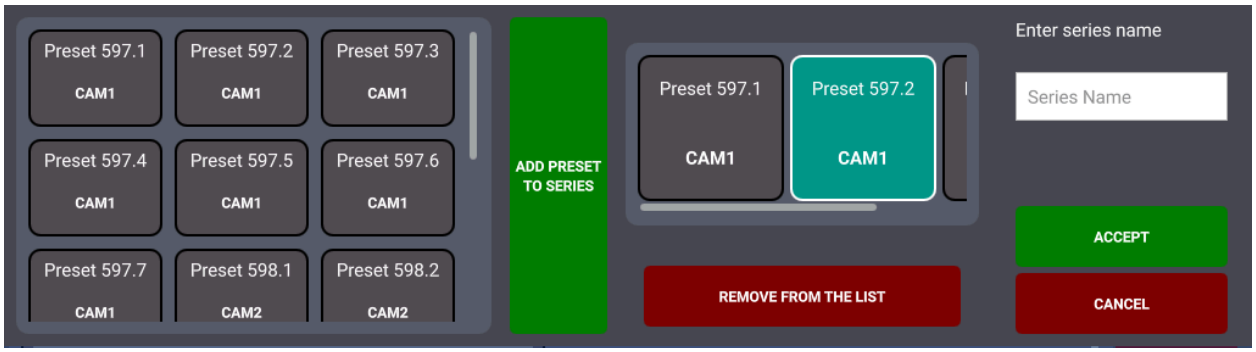


Figure 80 - Finalizing series creation

8.3. Edit series

In order to edit a series one first needs to navigate to the Series page in the main menu, select the series by clicking on it on the touch-screen and then click on the Edit button on the controller, after which the edit series dialog will open (*Figure 81)*.

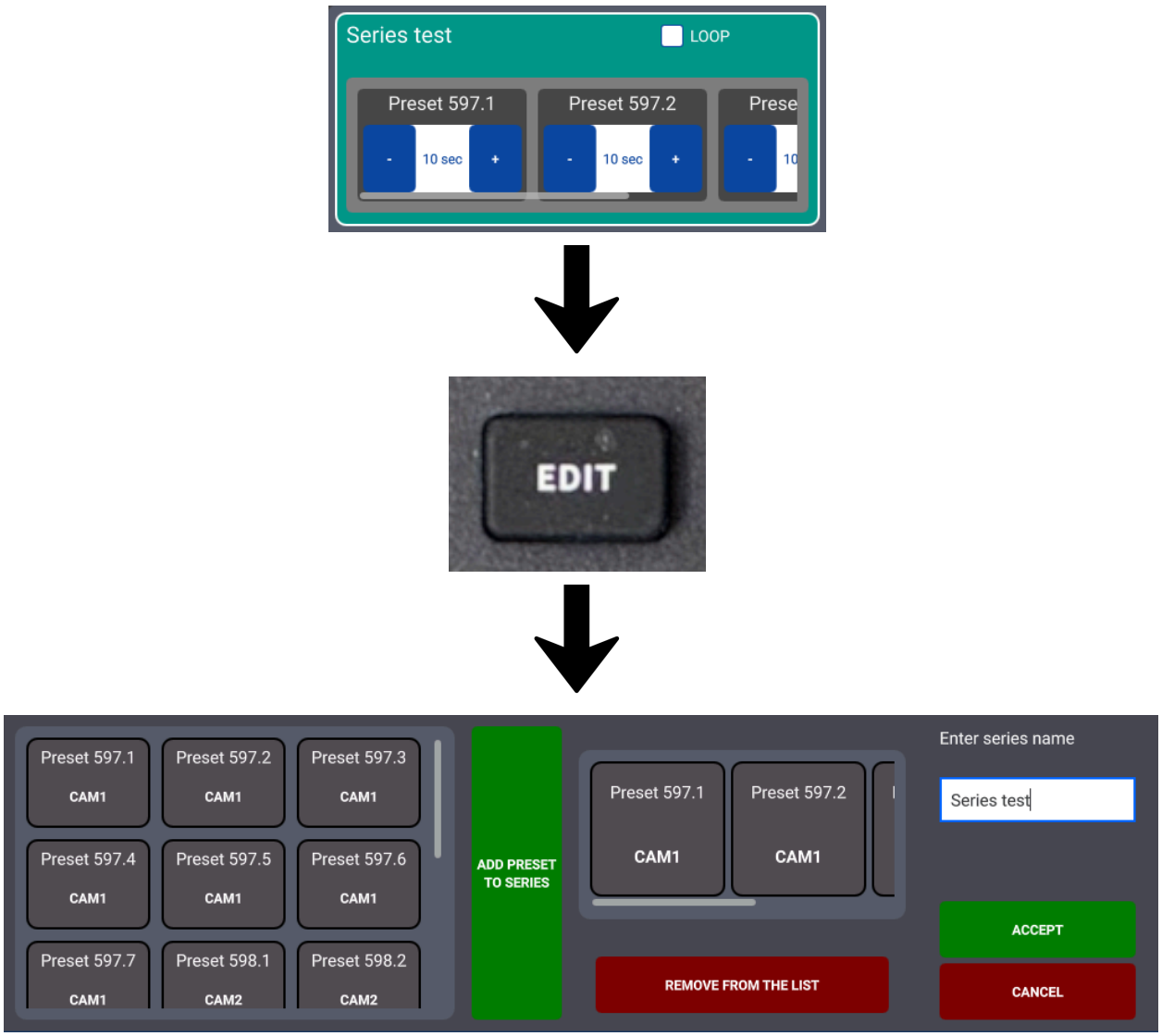


Figure 81 - Editing series

Series name can be changed and also presets can be added or removed from the series. This process is explained in detail and is the same as creating a series process.

8.4. Delete series

In order to delete a series one first needs to navigate to the Series page in the main menu, select the series by clicking on it on the touch-screen and then click on the Delete button on the controller (*Figure 82)*.

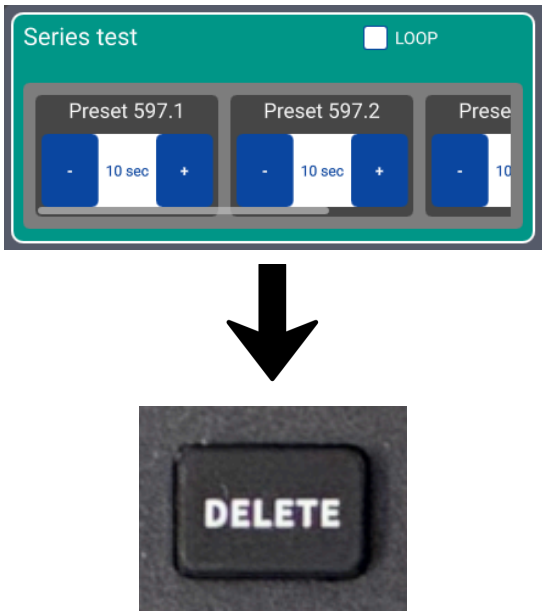


Figure 82 - Deleting series

8.5. Play series

In order to play a series one first needs to navigate to the Series page in the main menu, select the series that we want to execute, check the loop box if one wants to run the series in a loop (when the series arrives at the end it starts again from the first preset until stopped) and if needed adjust the single preset execution times. Preset execution time is adjusted by selecting the preset and adjusting the time by clicking or holding the plus and minus buttons at the bottom of each preset in the list (*Figure 83)*.

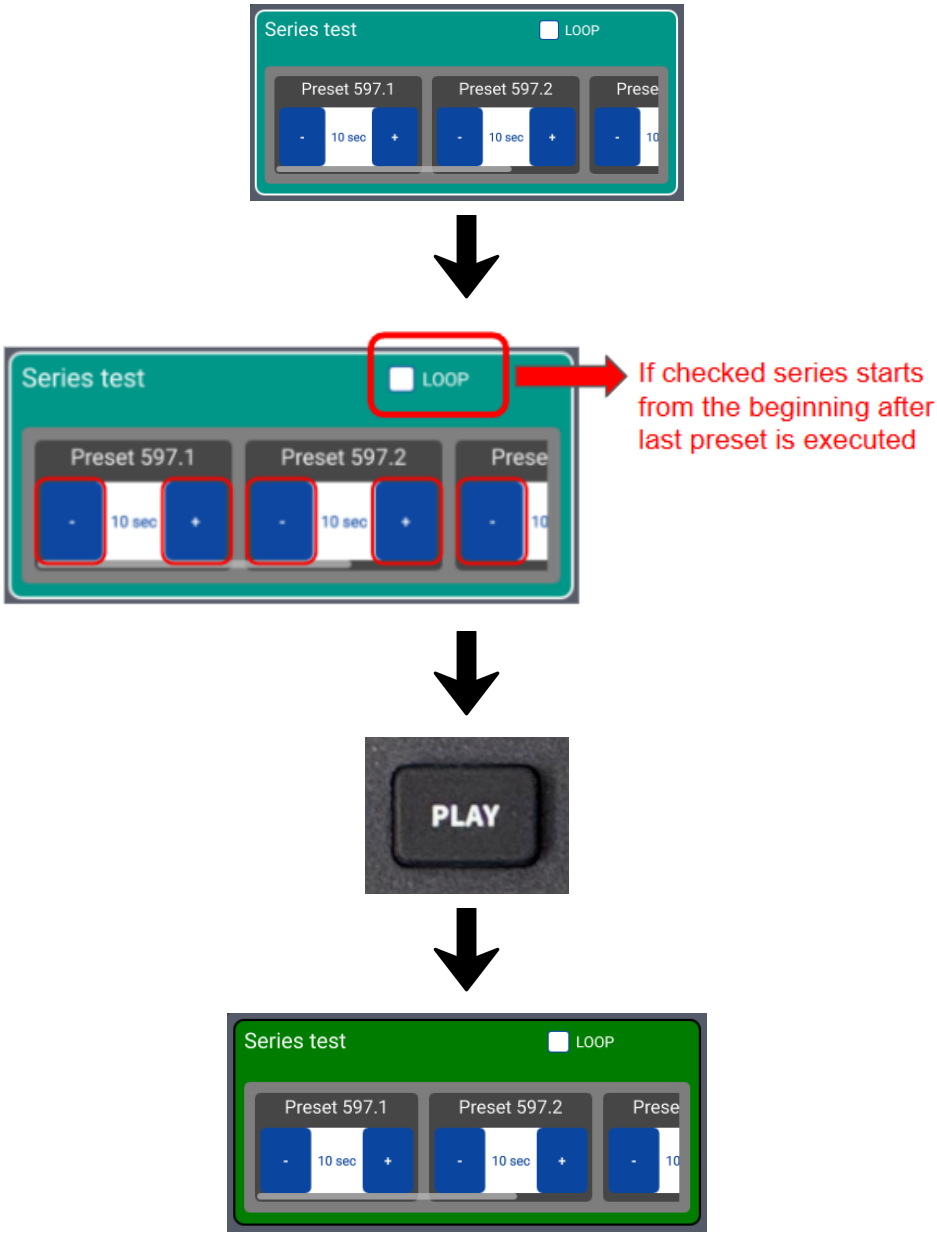


Figure 83 - Executing series

After starting, the execution series will change color to green.

