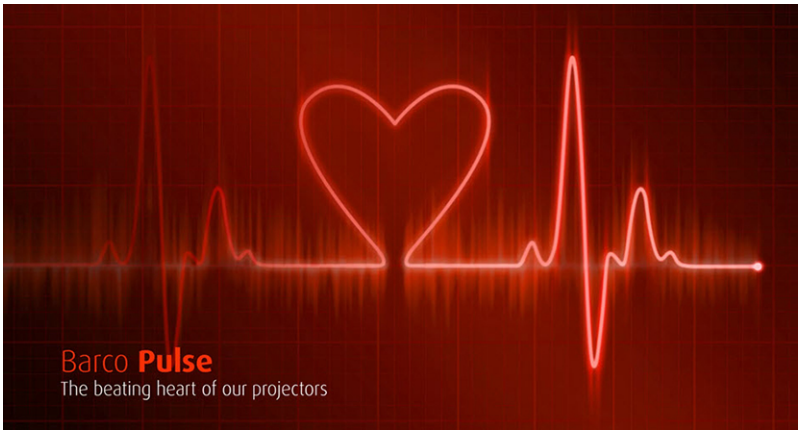
Pulse OSD



User Guide

Product revision

Software Revision: Pulse 2.5

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1 General

1.1 Introduction

About this manual

This manual is designed to be a reference tool while setting up Pulse-powered Barco projectors. This either in a stand-alone installation, or a multi-projector setup.

Each software feature is explained in detail, with the following information:

- The path on the software to access the feature
- User access level required to see or use the feature.
- Projector models on which the feature is available.
- List of requirements (minimum software, peripherals or licences) needed to make the feature visible.
- General information on what the feature is about.
- A procedure explaining how to use the feature.
- Example screenshots of the feature

For installation instructions of the projector, see the projector installation manual instead. For general projector usage instructions, see the projector user guide

About the Pulse On-Screen Display (OSD)

The Pulse OSD and LCD software is a uniquely powerful and easy to use application built into Pulse-powered Barco projectors. The software provides all the necessary tools to configure and control the projector.

A comprehensive array of easy to access menu pages provides the user with ways to manipulate the source signals in various ways in order to create the desired output on screen or any projected surface.

1.2 Navigation

Navigation using the local keypad

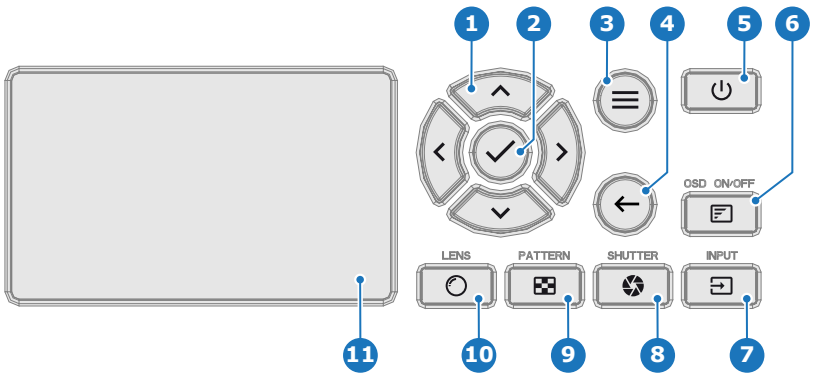


Image 1–1

1 Menu navigation keys
2 OK button, for menu confirmation
3 Menu button, opens or closes the menu
4 Back button, go up one level in the menu tree
5 Power on / off button
6 Projector OSD on / off button
7 Input button, opens the input quick selection menu
8 Shutter button, opens or closes the shutter
9 Pattern button, opens test patterns quick selection menu
10 Lens button, opens the lens feature menu.
11 LCD panel

Navigation using the basic remote

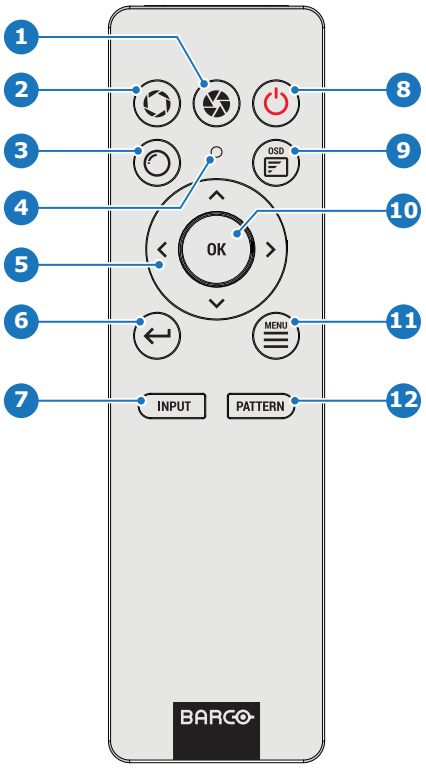


Image 1–2

1 Close shutter
2 Open shutter
3 Open *Lens features* menu
4 Button pressed indicator
5 Menu navigation keys
6 Back button, move back one level in menu tree
7 Input button, opens *Source* quick-selection menu
8 Power on / off button
9 OSD menu on / off
10 OK button, for menu confirmation
11 Menu button, opens or closes the menu
12 Pattern button, opens *Test pattern* quick-selection menu

Navigation using the Pulse RCU

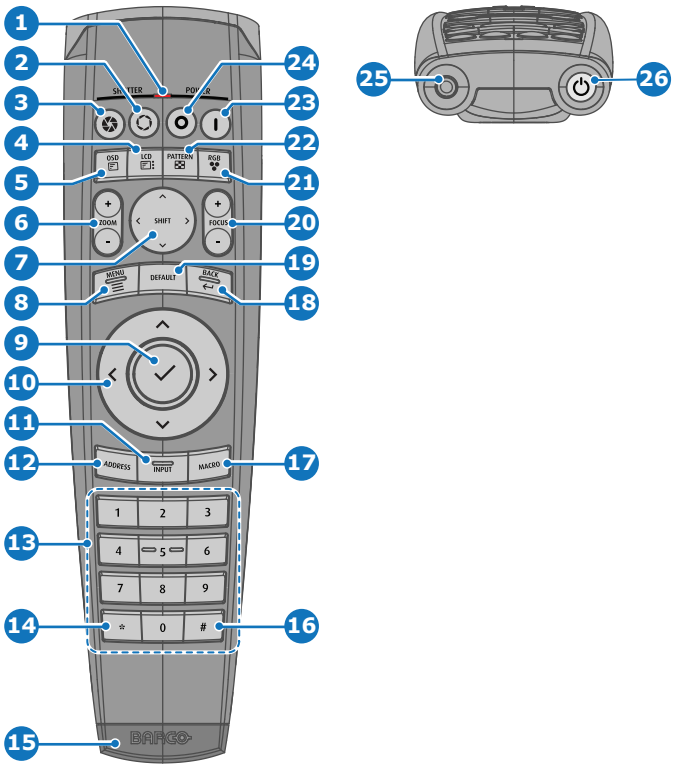


Image 1–3

1 Button pressed indicator
2 Shutter open
3 Shutter close
4 LCD/Touch panel on / off
5 Projector OSD on / off
6 Lens zoom
7 Lens shift
8 Menu open / close
9 Menu selection, OK button
10 Menu navigation
11 Input selection
12 Address button
13 Numeric buttons
14 Backspace (while entering values)
15 XLR connector
16 Decimal mark (while entering values)
17 Macro button (Not in use)
18 Menu back
19 Default value button
20 Lens focus
21 RGB filter
22 Test patterns
23 Power on
24 Power off
25 3.5 mm jack
26 RCU on / off

Navigating using the LCD touch display

The LCD panel of the projectors have touch functionality. Instead of using the remote control buttons or keypad keys or button, do one of the following:

- Touch menu icons to enter the respective menu.
- Swipe a menu up and down if not all information is not immediately visible (e.g. more than eight menu icons being visible).
- Return to a higher menu level, by touching the blue name in the top left corner of the display.
- Use touch functionality to use menu items (check boxes, sliders, digital keyboard or keypads, etc).
- Swipe menu panes left or right when multiple panes are available (e.g. the *Dashboard* menu).

Last chosen menu

The OSD software remembers the last chosen menu as long as the projector is in Ready or On mode. When the menu is turned off and on again, the software will automatically be returned to the last chosen menu.

The menu position is reset when the projector goes to Standby mode, or the projector is powered off.

For I600 and QDX, the menu position is only reset when the projector is powered off.

1.3 Using the UI elements

Interacting with UI elements

Menu settings are displayed using checkboxes, sliders, and horizontal selection lists.

Use these as follows:

- Press the **OK** button to select or deselect a checkbox. This enables or disables a function.
- Use the arrow keys to move a slider up or down on the value line. For a slider scaled 0-9, each step will equal 10% of the total value.
- Use the arrow keys to move in a horizontal selection list. Confirm the choice with the **OK** button.

Changes are implemented in real-time.

Scrolling through menus

When a blue vertical slider on the right side of the window is visible, this means that there are more items to show than those currently displayed.

If the vertical bar is visible, use the navigation buttons to scroll to the lower listed menu options.

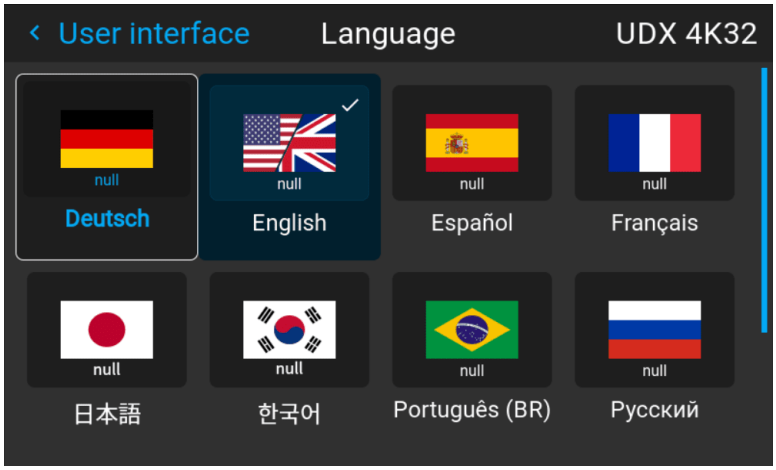


Image 1–4 Example of a menu with a vertical slider

Toggling sliders

Several icons and menu features can be enabled or disabled using toggle sliders. Using the **OK** button on the slider to enable or disable the feature respectively.

- When sliders are toggled to the right, they are colored blue and enabled.
- When sliders are toggled to the left, they are colored grey and disabled.

Image 1–5 Example of an enabled slider

Image 1–6 Example of a disabled slider

Using the on-screen keyboard

Certain menu features require a text or a set of numbers (e.g. an IP address, a host name, etc). For these menu items, an on-screen keyboard will be prompted upon entering the input field.