8.6. Stop series

Series that are currently being executed can in any time be stopped by selecting it and clicking on the Stop Series button (*Figure 84)*.

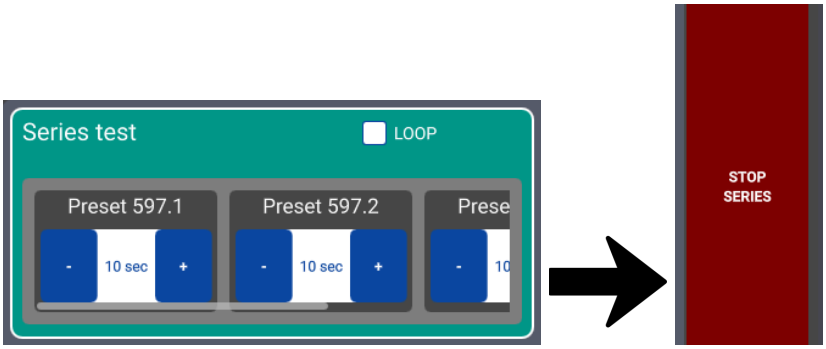


Figure 84 - Stopping series

9. Trace

Trace is an advanced type of preset that is created by recorded manual moves of the operator. These moves can later be recalled by pressing a button. This is a method where the user teaches (same as multiple teaching methods used in the robotic and automation industry) controller to create specific movements. The overview of the Trace page is given in *Figure 85*.

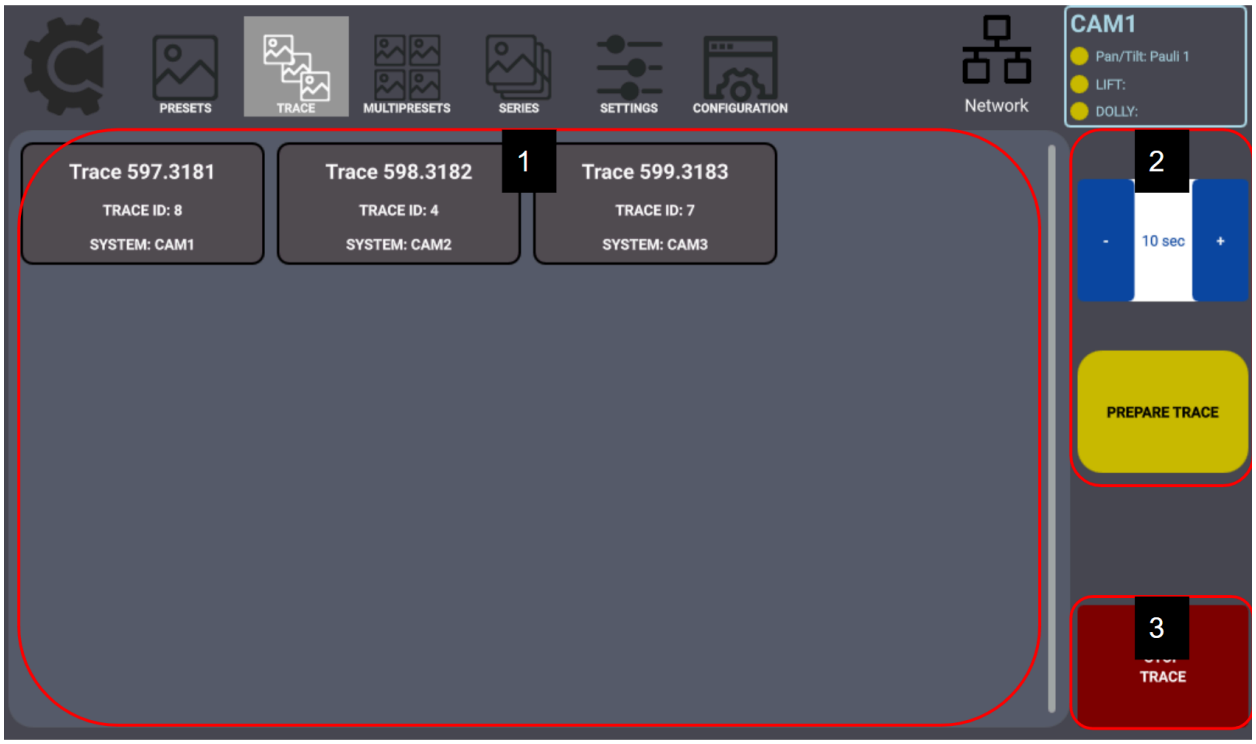


Figure 85 - Trace page overview

Marked by numbers are the following:

1 - Main part of the presets page is the list of saved presets, it occupies the central part of the page, this is explained in the Trace list view section.
2 - Prepare Trace section.
3 - Stop Trace button

9.1. Trace list view

Figure 86 - Trace list view

Trace list view is used to show all traces that are currently saved on the controller. Traces are arranged in a grid.

Below is the image of a single trace instance.

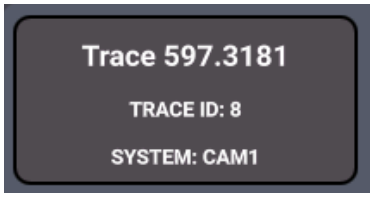


Figure 87 - Single trace instance

Each trace has its name, trace id which represents the id of the preset for the beginning of the trace and information about the control system for which the trace has been made.

9.2. Record trace

In order to create a trace one first needs to navigate to the Trace page in the main menu, click on the Trace Rec button on the controller. After clicking on the button it will change color to red and that is the indication that recording has started. This process is shown in *Figure 88*.

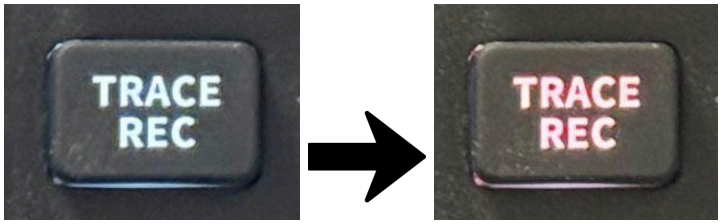


Figure 88 - Record trace button

After recording is started one can move the control system, and all inputs will be recorded. When movement is finished one needs to click on the Trace Rec button on the controller again and create dialog will appear. Trace should be given a name and the accept button should be clicked in order to create a trace (*Figure 89)*.

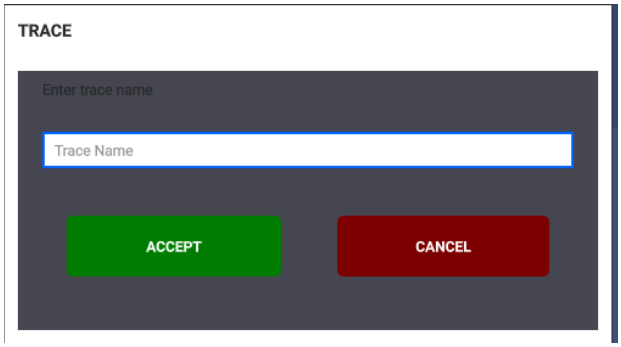


Figure 89 - Create trace dialog

9.3. Edit trace

In order to edit a trace one first needs to navigate to the Trace page in the main menu, select the trace by clicking on it on the touch-screen and then click on the Edit button on the controller, after which the edit trace dialog will open (*Figure 90)*.

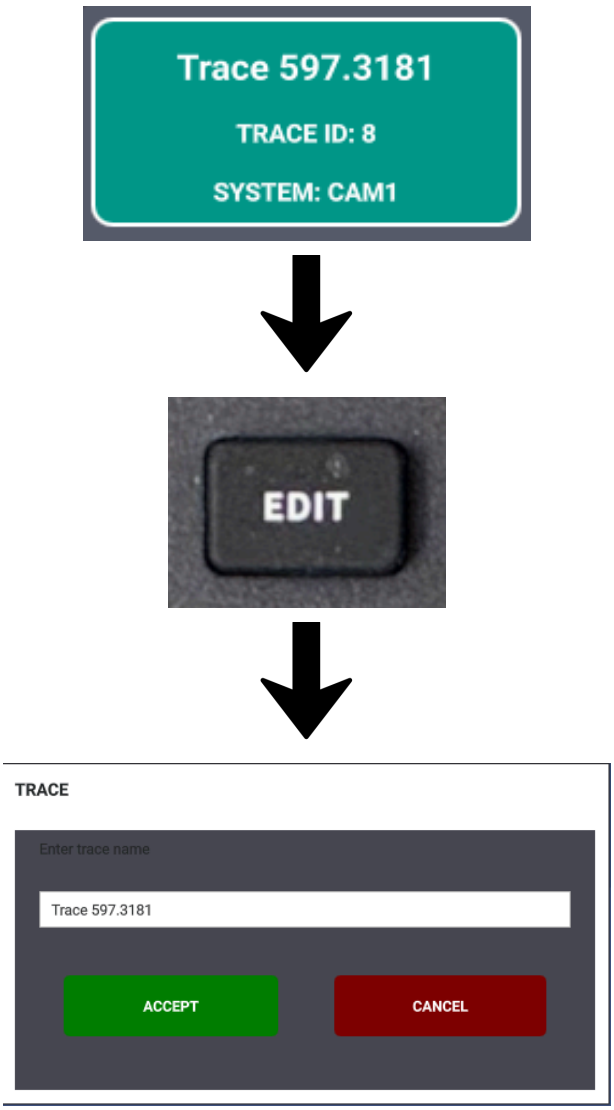


Figure 90 - Editing trace

In this dialog the only option is to change the trace name.

9.4. Delete trace

In order to delete a trace one first needs to navigate to the Trace page in the main menu, select the trace by clicking on it on the touch-screen and then click on the Delete button on the controller (*Figure 91)*.

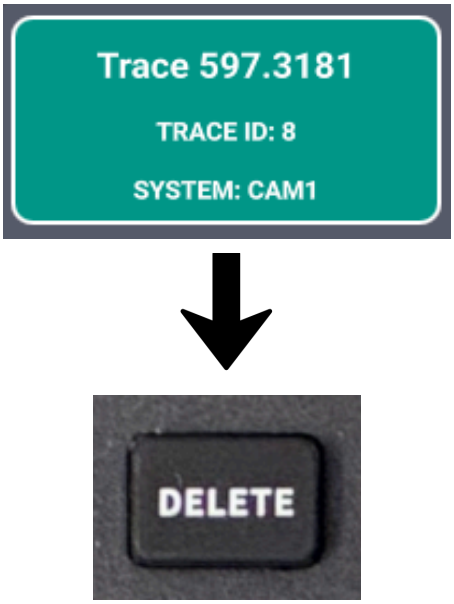


Figure 91 - Deleting trace

9.5. Prepare trace

In order to prepare a trace one first needs to navigate to the Trace page in the main menu, select the trace by clicking on it on the touch-screen and then adjust the preparation time by clicking on the + and - buttons and pressing the Prepare Trace button (*Figure 92)*.

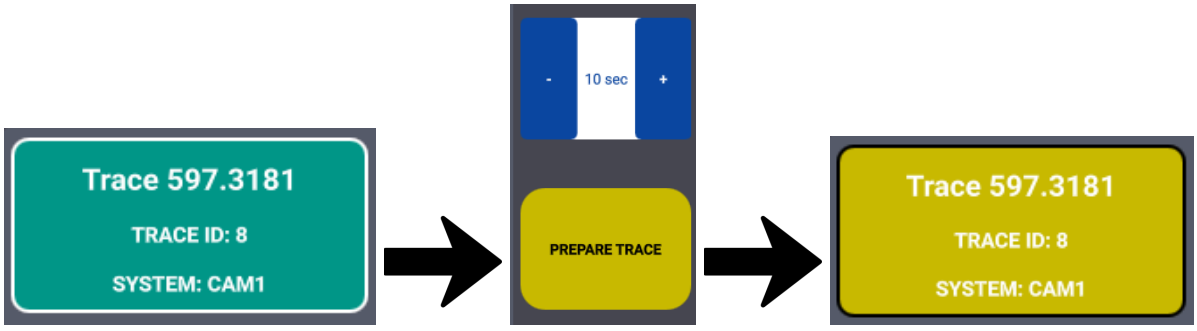


Figure 92 - Preparing trace

While preparing, the trace will change color to yellow.

9.6. Play trace

In order to play a trace one first needs to navigate to the Trace page in the main menu, select the trace that is already prepared, and press the Play button on the controller (*Figure 93)*.

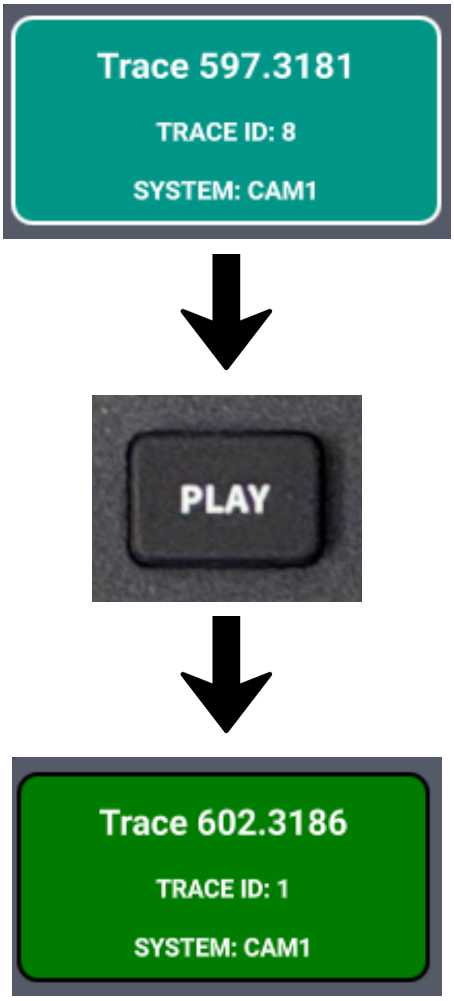


Figure 93 - Playing trace

While executing, the trace will change color to green.

9.7. Stop trace

Trace that is currently being executed can in any time be stopped by selecting it and clicking on the Stop Trace button (*Figure 94)*.

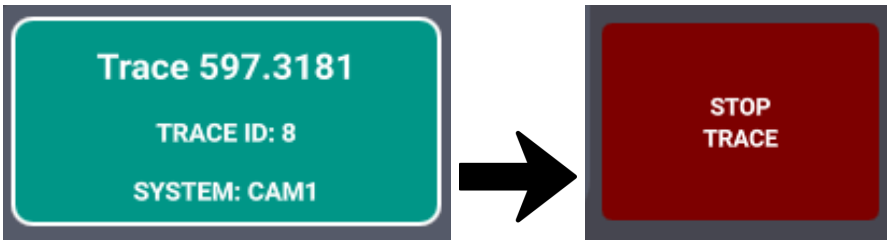


Figure 94 - Stopping trace

10. Settings page

The settings page is used to call actions for specific devices such as calibrating dollies and sliders, resetting communication, configuring the device itself or opening image control windows.

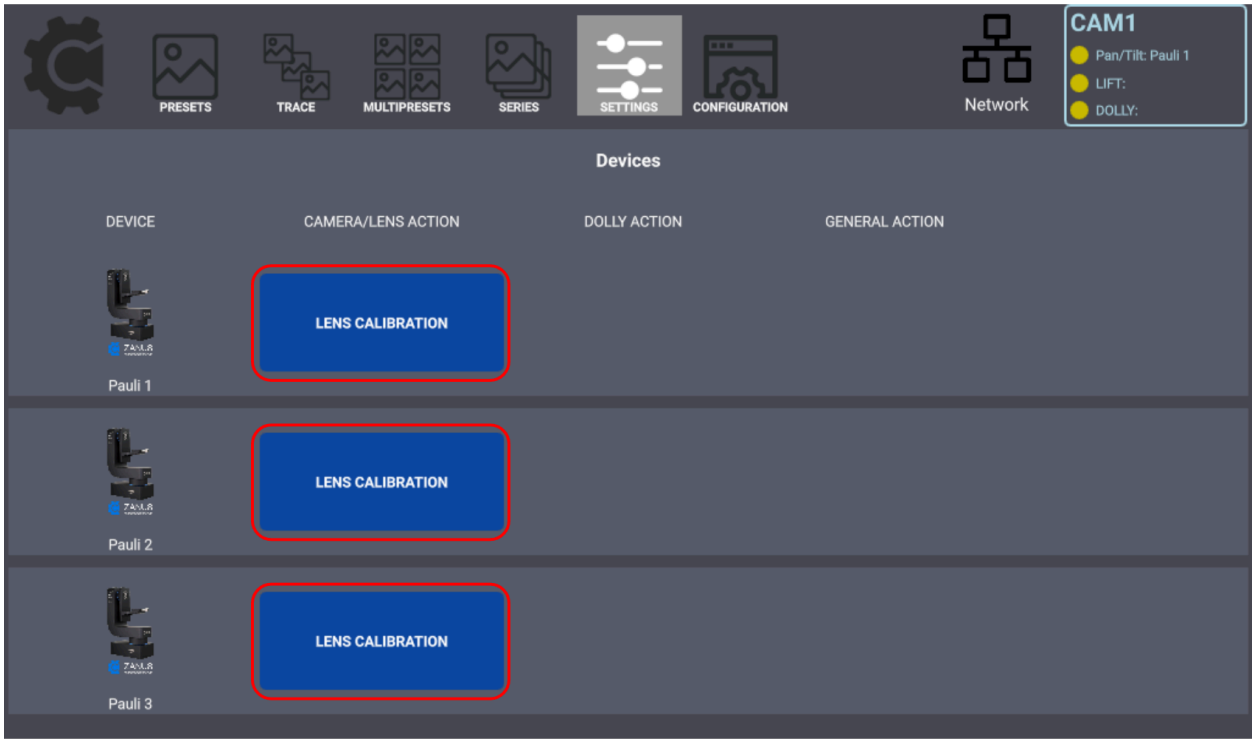


Figure 95 - Settings page overview

10.1. Device actions

In the following sections we will go through all available actions that are currently available in the RoboStick and explain them. Keep in mind that in the future new actions may be added.

10.1.1. Reset communication action

Figure 96- Reset communication button

The reset communication button is used to reset the communication (usually TCP communication) between RoboStick and a physical device that is controlled by the controller. In order to reset communication, users need to click on this button. This button is depicted in *Figure 96*.

⚠ *Note that when the device doesn't have any case of communication handshake as in for example UDP communication this button will not be visible.*

10.1.2. Lens calibration action

Figure 97- Lens calibration button

Lens calibration button is used when certain lens types, or lens control systems that are controlled by Zanus Robotic Pan tilt heads have the option of calibration at the start of the workflow. In order to start lens calibration, users need to click on this button. This button is depicted in *Figure 97*.

10.1.3. Dolly calibration action

Figure 98- Dolly calibration button

Dolly calibration button is used when a dolly or slider needs calibration at the start of the workflow. In order to start dolly calibration, users need to click on this button. This button is depicted in *Figure 98*.

10.1.4. Device config action

Figure 99- Device config button

Device config button is used when a controlled device can be configured with the controller. This configuration depends on the device type and manufacturer. The device config button is depicted in *Figure 99*.

10.1.5. Save preferences action

Figure 100 - Save preferences button

Save preferences button is used when one wants to save preferences for sensitivities and axis control direction inversion for the controller. In order to save the preferences one needs to click on this button. The preferences that are mentioned above will be saved and will load automatically on the next startup of the controller.

10.1.6. Image control action

Figure 101 - Save preferences button

Image control button is used to open a window for Image control for the Camera device or PTZ camera. The image control window will look different depending on the specific manufacturer and device model. Below is one possible look of the image control button.

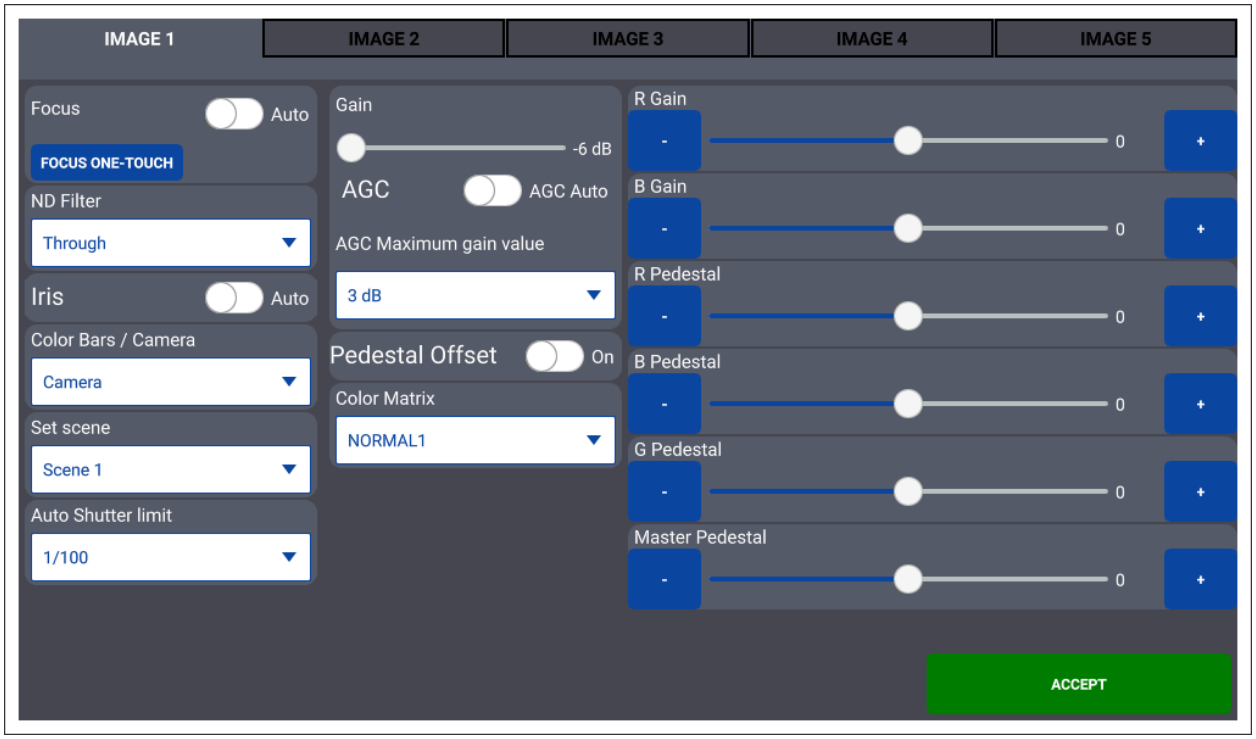


Figure 102 - Image control window

In this window one can change image properties that are available for that specific model of the camera. All image properties have values and names according to the manufacturer's protocol and documentation.