Use one of the following methods for entering text:

- For characters, use the arrow keys on the RCU or local keypad to navigate the digital keyboard. Press the **OK** button on the RCU or keypad to confirm each character.

- Use the LCD touch panel on the projector. Touch each desired character on the on-screen keyboard to confirm.
- While controlling the Pulse RCU, use it as follows:
  - Press the numeric buttons to enter numeric values.
  - Use the asterisk button (*) as backspace to remove an entered digit.
  - Use the number sign button (**#)** button to enter a dot **(.)**.

Once entered, press the enter (↵) symbol on the on-screen keyboard to confirm the entry. As a result, the digital keyboard will be hidden.

If present in the menu, press the *Apply* button to confirm the entered text.

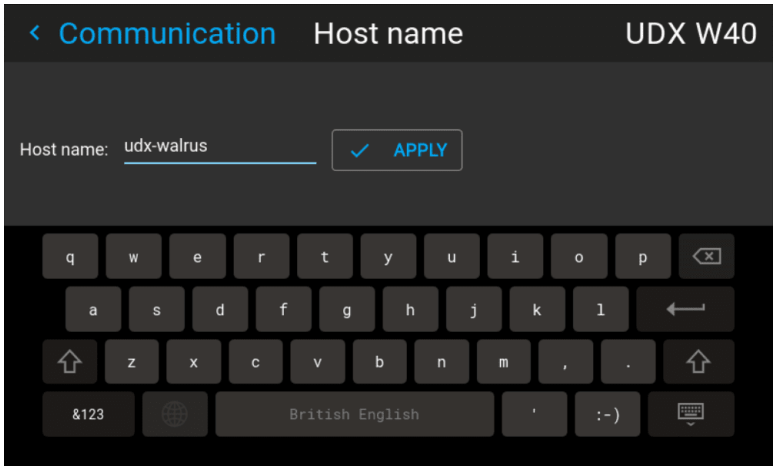


Image 1–7 Example of the on-screen keyboard

Projector configuration process overview

2

About this chapter

After the projector is physically installed, the configuration process can be started. This chapter gives an overview of all the different stages in the configuration process which have to be followed to get the projector up and running. Each stage is briefly described and refers to more detailed step by step procedures in this manual.

Use this process overview as a checklist to ensure all stages have been followed in the configuration process of the projector.

2.1 Prerequisites

Overview

Prerequisites may vary depending on the projector model to install. The list of prerequisites provided here is indicative. For more information on each prerequisite, please consult the installation manual of the projector.

List of prerequisites

The following prerequisites must be met before the projector can be configured:

- The projector must be physically installed.
- An appropriate lens must be installed in the projector lens holder.
- Install optional peripherals, systems and devices.
- The necessary physical connections with source signal devices have been made.
- Define the necessary network configuration for the projector with the local network administrator.
- Turn on the projector.
- Insert batteries into the remote control (basic remote or Pulse RCU).

2.2 Process overview

Projector configuration process

1. **Check if all prerequisites are fulfilled.** For more info see “Prerequisites”, page 16
2. **Select the projector language and accept the EULA**. For more info, see “First start of the software”, page 20.
3. **Configure the projector orientation**. For more info, see “Orientation”, page 80.
4. **Configure the network of the projector**, using one of the network possibilities (LAN, WiFi or HDBaseT). For more info, see “Network setup”, page 145.
5. Update the software to the latest available version. For more info, see the projector user guide.
6. **Configure the broadcast address, projector address and the active IR sensors**. For more info, see “Remote control”, page 142.
7. Configure the **projector host name**, or leave the default. For more info, see “Host name - Custom projector name setup”, page 144.
8. **Calibrate the installed lens**. For more info, see “Lens calibration”, page 189.
9. Position the projector to **center the projected image onto the screen or projected surface**. Do this as follows:
   - Perform a **lens shift** action until the projected image is in the center of the projected screen. For more info, see “Configuring lens shift”, page 88.
   - Adjust the projector to project perpendicular to the screen. Use one of the following methods:
     - In case of table-mount installation, **adjust the projector feet** and consult **the tilt sensor** menu. For more info, see “Tilt sensor”, page 83
     - In case of non-motorized rigging frame, **manually adjust the frame** and consult the **tilt sensor** menu. For more info, see “Tilt sensor”, page 83
     - In case of motorized rigging frame, **use the motorized rigging frame menu**. For more info, see “Manipulating the motorized rigging frame ”, page 85.
   - If installed, use the optional **distance meter** to aid with positioning the projector. For more info, see “Laser ranging”, page 81.
10. In case of projecting on a projection screen, adjust the image resolution to the screen dimensions as follows:
    - **Determine the Screen size that is being projected on**. For more info, see “Warping – Screen size”, page 96.
    - **Determine the desired scaling mode** of the projector. For more info, see “Scaling modes”, page 94.
    - In case of a **non-Cinemascope residential projector**, **use 16:9 Centered function** instead. For more info, see “Cropping the image to 16:9 centered”, page 77.
    - In case of a **Cinemascope residential projector**, **crop the image according to the desired projection format and screen**. For more info on cropping for Cinemascope, see “Cinemascope – Cropping the image”, page 62.
11. In case of a multi-projector setup, align the projector with others in the setup as follows:
    - Depending on the projected surface and area this projector will project, adjust as follows:
      - **Adjust** the position of **the four corners** of the projected area. See “Warping – 4 corners adjustment”, page 99
      - For more **free warping** of the projected area, use **symmetrical or asymmetrical bow correction**. See “Warping – Bow”, page 101
      - Use **blending and masking** to configure the overlap between each projector in the setup. See “Blending & masking”, page 109.
      - Use the **transport delay** menu to align the **latency** between all projectors in the setup. See “Warping – Latency control in a multi projector setup”, page 107.
      - Use **tilted brightness uniformity correction** to adjust for “brighter” and “darker” spots in the projected area. See “Tilted brightness uniformity correction”, page 56.
12. Ensure the basic projected **image** will be **focused and sharp**. Do this as follows:
    - In case of UDX and UDM, ensure **dynamic focus is enabled**. For more info, see “Configuring dynamic focus”, page 89.

- When a **motorized lens** is installed, **adjust the zoom and focus**. For more info, see “Optical zoom and focus”, page 88.
- For an **F-Series** family projector, **configure the Iris**. For more info, see “Configuring the Iris”, page 91.
- Fine-tune the projected image, **using digital shift and zoom**. For more info, see “Digital zoom and shift”, page 59.

13. **Select the projection source** as follows:
    - For a standard **single source** setup, see “Displaying a single source”, page 36.
    - For a **multi-source** setup, see “Displaying multiple sources: Stitched layouts”, page 38.
    - For the details of **3D setups** (including **simulation and NightVision**), see “3D projection”, page 125.
14. If available for your model, **configure your installed peripherals** as follows:
    - If the **external cooler** is installed, set the desired cooling mode. See “Setting up the external cooler”, page 180
    - If the **distance meter and camera kit** is installed, do the following:
      - **Enable the camera**. See “Security – Enable camera preview”, page 199
      - **Measure the distance** to the screen and store it for reference. See “Laser ranging”, page 81.
    - If a peripheral is connected with the front XLR connector, **power the front XLR connector** accordingly. See “Controlling the front XLR connector”, page 178
    - If the projector is part of an entire setup using DMX, **configure the DMX settings**. See “DMX”, page 154.
    - If the projector is part of an entire setup using PJLink, **configure the PJLink settings**. See “PJLink”, page 156.
    - If peripherals are connected with the projector, using the trigger outputs, **configure the triggers**. See “Trigger outputs control”, page 160.
15. Use the features available in the **Image menu** to **fine-tune the projected image** until the desired image is on the screen. For more info on these features, see “Image”, page 47.
16. **Save your current configuration in a projector profile**. For more info on projector profiles, see “Projector profiles”, page 131.

3 Basic menus

3.1 First start of the software

Select UI language

When the projector is started for the first time, the select language menu will be prompted. Choose one of the following languages:

- German (DE)
- English (EN-US)
- Spanish (ES)
- French (FR)
- Japanese (JA)
- Korean (KO)
- Portuguese (PT-BR)
- Russian (RU)
- Chinese (ZH)

Image 3–1 Example of the welcome screen

Once confirmed , the **Pulse product-specific End User License Agreement** (EULA) will be prompted. Access to the projector software will be restricted until the EULA has been fully read and approved.

The EULA will not be prompted on simulation projectors (FL40, FS40, F70, F400). The EULA approval process for simulation projectors happens during the purchasing process instead.

Product Registration

The product registration is mandatory on new models of UDM, Njord and Hodr
Product registration is optional on new models of UDX and I600.

Upon first startup the product registration menu will be prompted. Perform the registration procedure now, or choose to *Register Later*. For more information on the full registration procedure, refer to the Projector Registration user guide.

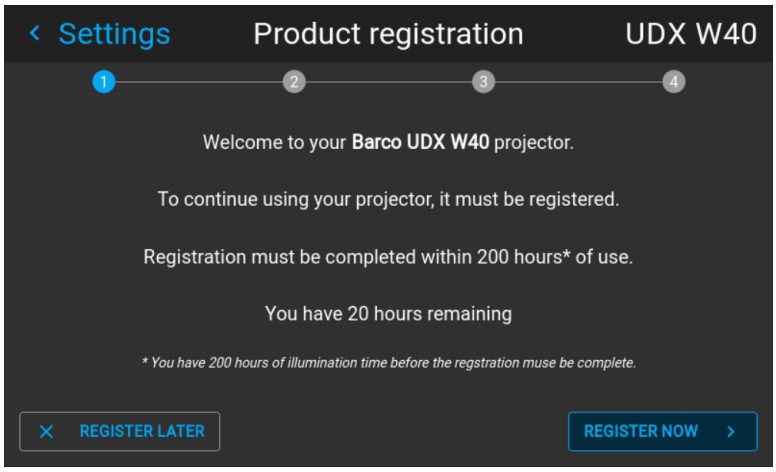


Image 3–2 Example of the Product registration form

3.2 Dashboard screens

Dashboard Screens

While the projector menu is not active, or the projector is in Ready or Standby mode, the dashboard screens remain visible. These screens give an overview of the state of the projector and can be navigated through using the left and right arrow keys, or by swiping the screen left or right. The dashboard screens are the following:

Panel	Explanation
Dashboard	Overview of basic projector information. Listed are the following: • **Source information**: Chosen connector, connected, resolution and special coding icon (e.g. HDR) • **Projector information**: Power status, light source status and general environmental condition • **Display information**: Current display mode, transport delay, frequency, RGB mode and output resolution • **Communication information**: Current host name, IP address, Software version, broadcast address, projector address, DMX address
Functions	A list of icons of all available functions on the current model. See further for a detailed explanation of the Function icons. **Requirement**: Pulse 2.5 or later.
About	General info about the projector. This includes serial number, software version, mounted lens and light source runtime. It also includes altitude, and the pitch and roll tilt angles. • **Projector information**: firmware, serial number, article number, lens type, registration status • General projector statistics • List of installed licenses • **Time and Schedule**: Current time, and first upcoming scheduled event. **Note**: Updated menu in Pulse 2.5
Notifications	The error and/or warning messages that are currently active. If no messages are active, this list will be empty.
Preview	A preview pane of the projected image. If no image is being projected, a “No signal” test image is displayed instead. **Note**: Not supported on F400 and I600

Use the host name or IP address to connect to the projector using external tools, like Pulse Prospector

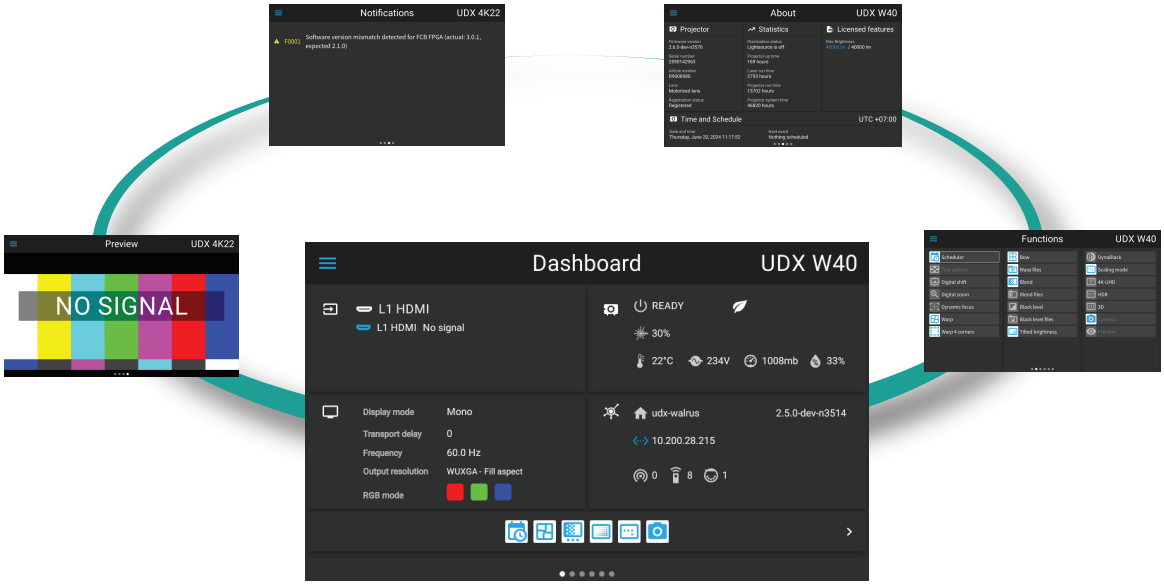
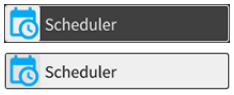
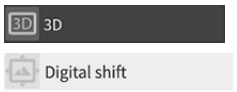
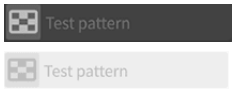
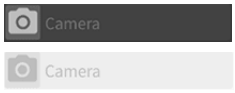


Image 3–3 Example of the Dashboard screens

Functions dashboard page explanation

Example function icon	Description	Shortcut (yes/no)
	White and blue icons are enabled features that are currently active.	Yes
	Grey icons with white text (dark mode) or black text (light mode) are enabled, but currently not active.	Yes
	Grey icons with muted text are menu items disabled in the current power state. Changing power state to ON will enable these features (e.g. *Test patterns* menu)	No
	Grey icons with muted text at the end of the icons list are not accessible with the current user rights. Signing in with the correct user rights will enable the features (e.g. the *Security* menu requires a minimum of Power user rights).	No

3.3 Test Patterns

Location and availability

- **Menu**: *Test Patterns*
- **Access level**: all
- **Models**: all

The Test patterns menu will only be accessible when the light source is on.

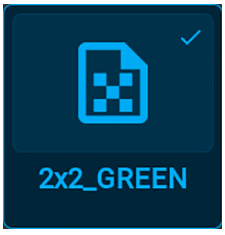
List of standard test patterns

The test patterns that are available by default are the following:

- Aspect
- Focus-Green
- Focus-bursts
- White / Black/ Red / Green / Blue
- Cyan / Magenta / Yellow
- Color bars
- Color gradients
- Checkerboard
- Cross hatch
- Geometry
- Horizontal gray bars
- Vertical gray bars
- 3D Stereo

About the test pattern types

There are three types of test patterns possible in the projector:

Type	Explanation	Example of test pattern icon
Standard test patterns	One of the standard test patterns listed before.	
Warped test patterns	Every test pattern will have a “warped” variant available, symbolized with a “warp” symbol on the top-left corner of the icon. If warping is enabled and configured, the warping will be applied to this test pattern. If warping is disabled or not configured, a warped test pattern will be identical to its standard test pattern variant. **Requirement**: Pulse 2.2 or later	
Custom test patterns	Can be uploaded via an external tool. Custom test patterns and their warped variants can be found at the bottom of the list of available patterns. All standard test patterns will have a unique icon. Custom uploaded test patterns on the other end will be marked with a “default test pattern file” icon.	

How to use test patterns

1. In the Test pattern menu, select the desired test pattern from the list.
2. To turn the test pattern off, select *off* instead.

Image 3–4 Test patterns menu, test pattern off

Shortcut buttons

On the keypad or remote, press the **test patterns** button (⚄). When either of these buttons is pressed, a popup menu will be prompted on the LCD screen and OSD, showing a horizontal list of the available test patterns.

When prompted, use the arrow keys and select the desired test pattern. Confirm with the **OK** button.

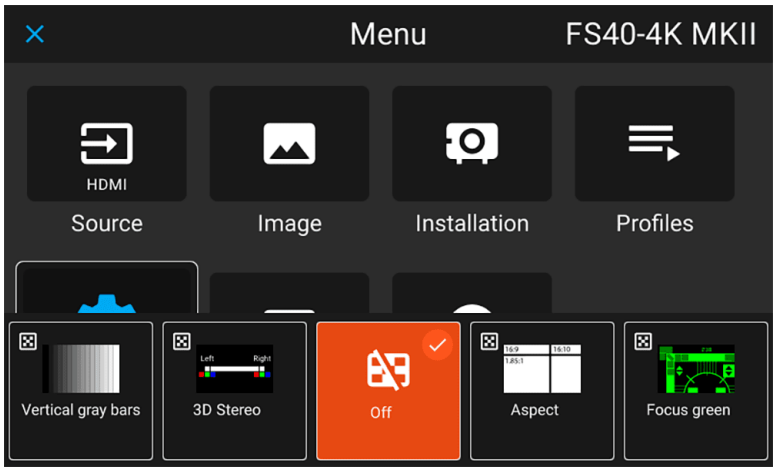


Image 3–5 Test pattern pop up menu

User rights and logging in

4

4.1 User authentication

About authentication

To enhance the security of the Pulse-based projectors, only basic features and parameters can be accessed without additional authentication. If access to more advanced features or parameters is needed, logging in with user name and password is required at each startup.

User authentication is enabled by default, while Pin authentication is disabled. Both can be enabled or disabled using Pulse Prospector. For more info, refer to the Pulse Prospector user guide.

Users cannot be managed using the Pulse OSD software. Users can only be managed using the Pulse Prospector. For more info on user management, refer to the Pulse Prospector user guide.

User group credentials

There are four user groups in total. Three user groups are visible and have a default user name and password.

User group	Default user name[1]	Default password[2]	Default PIN
End User	user	default1234	69905
Power User	poweruser	default1234	292920
Administrator	admin	default1234	297081

There is one hidden user group available with fixed credentials, intended for service activities that can only be performed by authorized staff:

User group	User name	Password	PIN
Service Partner	service	On request (see following chapter)	On request (see following chapter)

CAUTION: For security reasons, it is strongly recommended to change the default password and pin codes as soon as possible. Refer to the Pulse Prospector user guide for more info.

Password and pin authentication for user group “service partner”

The password and pin code for the service partner user group are confidential for security reasons. The password and pin code can only be obtained if the user is a Barco certified service partner.

For the service pin code, the method of obtaining the code depends on the projector model family:

- For new projector families (I600, F400, QDX), send a request for the Service Partner password to Barco help desk, including the serial number of the projector(s). Help desk will generate and share the password. Each password is uniquely linked to the serial number of a projector and does not change over time.
- For older projector families (UDM, UDX, F40, F70, F80) a generic service pin code exists, which can be obtained during the Barco-provided service partner training.

The generic service pin code will be phased out for security reasons. Similarly, on new projector models, PIN authentication will be disabled by default for security reasons. However, using Pulse Prospector, Pin authentication can still be enabled. For more info, refer to the Pulse Prospector user guide.

1. User names are case sensitive
2. Passwords are case sensitive

Role of the user groups

Groups	Features[3]
End user	• Can use the basic Pulse features
Power user	• Can use all menu features the end user has access to • Can use the *Security* menu features • Can use the *Diagnostic* menu • Can use the following advanced settings features: - *Color Wheel* - *Native RealColor* - *Statistics* - *Tilt sensor calibration* - *Laser banks* - *Optical filter*
Administrator	Can use all menu features the power user has access to. Can use all features of the *PJLink* menu.
Service	• Hidden user account, reserved for certified service partners. • Cannot be deleted, renamed or otherwise edited. • Can use all menu features the administrator has access to. • Can use the following advanced settings features: - *Factory native RealColor* - *Pixel shift* - *TIM curing* - *Laser pulsing*

Authentication differences depending on software version

Throughout the software release cycle, Barco has been continuously improving its security features. For this reason the login feature will be different depending on which version of the software is used.

Due to technical reasons, not every projector model has an update path available to the latest software version. Because of this, all existing login methods are listed in the following procedures. This as follows:

- For projectors running Pulse 2.5 or later, see “User authentication on Pulse 2.5”, page 30
- For projectors running Pulse 2.2, 2.3 or 2.4, see “User authentication on Pulse 2.2 – 2.4”, page 32
- For projectors running Pulse 2.1 or older, see “User authentication on Pulse 2.0 and 2.1”, page 34..

3. Features depend on projector model.

4.2 User authentication on Pulse 2.5

Location and availability

- **Menu**: *Login*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.5 or later

Accessing the advanced settings

Several menu items are either hidden or partially locked for the default user. Use the *Login* feature to have increased access to the projector features.

Once logged in, the blue key icon will remain visible on each menu title throughout the projector.

The user will remain logged in as long as the *Logout* action on the main menu is not used. When the projector is rebooted or powered off, the user will also be logged out.