⚠ *For detailed information about what image properties can be controlled and how, please refer to manufacturer's documentation for specific device models.*

11. Configuration

The configuration page is used to configure the RoboStick controller. In the following sections we will go over every section on this page in detail.

Figure 103 - Configuration page overview

Selections marked by numbers are following:

1 - Control systems tab used for configuring controllable systems that are made from added devices.

2 - Devices tab used for configuring devices that will be controlled.

3 - Video tab used for configuring video monitors for displaying video output.

11.1. Control systems section

The control system section of the Configuration page is used to set up and configure control systems that the user wants to control.
In this section we can see a list of control systems that are controlled with the controller. Every system has its name, SDI input slot, video monitor on which stream from that system is

displayed, and system parts. Control system parts are separated in four categories as shown in *Figure 104*.

Figure 104 - Examples of control system parts

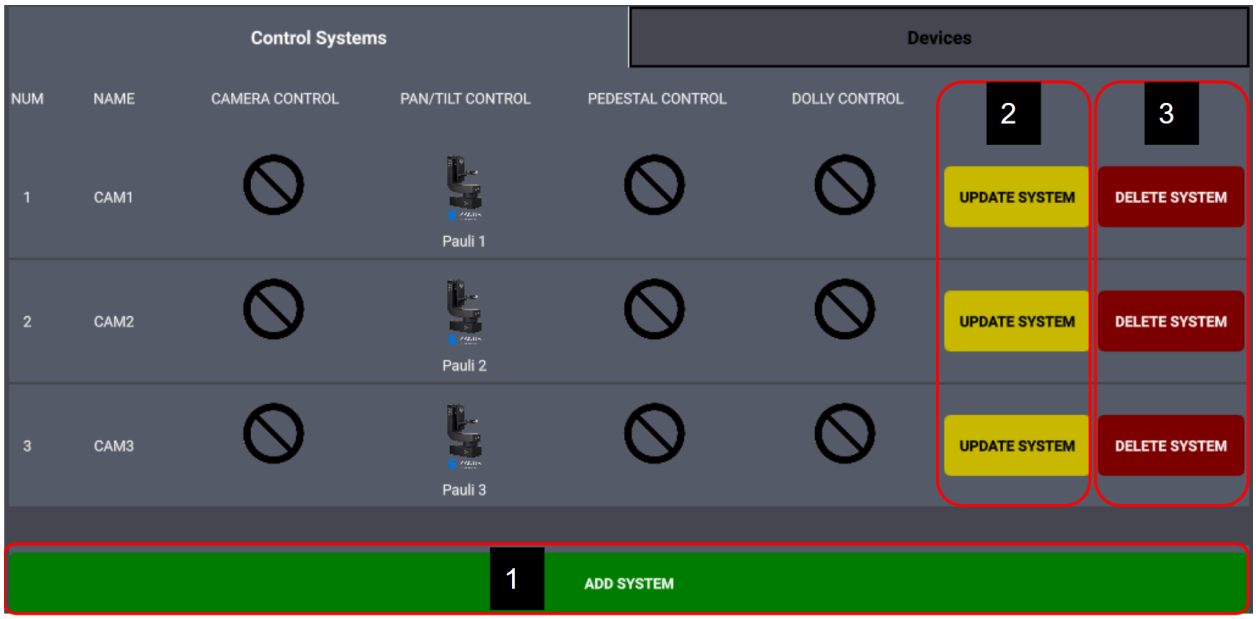


Figure 105 - Control systems tab overview

Selections marked by numbers in *Figure 105* are following:

1 - Add system button

2 - Update system button

3 - Delete system button

We will go through each functionality in the following sections.

11.1.1. Add system button

Control systems can be created by clicking on the add system button.

⚠ *Note that in order for a device to be included in the control system that is being created, it should already be added to the controller, more on this in the Devices section.*

⚠ *Note that the user is responsible for physical configuration of the system so that the RoboStick control system configuration will be an exact representation of the physical system. For example if the system to be controlled is a PTZ camera on a dolly, the user needs to place the PTZ camera physically on the dolly and after that configure them as a system in RoboStick*

.

Figure 106- Add system button

When the Add system button is clicked the following dialog depicted in *FIgure 107* will appear.

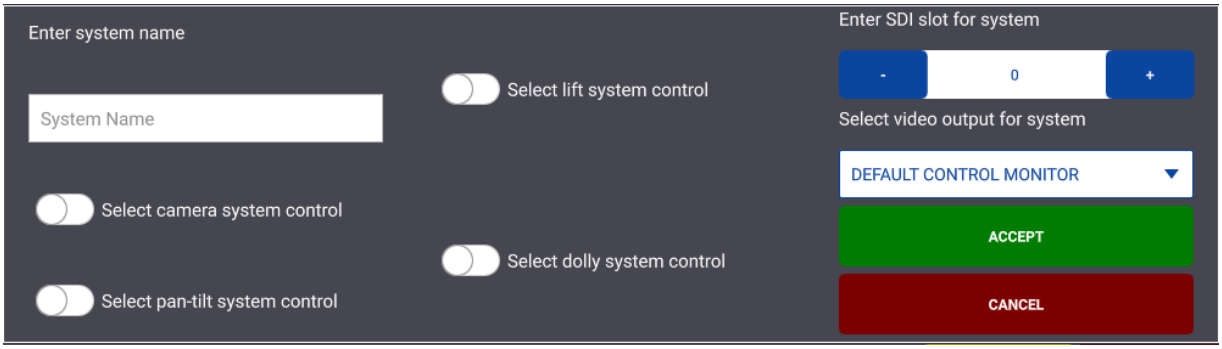


Figure 107 - Add system dialog

The first thing to do is to name the control system. The name of the system is going to be visible on the touch-screen (*Figure 108)*.

Figure 108 - System name

Next video output for the system can be selected. This should be the video output of the device SDI switching device to which the video stream coming from this control system should be streamed. If RoboStick is controlling the SDI matrix, then when the user changes the active camera, the video feed on the video output device (monitor) will change to the video feed from

that system (*Figure 109)*. For detailed explanation about how RoboStick works with SDI Router and output monitor please refer to Using RoboStick with SDI Router and output monitor section.

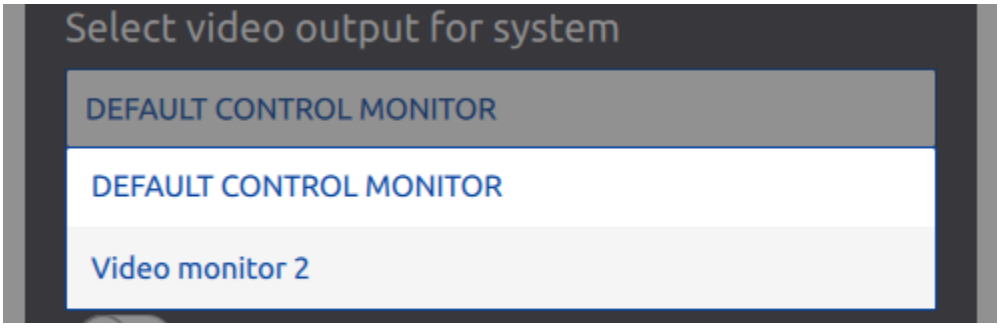
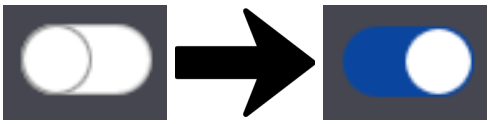


Figure 109 - Video output

Next camera system control can be configured. To enable this type of control for the system one first needs to check the switch next to the Select camera system control label. This will display the dropdown menu from which to choose camera control. This control type can also be skipped if the switch remains unchecked.



Now one can choose camera control from that menu. For the cameras that have support in the RoboStick zoom, focus, iris and image properties can be controlled (*Figure 110)*.

⚠ *Note that the user is responsible for correctly setting up the camera, its IP address and other settings if necessary which is explained in detail in the Devices section of this document.*

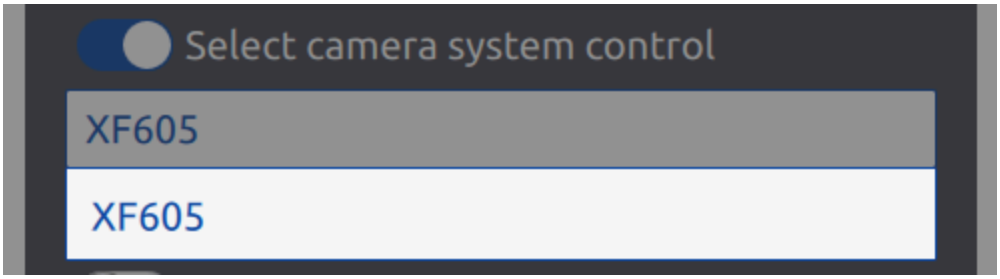
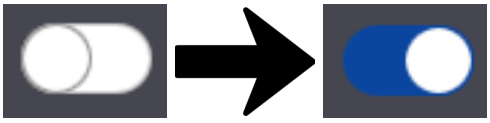


Figure 110 - Camera control

Next pan-tilt control for the control system can be configured. To enable this type of control one first needs to check the switch next to the Select pan-tilt system control label.This control type can also be skipped if the switch remains unchecked.



Now pan-tilt control from the dropdown menu can be chosen. Pan-tilt control includes pan-tilt heads and PTZ cameras.