How to login

1. In the main menu, select *Login* and confirm.

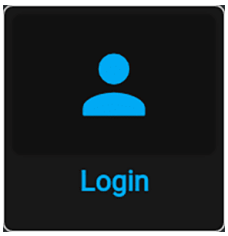


Image 4–1 Main menu, login

The Login dialog is prompted.

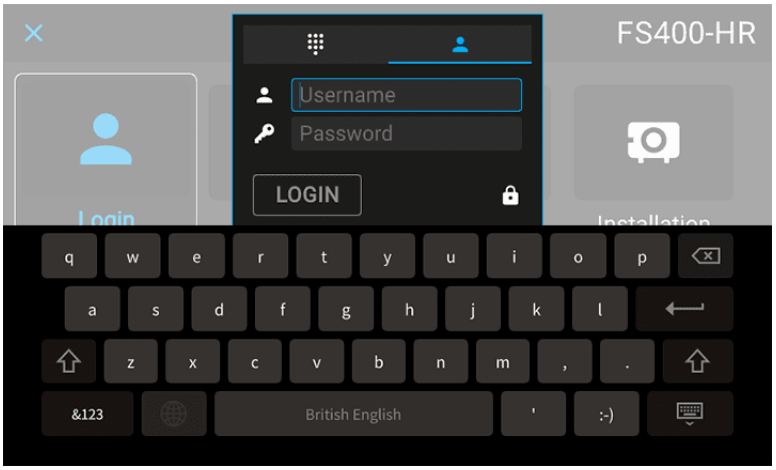


Image 4–2 Example of the login dialog

There are 2 ways to login:

- Via user name & password, go to step 2.
- Via a pin code, go to step 5.[4]

2. To login via user name & password, select the *User* icon and confirm.
3. Select the field next to the *user name* icon and confirm.

   The on-screen keyboard will be prompted. Enter the desired user name.

   Select the field next to the *password* icon and enter the password.

4. Pincode is only available when enabled in Prospector

4. Select **LOGIN** and confirm.
5. To login via digit code, select the digital keyboard icon and confirm.
6. Navigate to Pin code and click **OK**.

   The on-screen keyboard will be prompted. Enter the pin code.
7. Select **LOGIN** and confirm.

How to logout

1. While logged in, click on the *Logout* icon in the main menu.

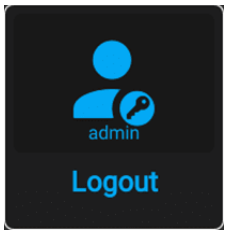


Image 4–3 Main menu, logout

2. When prompted, confirm to log out.

4.3 User authentication on Pulse 2.2 – 2.4

Location and availability

- **Menu**: *Settings* > *Maintenance*
- **Access level**: power user, administrator, service
- **Models**: all
- **Requirements**: Pulse 2.2, 2.3 or 2.4

While it is important to update to the latest available software version, not all projectors already have a version of Pulse 2.5 available.

Accessing the advanced settings

The Advanced Settings and Remote access/Security menus are hidden by default for the regular user. Use the login feature to have increased access to the hidden features.

When successfully logged in, the following menu options will become available:

- the *Advanced* menu and *Remote access* menu on Pulse 2.2 and 2.3.
- the *Advanced* menu, the *Security* menu and the *Diagnostics* menu on Pulse 2.4.

The user will remain logged in as long as the user remains within the *Maintenance* menu and its submenus. Once the *Maintenance* menu is left, the user will automatically be logged out.

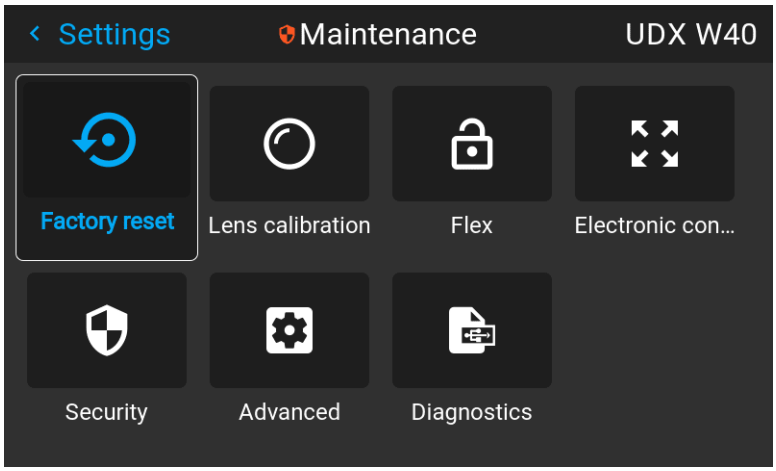


Image 4–4 Example of the Maintenance menu on Pulse 2.4

How to login

1. In the *Maintenance* menu, select *Login* and confirm.

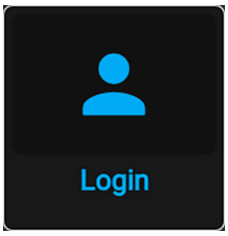


Image 4–5

The Login dialog is prompted.

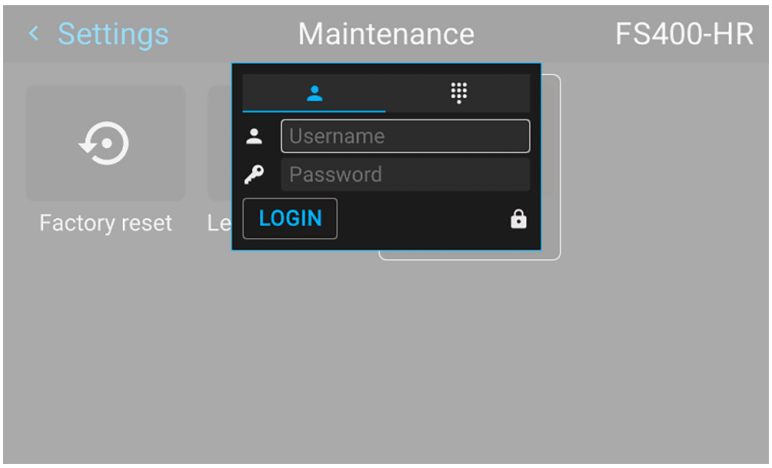


Image 4–6 Example of the login dialog

There are 2 ways to login:

- Via user name and password, go to step 2
- Via a pin code, go to step 5[5]

2. To login via user & password, select the *User* icon and confirm.
3. Select the field next to the *user name* icon and confirm.

   The digital keyboard will be prompted. Enter the desired user name.

   Select the field next to the *password* icon and enter the password.
4. Select **LOGIN** and confirm.
5. To login via the pin code, select the digital keyboard icon and confirm.
6. Navigate to Pin code and click **OK**.

   The digital keyboard will be prompted. Enter the pin code.
7. Select **LOGIN** and confirm.

5. Depending on software version, the pin code may only available when enabled in Prospector

4.4 User authentication on Pulse 2.0 and 2.1

Location and availability

- **Menu**: *Settings* > *Maintenance*
- **Access level**: power users, administrator, service
- **Models**: all
- **Requirements**: Pulse 2.0 or 2.1

While it is important to update to the latest available software version, some projector models still run a version of Pulse 2.1 as latest released software.

Accessing the advanced settings

The *Advanced Settings* and *Remote access* menus are hidden by default for the default user. Entering a specific *code* with the remote control to have increased access to the hidden features. The codes related to power users, administrators and service technicians can be obtained after following the projector training provided by Barco.

Navigate to the *Maintenance* menu. Enter the code with the numeric keys on the Pulse RCU. When entered correctly, the user will automatically be logged in (indicated by the red shield icon in the top bar). The *Advanced* menu and *Remote access* menu options will become visible.

The user will remain logged in as long as the user remains within the Maintenance menu. Once the Maintenance menu is left, the user will automatically be logged out.

It doesn't matter what else is typed or done with the remote. As long as the correct code is typed in, the *Advanced* menu will become visible

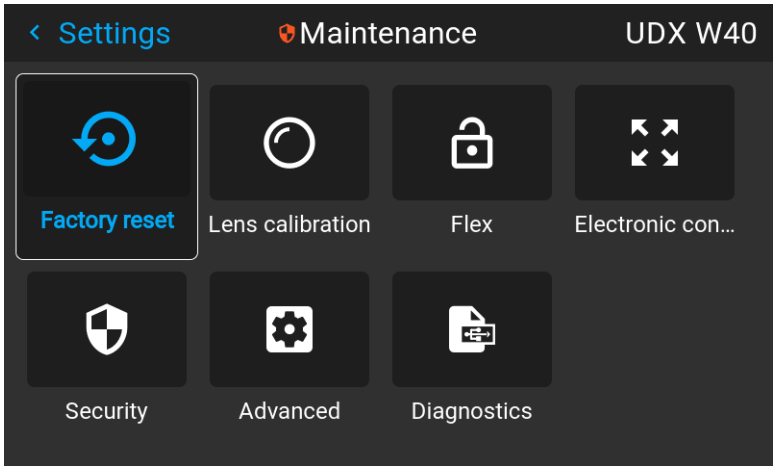


Image 4–7 Example of the Maintenance menu, with the Advanced menu unlocked

5 Source

5.1 Displaying a single source

Location and availability

- **Menu**: *Source*
- **Access level**: all
- **Models**: all

The list of available sources will be different for every projector. Check the specifications of the projector and input boards to see which input sources are available.

About selecting a source

Before a source can be projected, at least one of the input connectors must be connected to the output signal of the connected device(s). A valid synchronization signal must be available along with the source signal on at least one of the input connectors.

When no valid source image is displayed, a black image will be projected by default, at half power. To change the background image, see “No source image”, page 45.

How to select?

1. In the main menu, select *Source*.

Image 5–1 Main menu, Source

The *Select Source* menu is displayed with the available sources listed.

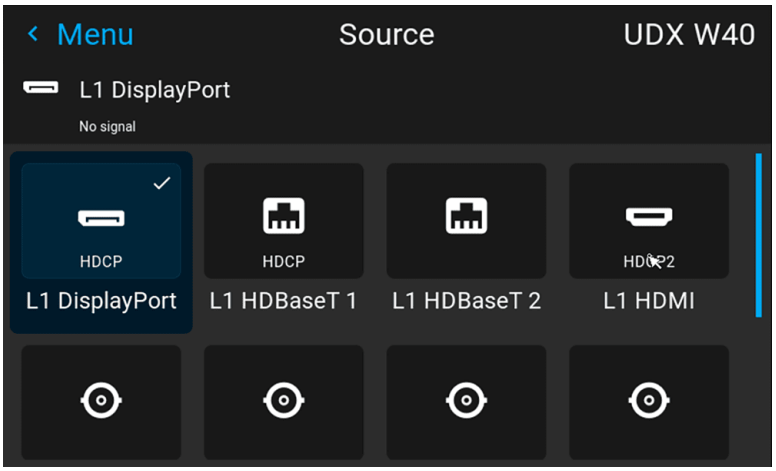


Image 5–2 Example of an input selection menu

2. Select the desired input and confirm.

Shortcut buttons

When the **Source** icon (⇄) is pressed on either the keypad or RCU, a popup menu will be prompted on the LCD screen and OSD, showing a horizontal list of the available input connectors.

Select the desired connector from the list and confirm.

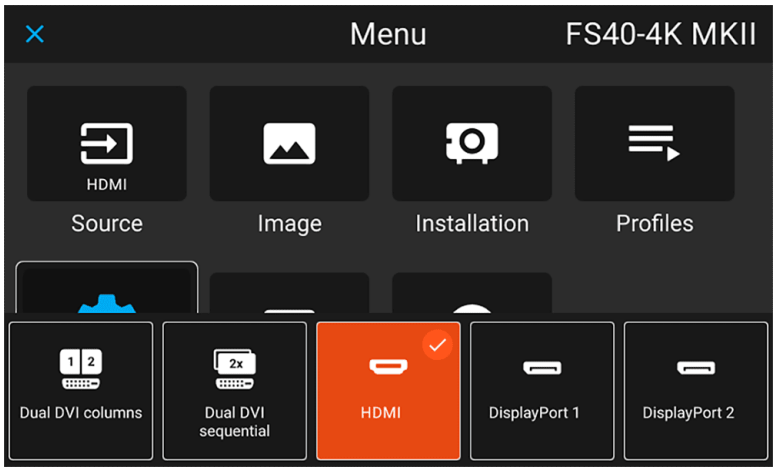


Image 5–3 Example of the input connectors pop up menu

5.2 Displaying multiple sources: Stitched layouts

Location and availability

- **Menu**: *Source*
- **Access level**: all
- **Models**: all

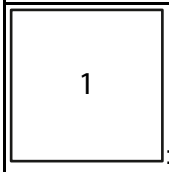
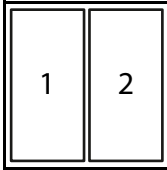
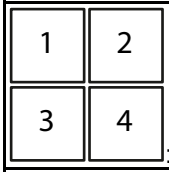
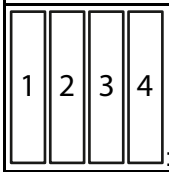
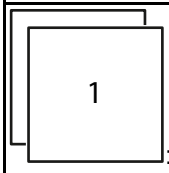
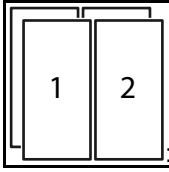
The list of available sources and stitched options will be different for every projector. Check the specifications of the projector and input boards to see which sources are available.

About stitched layouts

The first time a single source is selected, the source will be displayed in the projector's native resolution. If the resolution of the source is different to the projector's resolution, the image is stretched or shrunk.

It is however possible to configure and display two or four source signals to make up one single image in full native resolution. This is called a **Stitched Layout**: the sources are stitched together.

Possible stitched layouts

Type of layout	Description	Display mode (3D)
 : Single	A single source is displayed in full screen	Mono / Active stereo
 : Dual 1 x 2	Two inputs are required. The sources are displayed next to each other.	Mono / Active stereo
 : Quad 2 x 2	Four inputs are required. The sources are displayed in four quadrants.	Mono / Active stereo
 : Quad 1 x 4	Four inputs are required. The sources are displayed next to each other.	Mono / Active stereo
 : 2 x single	Two inputs are required. The sources are displayed one above the other.	Passive stereo
 : 2 x Dual 1 x 2	Four inputs are required. Two sources are displayed next to each other, while the other two are displayed above the first two	Passive stereo

How to select a stitched layout

1. Press **Menu** to activate the menus, select *Source* and confirm.

Image 5–4 Main menu, Source

The *Select Source* menu is displayed with the available sources listed.

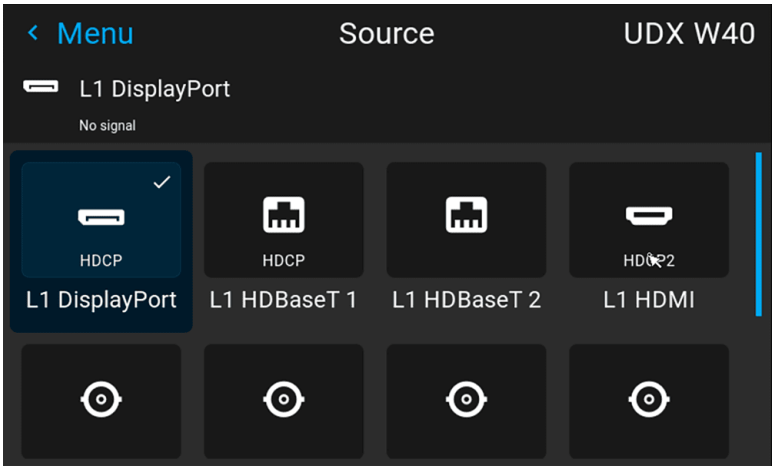


Image 5–5 Example of an input selection menu

2. Scroll down the list of available sources to find the available stitched options.

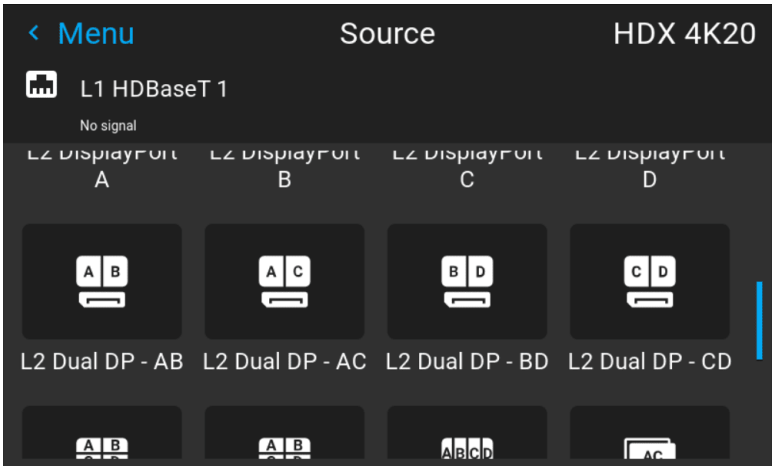


Image 5–6 Example of the stitched input options when the Quad DP board installed

3. Select the desired stitched input.

Shortcut buttons

When the **Source** icon (⇄) is pressed on either the keypad or RCU, a popup menu will be prompted on the LCD screen and OSD, showing a horizontal list of the available input connectors, including stitched options.

Select the desired stitched option from the list and confirm.

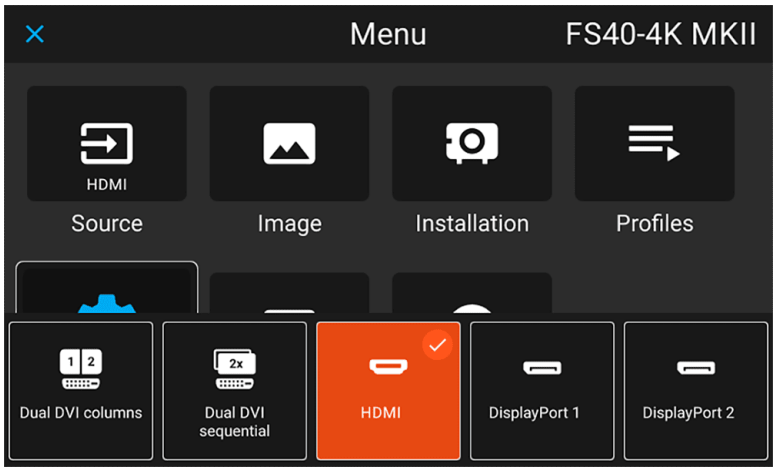


Image 5–7 Example of the input connectors pop up menu

5.3 Connector settings

Location and availability

- **Menu**: *Source* > *Connector settings*
- **Access level**: all
- **Models**: all

The list of available sources will be different for every projector. Check the specifications of the projector and input boards to see which input sources are available.

About connector settings

The Connector Settings menu allows the user to change settings for each input connector of the projector.

By default all options for every connector are set to automatic, together with the native Extended Display Identification Data (EDID).

When entering the menu for each input connector, the following can be changed:

- Color Space
- Signal Range
- EDID

How to configure a connector

1. Scroll down to the bottom of the list of available sources in the *Source* menu and select *Connector settings*.

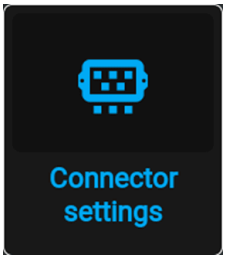


Image 5–8 Source menu, connector settings

The available input connectors are displayed.

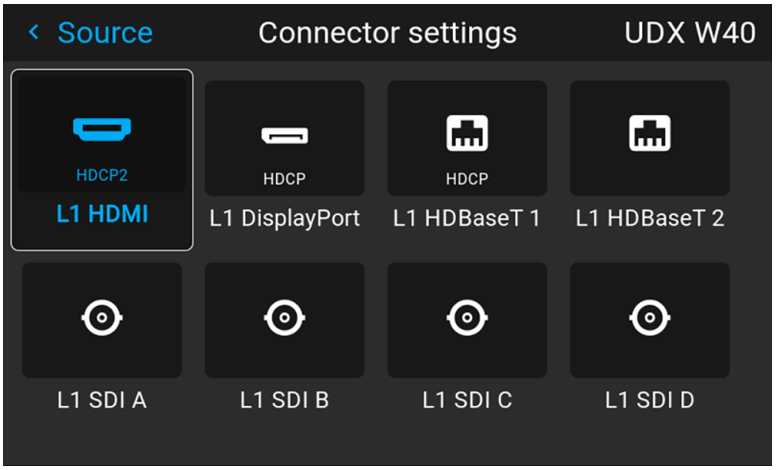


Image 5–9 Example of the Connector settings menu

2. Select the desired connector.

The connector settings menu for the selected connector will be displayed.

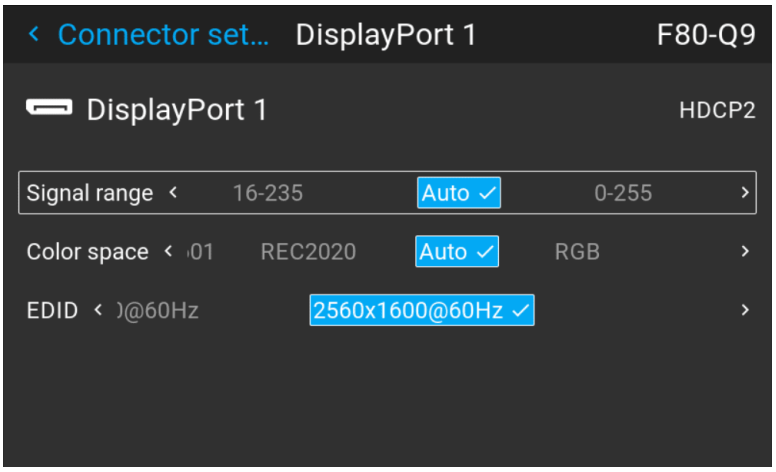


Image 5–10 Example of connector settings for one of the connectors

3. Do one of the following:
   - To force a limit on the used signal range, select one of the available *signal ranges*.
   - To force a limit on the color space, select one of the available *color spaces*.
   - To set a video timing other than the one native for the connector, select one of the options under *EDID*.