⚠ *Note that the user is responsible for correctly setting up the pan-tilt device, its IP address and other settings if necessary which is explained in detail in the Devices section of this document.*

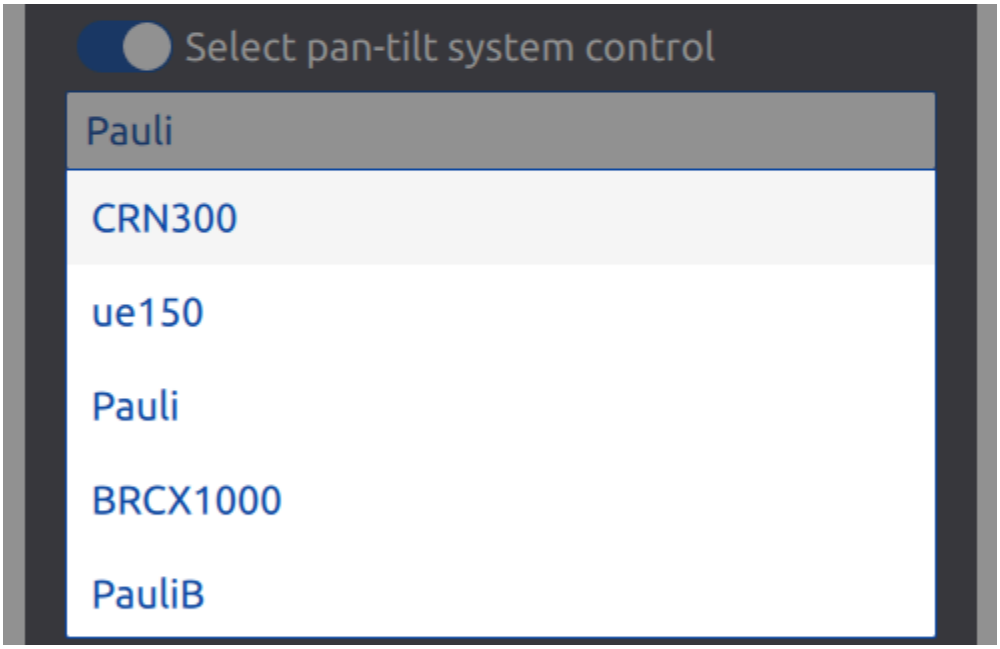
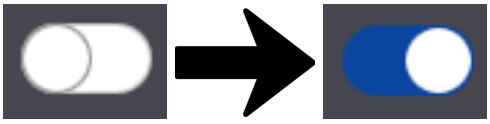


Figure 111 - Pan-TIlt control

Next lift control for the control system can be configured. To enable this type of control the switch next to the Select lift system control label should be checked. This control type can also be skipped if the switch remains unchecked.



Now the lift control device can be chosen from the dropdown menu.

⚠ *Note that the user is responsible for correctly setting up the lift device, its IP address and other settings if necessary which is explained in detail in the Devices section of this document.*

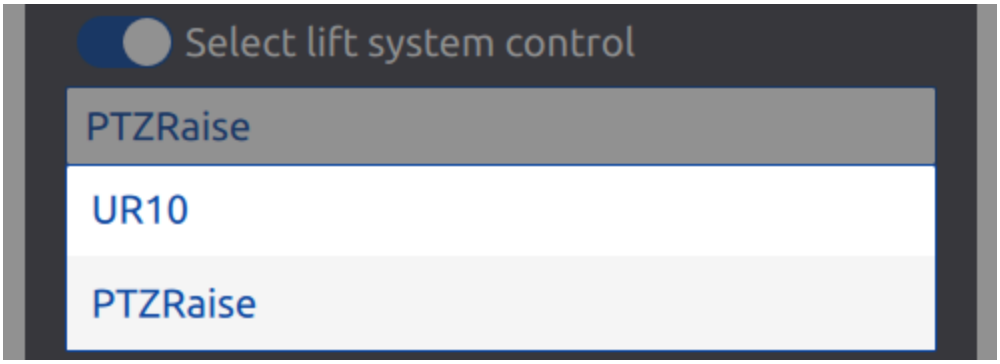
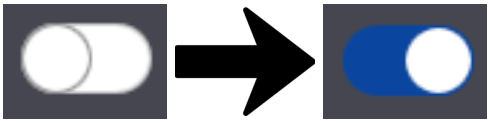


Figure 112 - Lift control

Next dolly control for the control system can be configured. To enable this type of control the switch next to the Select dolly system control label should be checked.This control type can also be skipped if the switch remains unchecked.



Now the dolly control device can be chosen from the dropdown menu. Dolly control includes motorized dollies and sliders.

⚠ *Note that the user is responsible for correctly setting up the dolly device, its IP address and other settings if necessary which is explained in detail in the Devices section of this document.*

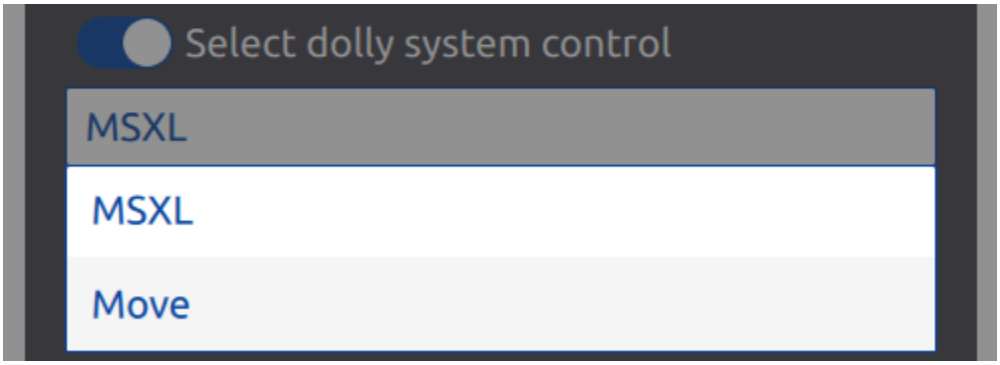


Figure 113 - Dolly control

11.1.2. Update system button

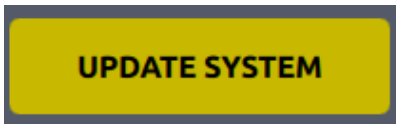


Figure 114- Update system button

Updating the control system is done by clicking on the yellow Update System button. The process is the same as creating a new system. The dialog will appear in which the user can adjust every aspect of the system.

⚠ *Note that in order for a device to be included in the control system that is being created, it should already be added to the RoboStick - more on this in the Devices section.*

⚠ *Note that the user is responsible for the correct physical configuration of the system and its parts and their IP addresses and other settings if necessary which is explained in detail in the Devices section of this document.*

11.1.3. Delete system button

Figure 115- Delete system button

Deleting the control system is done by clicking on the red Delete System button. Deleting the system will result in deleting the complete configuration of that system. Devices that were included in the system will remain as part of the RoboStick. If we also want to delete the devices that are part of the system one needs to refer to the Device section of this document.

11.2. Device section

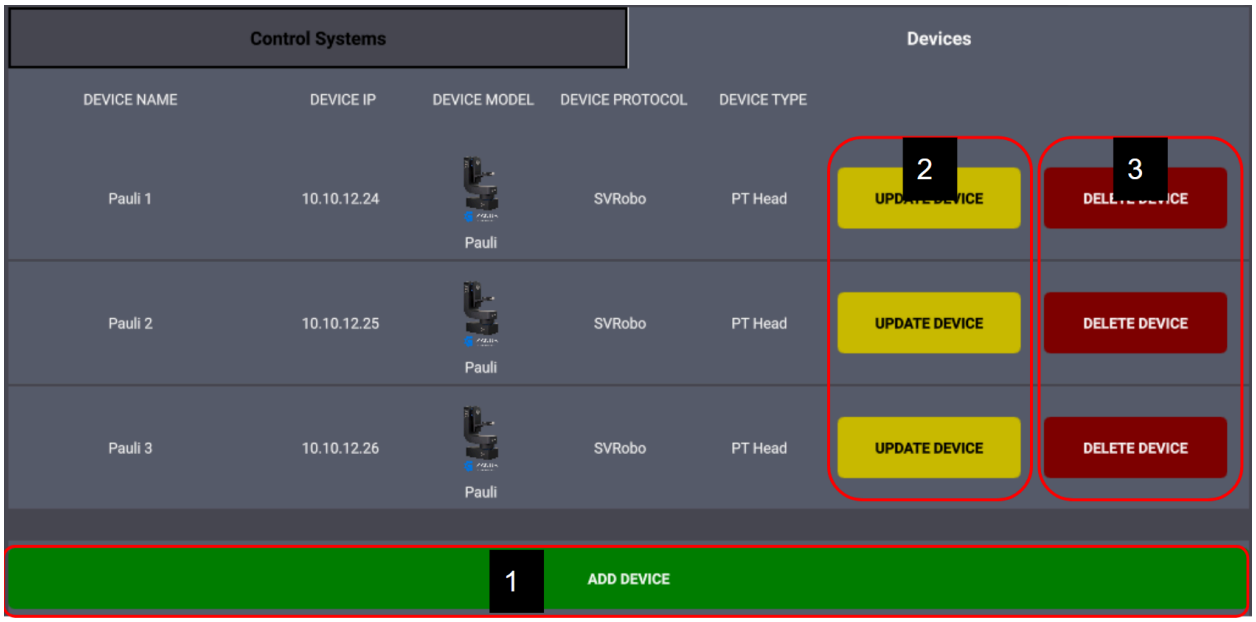


Figure 116 - Devices tab overview

In order to be able to control various devices with RoboStick they need to be added and configured in the Devices section of the controller. Some device types like pan-tilt heads, PTZ cameras, motorized dollies and lifts can be a part of the control system so we can move them and set the desired camera shot. Other devices such as SDI routers can be used to switch video streams, and some others can be controlled in some other way. In this section of the Configuration page we can view all devices that are added to the controller, we can add new devices, or update and delete existing devices. We are going to go through each option and also device types that are currently available.
Selections marked by numbers in *Figure 116* are:

1 - Add device button

2 - Update device button

3 - Delete device button

11.2.1. Add device button

Figure 117- Add device button

Adding devices can be done by clicking on the Add Device button on the bottom of devices section. The add device dialog will appear (*Figure 118)*

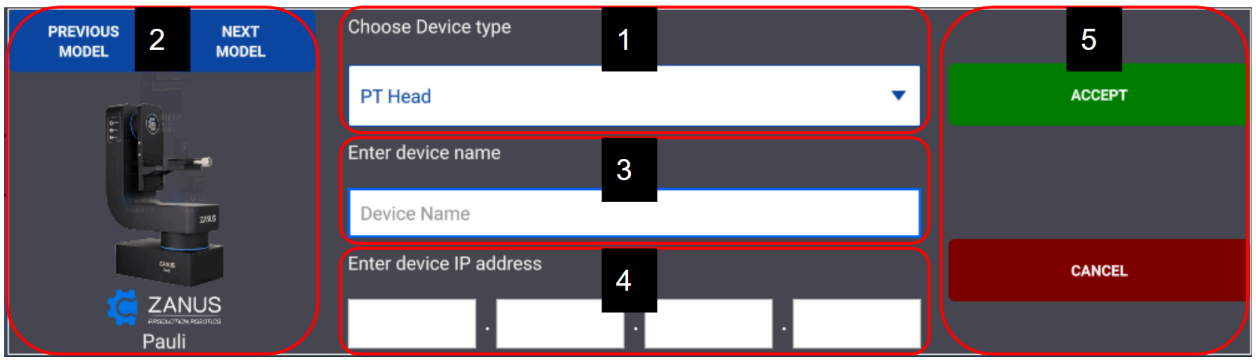


Figure 118 - Add device dialog

Selections marked by numbers in *Figure 118* are:

1 - Dropdown options for selecting device type
2 - Device model picker
3 - Device name field
4 - Device IP fields
5 - Accept and cancel buttons

We can give the device a name and assign the IP address that it has.