   Note: The EDID for SDI connectors cannot be changed.

5.4 Configure override

Location and availability

- **Menu**: *Source* > *Connector Settings*
- **Access level**: all
- **Models**: F40, F70, F400

About overriding the connector configuration

If there is a stitched layout in the projector setup, it may be necessary to override the settings of each connector individually. Using this, the following image settings can be altered:

- Brightness
- Contrast
- Saturation
- Gamma type

How to override the configured connector

1. In the Connector settings menu, select the desired connector and confirm.

   The **Connector Settings** menu for this connector will be displayed.

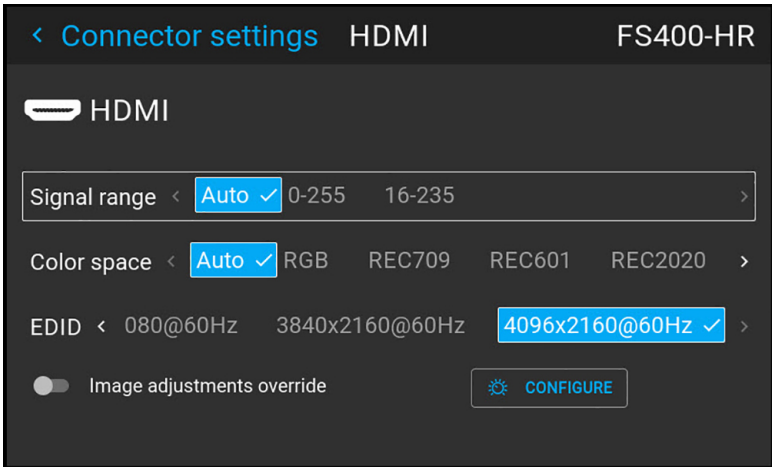


Image 5–11 Example of connector settings for an HDMI connector

2. Enable the *Image adjustments override* slider.
3. Click **Configure**.

   The *Configure overrides* menu is displayed.

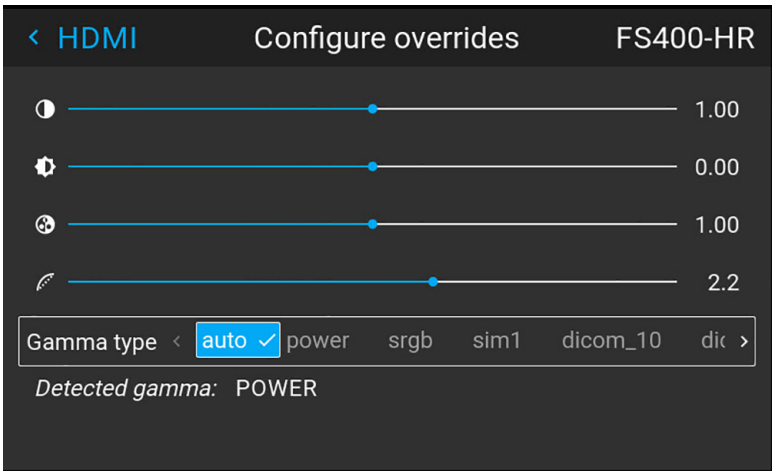


Image 5–12 Example of the Configure overrides menu

4. Set the desired override values for contrast, brightness, saturation and gamma type.

   Tip: For more info on how to change these image settings, see “Image”, page 47.

5.5 No source image

Location and availability

- **Menu**: *Source* > *No source image*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

What happens when no valid signal is selected

If no source with valid signal is selected, a default background image will be projected instead. However, the projected image when no source is selected can be customized.

Select one of the predefined backgrounds (full Black or full Blue), or upload a custom image using an external tool like Pulse Prospector (e.g. project a company logo instead).

While no source with an active signal is selected and the OSD is not projected on screen, the light source power will be reduced to 50% after 10 seconds as a light source power saving feature. This power saving feature can be disabled in the Auto dim menu. For more info, see “Auto dimming”, page 175.

How to change

1. Scroll down the list of available sources in the *Source* menu and select *No source image*.

Image 5–13 Source menu, No Source image

The *No source image* menu is displayed.

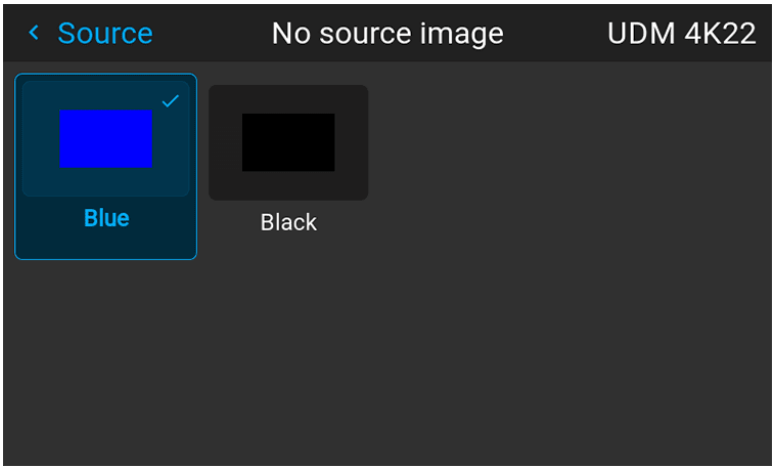


Image 5–14 Example of the No source image menu

2. Select the desired image to project when no source image is available.

Custom background images will be listed after the predefined images.

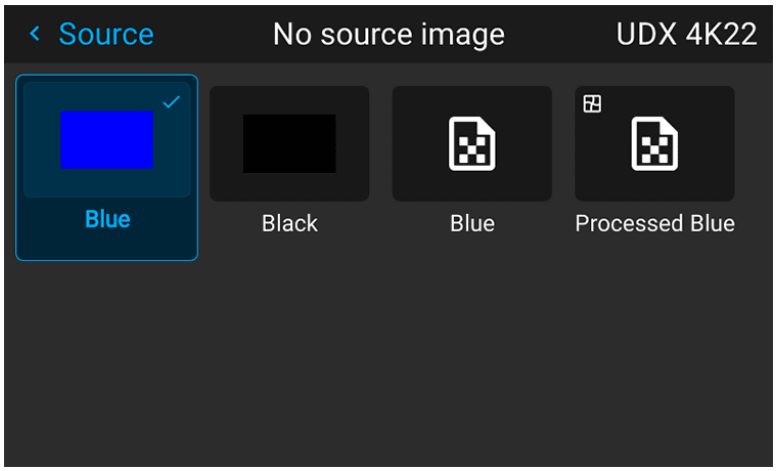


Image 5–15 Example of the No source image menu with two custom background images.

6 Image

6.1 Adjusting contrast

Location and availability

- **Menu**: *Image* > *Contrast*
- **Access level**: all
- **Models**: all

Purpose

The contrast function is used to adjust the difference between the darkest and lightest colors. It does this by applying or removing gain to the red, green and blue signals.

How to set up contrast

1. In the *Image* menu, select *Contrast*.

Image 6–1 Image menu — Contrast

The *Image settings* menu is displayed.

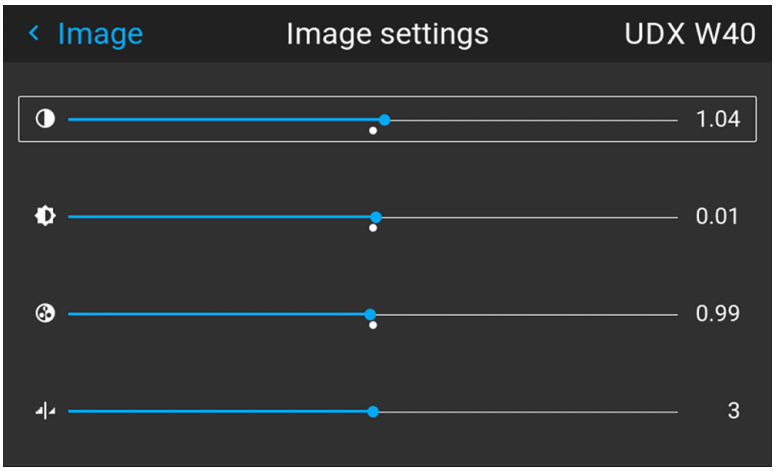


Image 6–2 Example of the image sliders, contrast is the first slider

2. Use the ◄ or ► key to change the contrast enhancement until the desired value is reached.
   - Available range: 0.00 to 2.00
   - Default value: 1.00
3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.2 Adjusting brightness

Location and availability

- **Menu**: *Image* > *Brightness*
- **Access level**: all
- **Models**: all

Purpose

The brightness function is used to adjust the black level of the projected image. It adds or subtracts an offset to the red, green and blue signals.

An image with higher brightness will make dark colors lighter and light colors whiter.

How to set up brightness level

1. In the *Image* menu, select *Brightness*.

Image 6–3 Image menu – Brightness

The Image settings menu is displayed, the brightness slider will be highlighted.

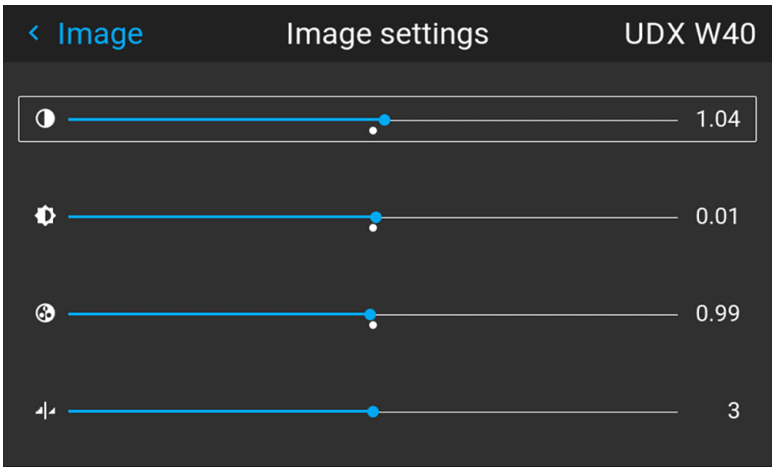


Image 6–4 Example of the image sliders, brightness is the second slider

2. Use the ◄ or ► key to change the brightness slider until the desired value is reached (adjustable between -1.00 and +1.00).
   - Available range: -1.00 to +1.00
   - Default value: 0.00
3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.3 Adjusting the saturation

Location and availability

- **Menu**: *Image* > *Saturation*
- **Access level**: all
- **Models**: all

Purpose

Saturation impact on the white levels and the intensity of the projected colors.

A picture with low saturation will have muted or subdued colors, whereas an image with high saturation will have more vibrant colors.

How to set up saturation level

1. In the *Image* menu, select *Saturation*.

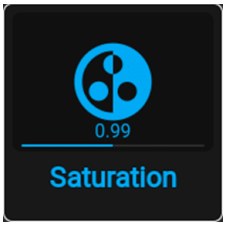


Image 6–5 Image menu – Saturation

The Image settings menu is displayed. The saturation slider will be highlighted.

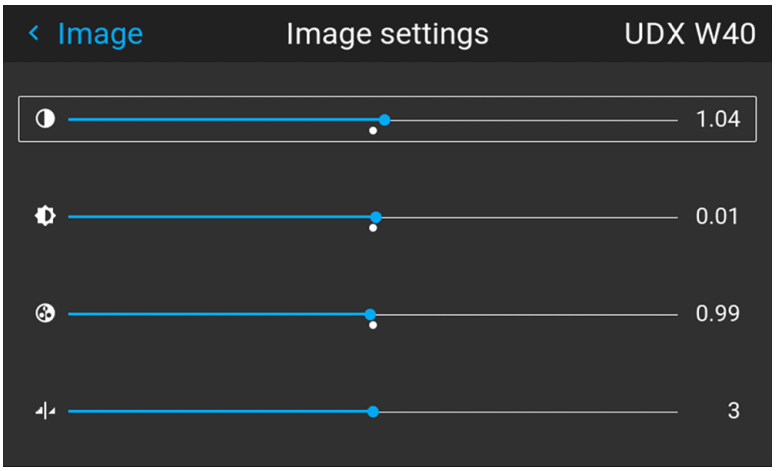


Image 6–6 Example of the image sliders, Saturation is the third slider

2. Use the ◄ or ► key to change the saturation until the desired value is reached.
   - Available range: 0.00 to 2.00
   - Default value: 1.00
3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.4 Adjusting the sharpness

Location and availability

- **Menu**: *Image* > *Sharpness*
- **Access level**: all
- **Models**: all

Purpose

The sharpness adjustment amplifies the high frequency components in the picture. Increasing the sharpness of the source may help pictures and text stand out as sharper. In case of text (e. g. spreadsheets, presentations), text may become more readable.

However, take into account the following when projecting images or movies:

- An image with a sharpness that is too low will be perceived as “blurry”.
- An image with a sharpness that is too high will have “image noise” present.

Adjust the image to avoid both image noise and blur as much as possible.

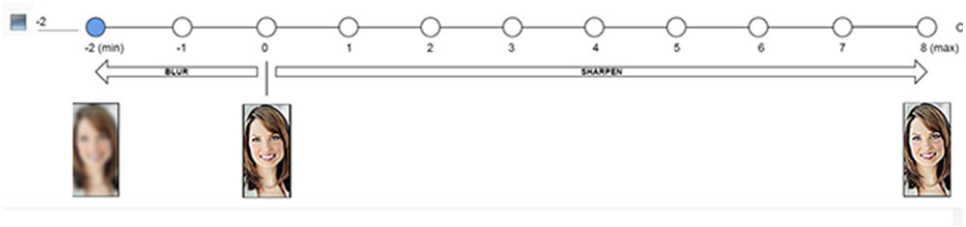


Image 6–7 Example of the effect of sharpness on images

How to adjust the sharpness

1. In the *Image* menu, select *Sharpness*.

Image 6–8 Image menu – Sharpness

The *Image settings* menu is displayed. The sharpness slider will be highlighted.

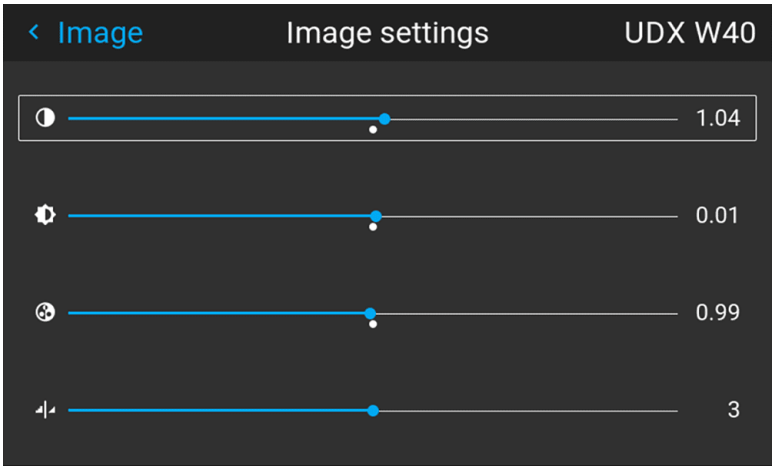


Image 6–9 Example of the image sliders, Sharpness is the bottommost slider

2. Use the ◄ or ► key to change the sharpness until the desired value is reached.

- Available range: -2 to 8.
- Default value: 0

3. If necessary, use the ▲ or ▼ key to select the other image adjustment options.

6.5 Adjusting the gamma correction

Location and availability

- **Menu**: *Image* > *Gamma*
- **Access level**: all
- **Models**: all

Purpose

Gamma correction is an image quality enhancement function that offers a richer image by brightening the already darker portions of the image without altering the brightness of the brighter portions (contrast feeling enhanced).

How to adjust

1. In the Image menu, select *Gamma*.

Image 6–10 Image menu – Gamma

The *"Gamma"* menu is displayed.

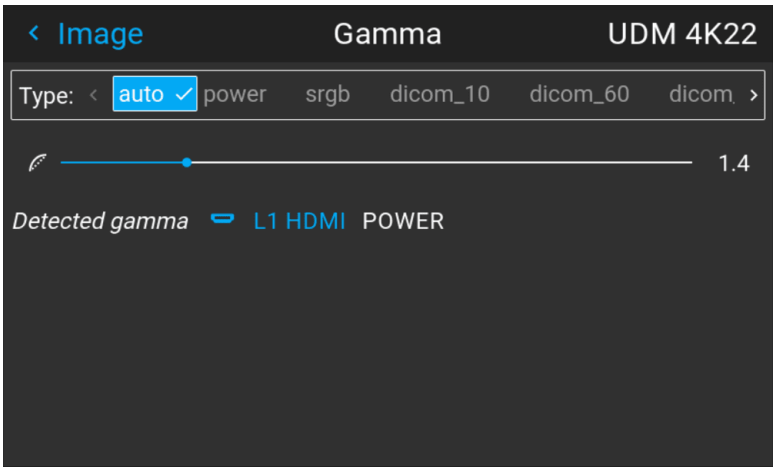


Image 6–11 Example of the gamma menu

2. Select the gamma slider.
3. Use the ◄ or ► key to change the gamma until the desired value is reached.
   - Available range: 1.0 to 2.8
   - Default value: 2.2
   - Step precision: 0.1

6.6 Setting the desired Gamma type

Location and availability

- **Menu**: *Image* > *Gamma*
- **Access level**: all
- **Models**: all

About the alternate gamma types

Next to the standard gamma correction, projectors can be manipulated in a way to simulate gamma types for other devices or purposes. This includes sRGB (standard Red-Green-Blue), Power gamma, DICOM gamma ranges and for simulation projectors sim1.

DICOM gamma ranges are usually reserved for medical displays. While this projector is **not** a certified DICOM display, it can simulate certain specific DICOM gammas at a few selected max light outputs. The DICOM gamma assumes that both ambient light and the projector outputs black as 0 cd/m². Then there will be a few predefined gamma curves at the following light outputs:

- DICOM 10: 10 cd/m²
- DICOM 60: 60 cd/m²
- DICOM 180: 180 cd/m²
- DICOM 250: 250 cd/m²
- DICOM 300: 300 cd/m²
- DICOM 400: 400 cd/m²

This is the full list if DICOM gammas. Some projector models will have a more restricted list.

Restriction for residential models

Because of the more limited use cases in residential environments, the amount of gamma types for HER models is limited to the following gamma types:

- sRGB (standard Red-Green-Blue)
- Power

Exception when using an HDR source

HDR/PQ is the only alternate color gamma that can not be selected in the Gamma menu. Because the color output of HDR is dependant on extra factors such as screen luminance, a separate menu has been made available for this. For more info on this separate menu, see “Displaying HDR content”, page 70.

If the source signal is HDR encoded an HDR icon will be visible next to the source signal. This is visible both in the Source selection menu, as well as the Dashboard menu.

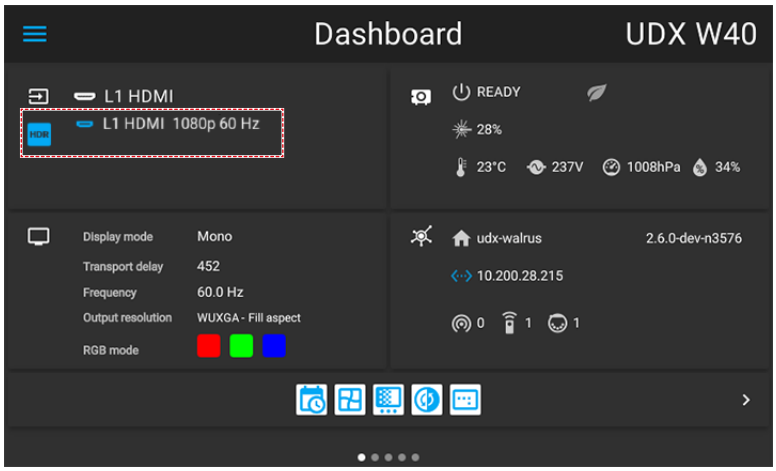


Image 6–12 Example of the HDR icon on the Dashboard menu

How to adjust the gamma type?

1. In the Image menu, select *Gamma*.

Image 6–13 Image menu – Gamma

The *Gamma* menu is displayed.

If source content is available, the *detected gamma* of the source will be displayed at the bottom of the menu.