⚠ *Note that IP address needs to be unique, and also IP on the device itself needs to be the same as the IP address that we enter here.*

After that, the device type should be chosen. All device types and device models that are currently supported by the RoboStick controller are shown inside the dropdown on the following image.

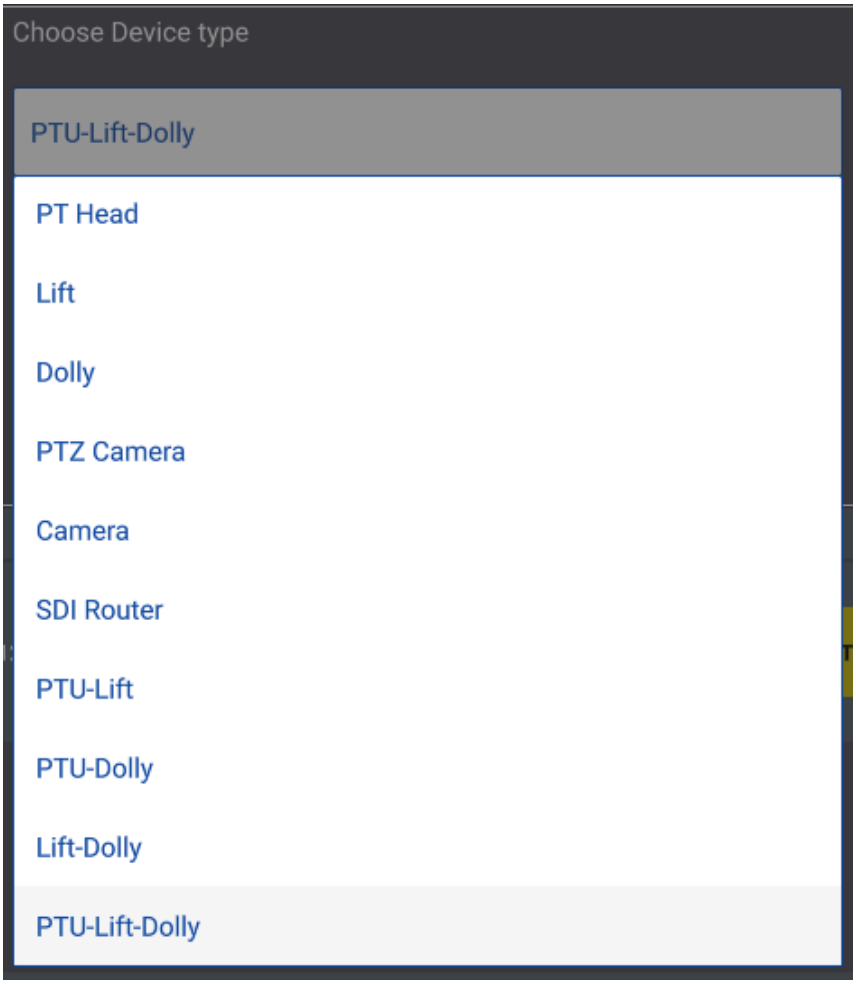


Figure 119 - Choose Device type options

We already mentioned some device types in different contexts but now we are going to go in detail about each device type, and currently supported models of that device type. Models are selected by clicking on the Previous and Next buttons cycling over supported models.

In the following sections we will go through all device type options available.

11.2.1.1. PT Head device type

Figure 120 - PT Head example

PT stands for pan-tilt. Currently the Zanus pan-tilt heads are supported in the RoboStick controller. Most pan-tilt heads beside control for panning and tilting can also control zoom, focus and iris in some way. Either with serial connection or with external lens motors. For all supported device models see supported devices section.

11.2.1.2. Lift device type

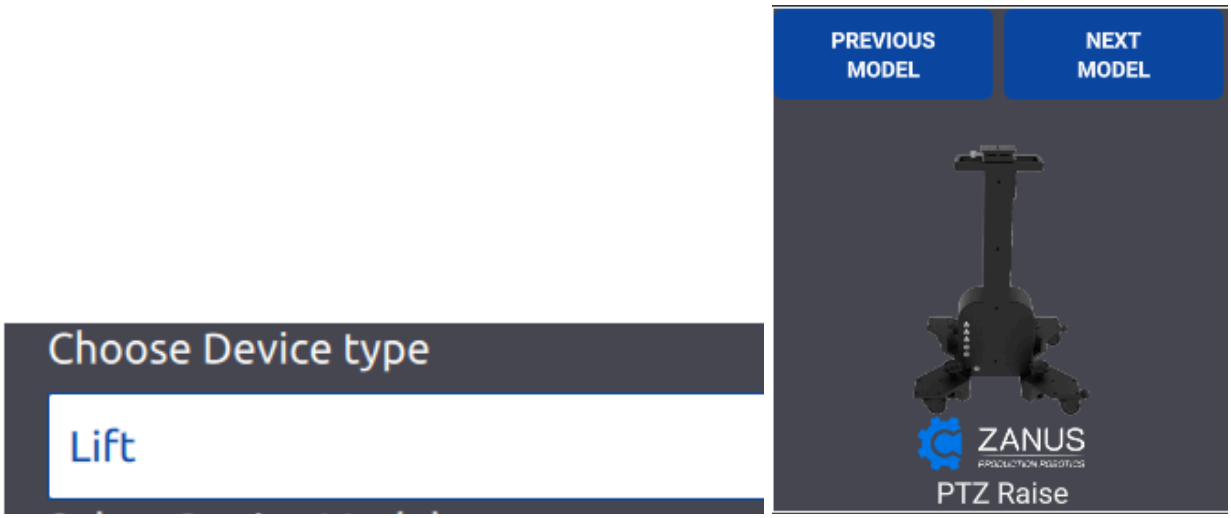


Figure 121 - Lift example

Lifts or pedestals are moving cameras in a vertical direction. For all supported device models see supported devices section.

11.2.1.3. Dolly device type

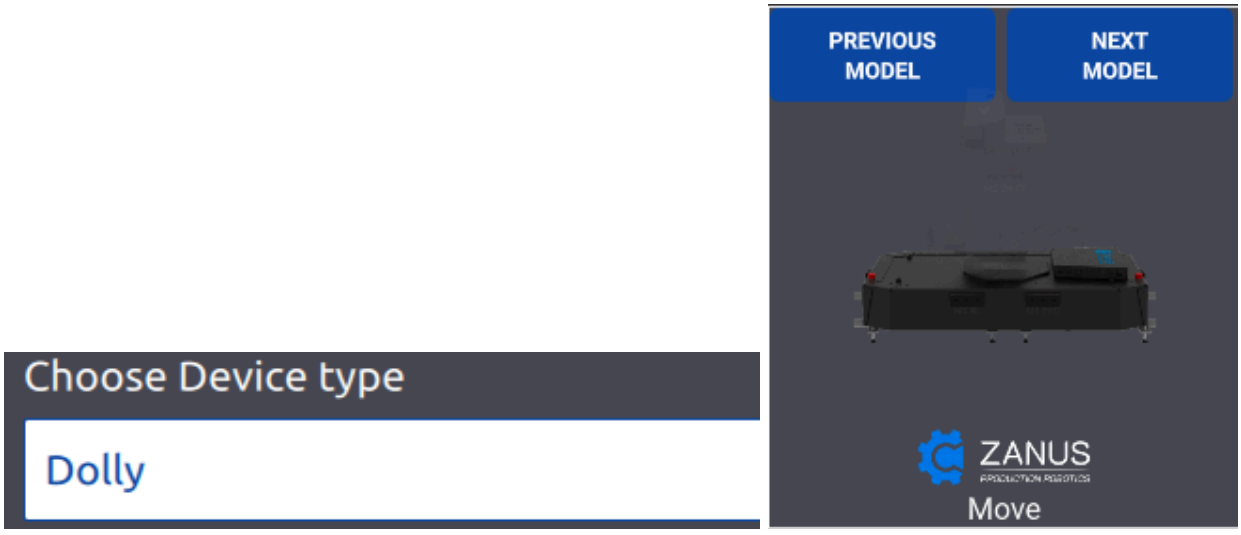


Figure 122 - Dolly example

Dollies or sliders are devices that are moving the camera on some kind of rails in a horizontal plane. For all supported device models see supported devices section.

11.2.1.4. PTZ Camera device type

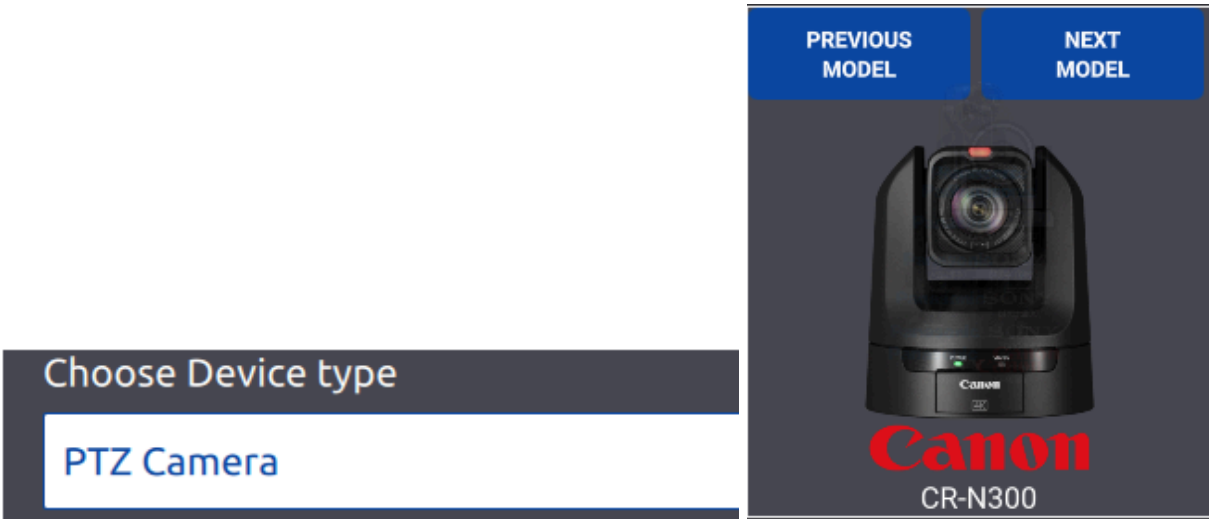


Figure 123 - PTZ Camera example

PTZ Cameras are cameras that have the ability to pan, tilt and zoom. Also those cameras offer possibilities for focus and iris control, and for control of the image settings of the camera. For all supported device models see supported devices section.

11.2.1.5. Camera device type

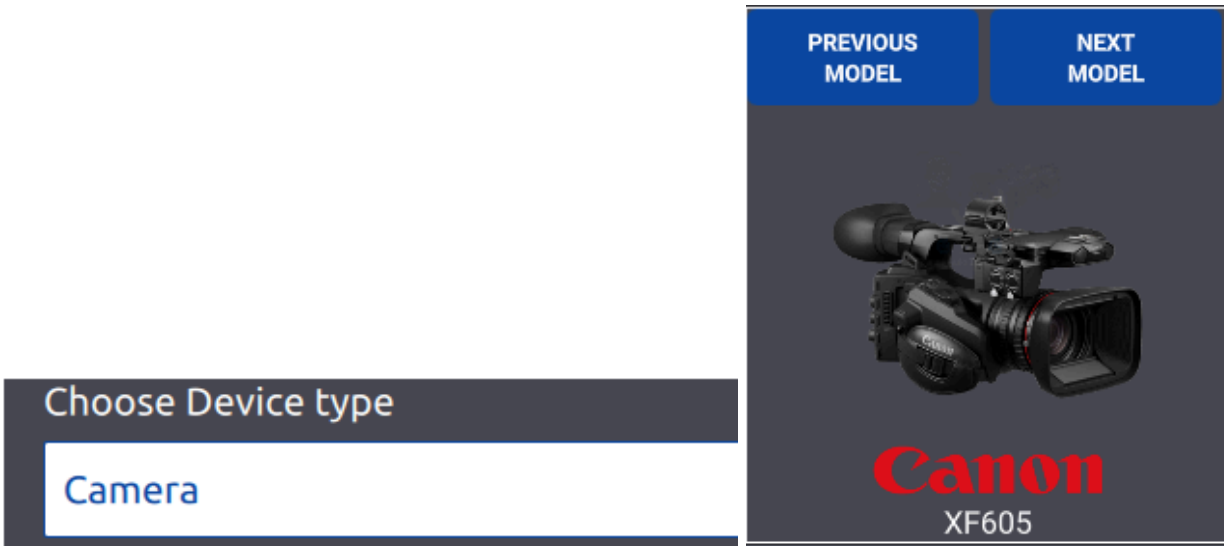


Figure 124 - Camera example

Camera is the device type that has the ability to control zoom and focus over ethernet. Currently only For all supported device models see supported devices section.

11.2.1.6. SDI Router device type

Figure 125- SDI Router example

SDI Routers are used to route video signals from its inputs to designated outputs. For all supported device models see supported devices section.

11.2.1.7. PTU-Lift device type

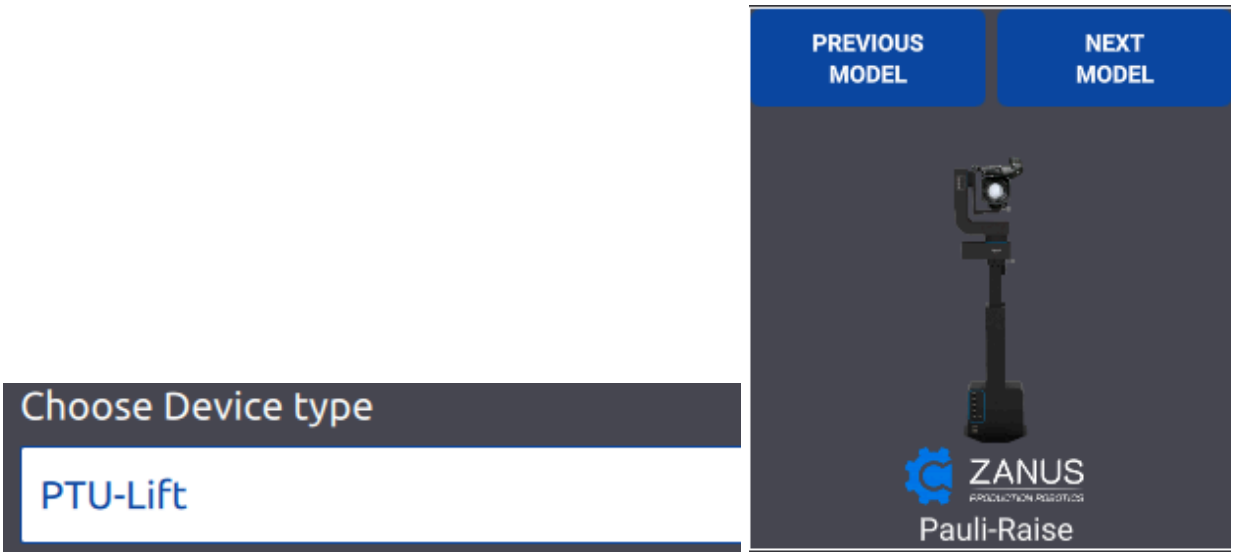


Figure 126 - PT Head & Lift combination

Device type that is composed of the Zanus PT Head and lift. In this setup head is the master and lift is the slave. For all supported device models see supported devices section.

11.2.1.8. PTU-Dolly device type

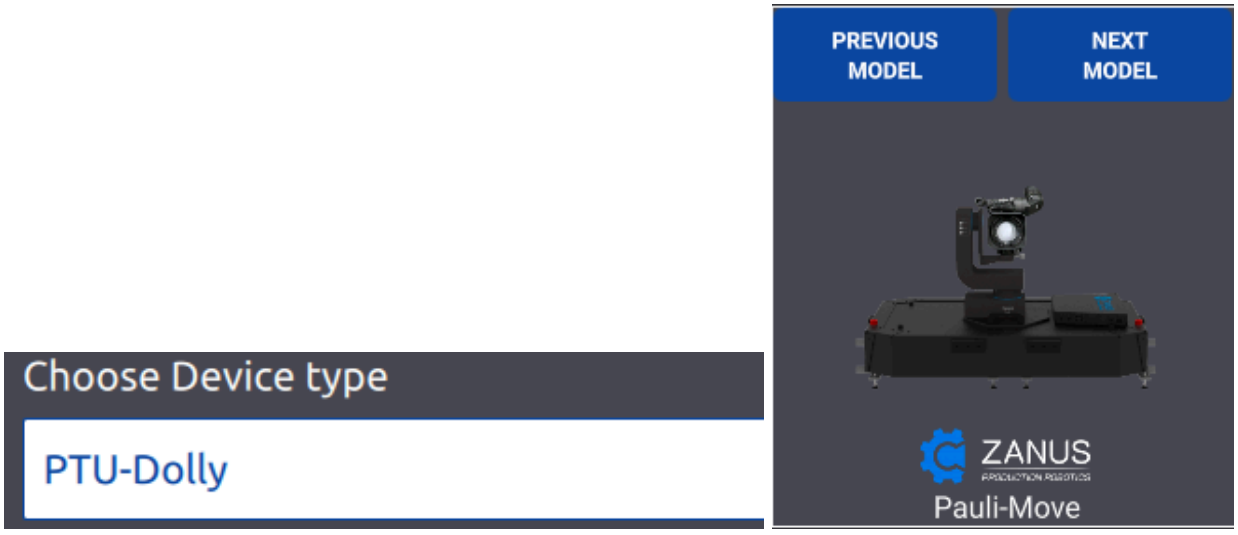


Figure 127 - PT Head & Dolly combination

Device type that is composed of the Zanus PT Head and dolly. In this setup head is the master and dolly is the slave. For all supported device models see supported devices section.

11.2.1.9. Lift-Dolly device type

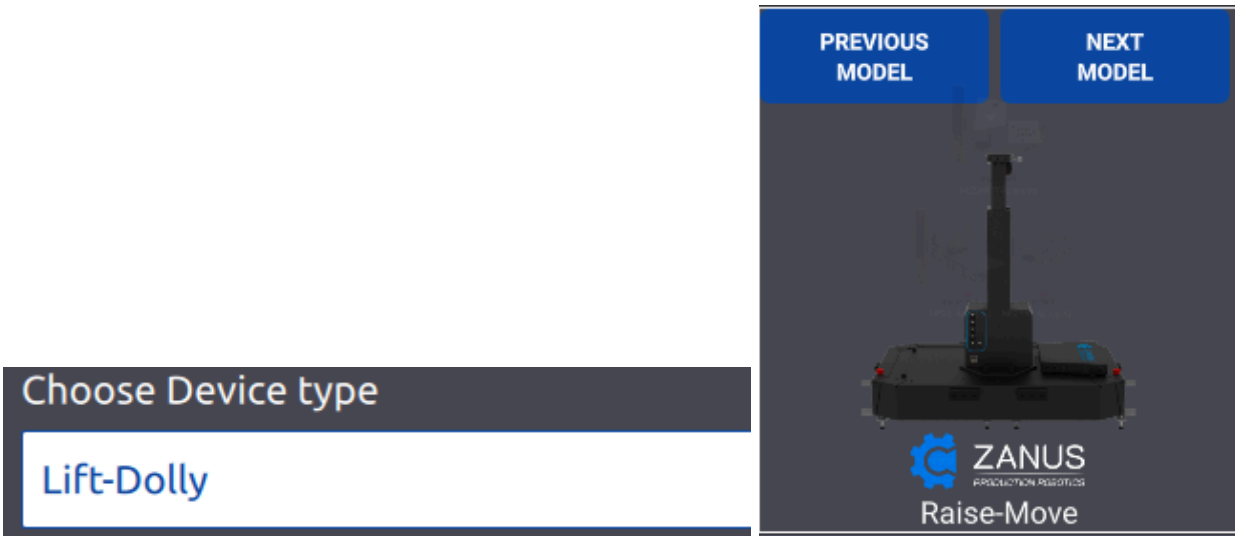


Figure 128 - Lift & Dolly combination

Device type that is composed of the Zanus lift and dolly. In this setup lift is the master and dolly is the slave. For all supported device models see supported devices section.

11.2.1.10. PTU-Lift-Dolly device type

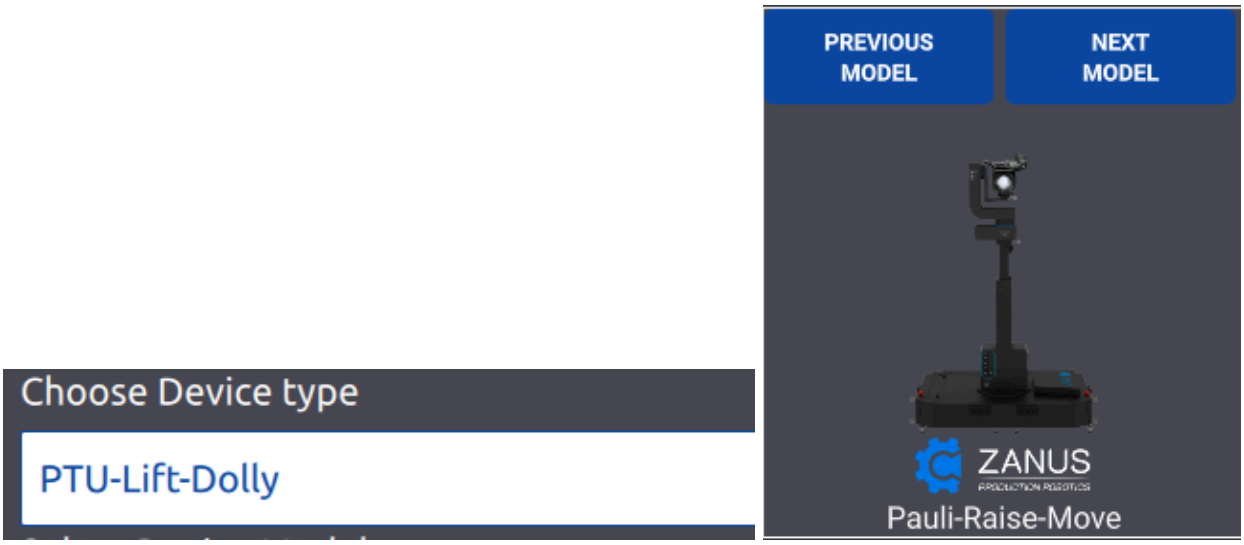


Figure 129 - PT Head & Lift & Dolly combination

Device type that is composed of the Zanus PT Head, lift and dolly. In this setup head is the master and lift and dolly are slaves. For all supported device models see supported devices section.

11.2.2. Update device button

Figure 130 - Update device button

Updating the device is done by clicking on the update device button. The process is the same as adding a new device. The only difference is that existing information for the device name, type, model and IP address are loaded.

11.2.3. Delete device button

Figure 131 - Delete device button

Deleting the device is done by clicking on the delete device button. If the device that is part of some control system is deleted that control system will also be deleted.

11.3. Video section

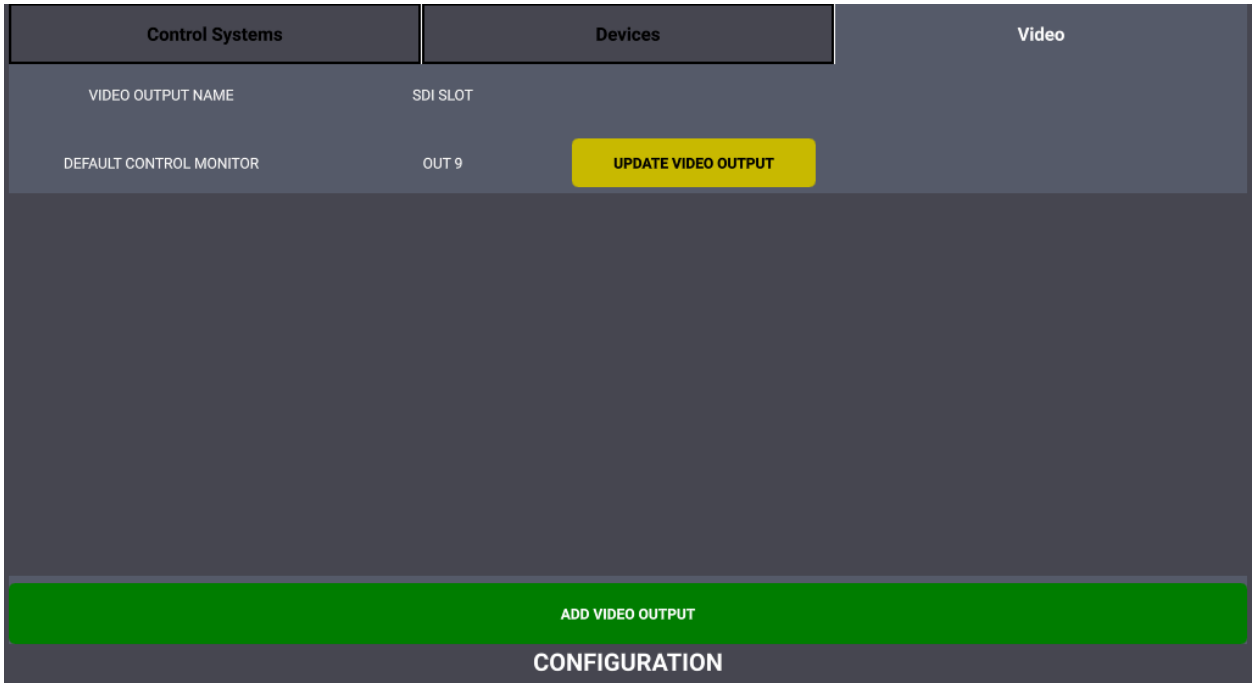


Figure 132 - Video section

The video section of the configuration page is used to set up video monitors on which the operator can see video feed from the system. In this section users can see a list of added video monitor devices, their name and SDI output slots on SDI matrix.

11.3.1. Add video output button

Figure 133 - Add video output button

Video output can be added by clicking on the add video output button at the bottom. After the click the following dialog will appear.

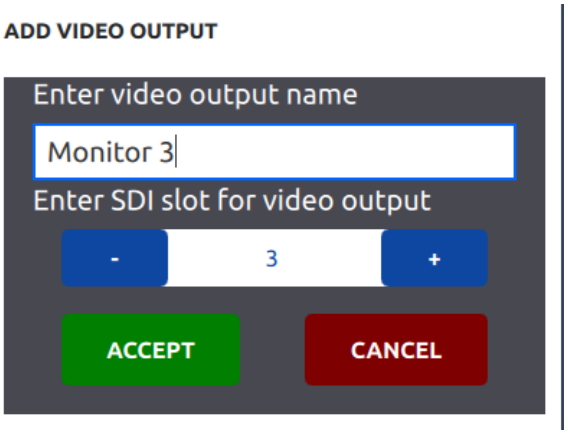


Figure 134 - Add video output dialog

We can now add a name for a new video output device, and adjust the SDI output slot for that device.

11.3.2. Update video output button

Figure 135 - Update video output button

The updating process is the same as adding video output, the only difference is that the name and SDI slot are loaded.

11.3.3. Delete video output button

Figure 136 - Delete video output button

Deleting the video output can be done by clicking the delete video output button.

11.3.4. Using RoboStick with SDI Router and output monitor

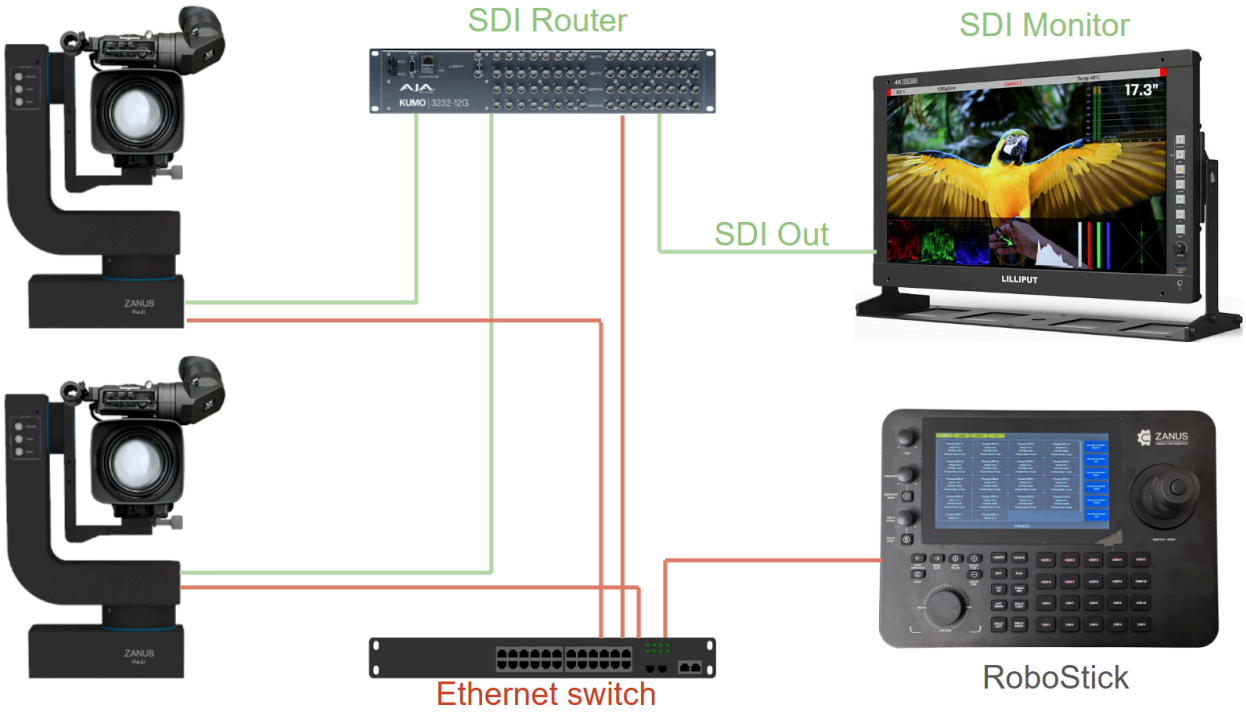


Figure 137 - Video stream setup

In Figure 137 is displayed one example of setup with RoboStick, SDI Output monitor, SDI Router and two Pauli Pan-Tilt Heads. Everything is connected to the same local network.

To have ability to switch between video outputs from first or second camera one needs to properly configure devices and control systems in RoboStick as following:

- One needs to add one SDI Router device with the correct IP address. SDI Router needs to be connected with ethernet cable to the same local network as everything else.
- One needs to add two Pauli devices with correct IP addresses and create a control system which will be represented by CAM1 and CAM2 camera buttons. When setting up control systems keep in mind that the SDI slot for the system needs to be the exact **SDI INPUT** slot on the physical SDI Router.
- Afterwards one can add a new control output monitor or edit the existing Default control monitor. Make sure that when configuring the SDI slot for the monitor it matches with the exact **SDI OUTPUT** slot on the physical SDI Router.
- Make sure that everything is connected properly with Ethernet and SDI cables

Now when the CAM1 button is clicked the output on the SDI Monitor will change to the output from the first camera, and when the CAM2 button is clicked the output will change to the output from the second camera. In this way it can be achieved for the operator to have the ability to see video feed from the camera that he is currently controlling.