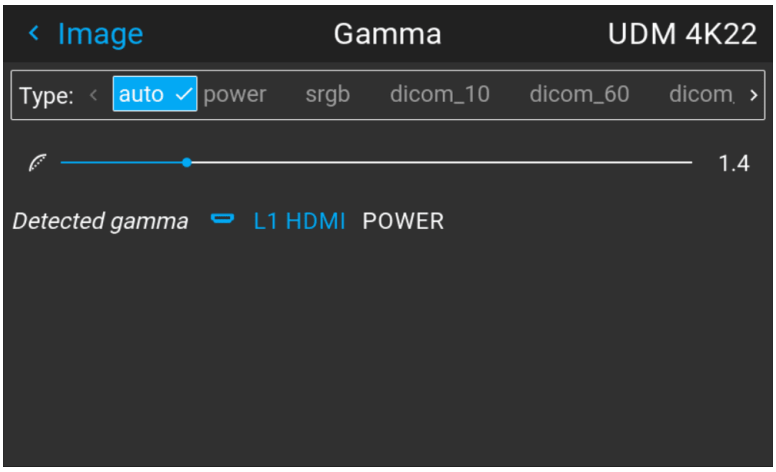


Image 6–14 Example of the gamma menu

2. Use the ◄ or ► key to select the desired gamma type and confirm.

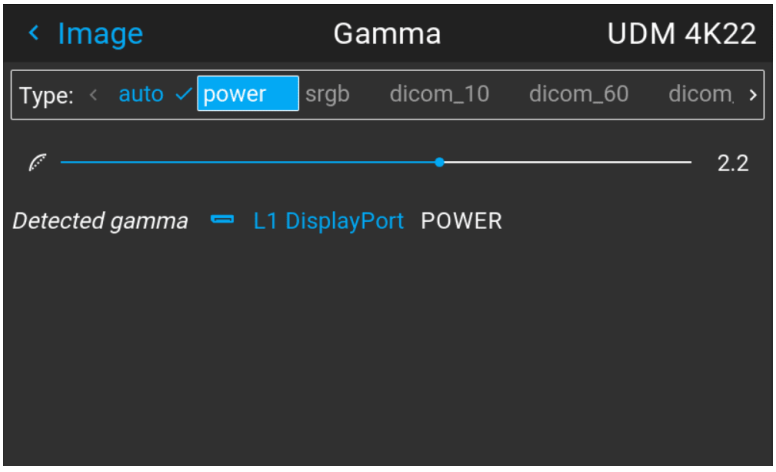


Image 6–15 Example of selecting a gamma type

Tip: If not sure what gamma type to select, keep the default value **auto** selected. This automatic mode will determine the used gamma type based on the incoming signal.
However: keep in mind when using the automatic mode, the media player will need to be configured correctly as well. While most mainstream media player devices will be configured correctly by default, Barco cannot guarantee this is the case for every device available on the market. If the projected image seems “off”, it may be necessary to check the configuration of the media player. For more info, check the user guide of the media player device.

6.7 Tilted brightness uniformity correction

Location and availability

- **Menu**: *Image* > *Tilted brightness uniformity*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

The Tilted brightness uniformity correction feature is only enabled when the light source is on

What is tilted brightness uniformity correction?

Projectors in the events and simulation market can be installed at any angle possible. However, this can result in the lens being positioned in an angle (horizontal or vertical) towards the projection surface.

Due to this, one side of the projected surface can become brighter than the other (left versus right side, top versus bottom side or both). While a slight difference in brightness might not be that noticeable in a single-projector setup, when having the projector installed in a multi-projector setup brightness differences can possibly ruin immersion.

The *Tilted brightness uniformity* menu allows the user to correct the projected image, so that every side of the projected image looks equally bright.

How is the correction applied?

The Tilted brightness uniformity menu has two adjustment options, applying a “darkness gradient” over the horizontal and/or vertical axis. This is applied as follows:

- A positive horizontal correction will result in the right side of the screen becoming less bright than the left side.
- A negative horizontal correction will result in the left side of the screen becoming less bright. than the right side.
- A positive vertical correction will result in the bottom side of the screen becoming less bright than the top side.
- A negative vertical correction will result in the top side of the screen becoming less bright than the bottom side.

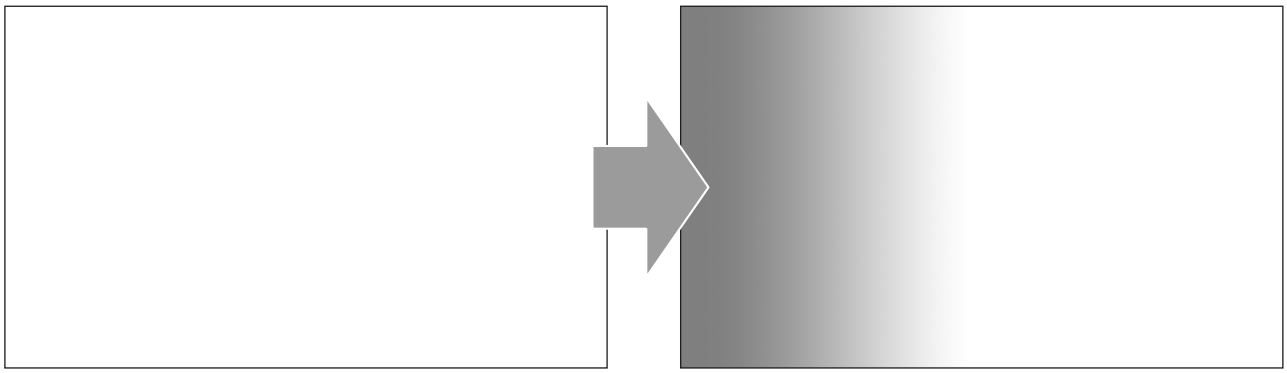


Image 6–16 Example of a (maximum) negative horizontal correction being applied on the projected image.

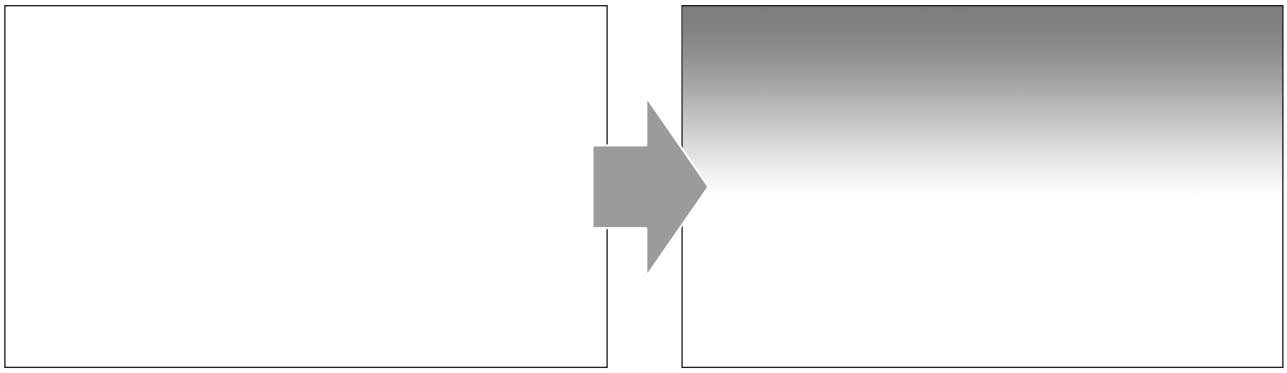


Image 6–17 Example of a (maximum) negative vertical correction being applied to the projected image.

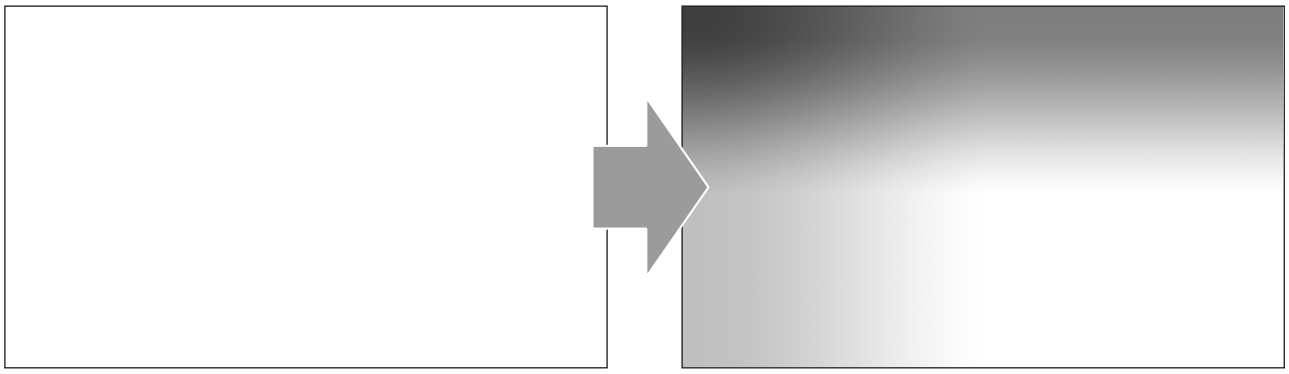


Image 6–18 Example of a maximum negative correction on both horizontal and vertical axes to the projected image.

Required tools

Light meter

How to adjust brightness across the screen

1. In the Image menu, select *Tilted brightness uniformity*.

Image 6–19 Image menu, Tilted brightness uniformity

The Tilted brightness uniformity menu is displayed.

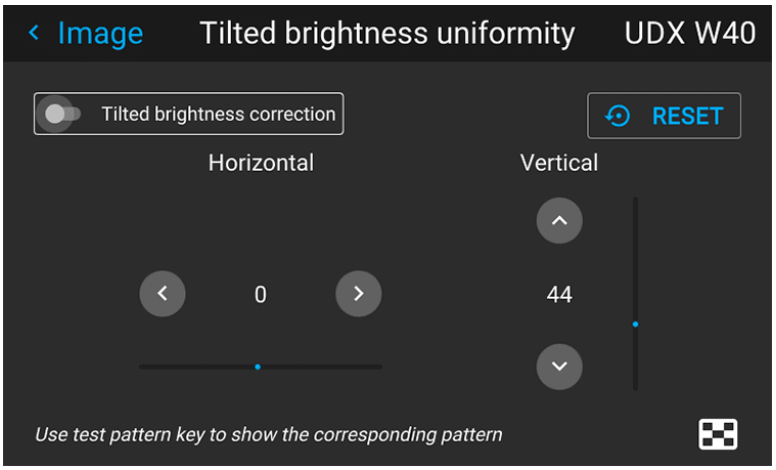


Image 6–20 Exampe of the Tilted brightness uniformity

2. Enable the *Tilted brightness correction* slider.
3. Use the Test Pattern button on the RCU to project the full white test pattern.

   Tip: While any test pattern or projected image can be used, the best result will be achieved while projecting the full white test pattern.

4. Use a light meter to measure the brightness on the left side, center and right side of the projected surface.
5. Adjust the brightness on the *Horizontal* axis until the left and right side of the projected surface are equally bright.
6. Use a light meter to measure the brightness on the top side, center and bottom side of the projected surface.
7. Adjust the brightness on the *Vertical* axis until the top and bottom side of the projected surface are equally bright.
8. Repeat the previous steps until the brightness is even across all sides of the projected surface.

Press the **Reset** button in case of mistakes. When pressed, both the horizontal and vertical axis will return to the center value.

6.8 Digital zoom and shift

Location and availability

- **Menu**: *Image > Digital zoom and shift*
- **Access level**: all
- **Models**: UDM, UDX, I600, F40, F70, F80, F400

What can be done?

The image can be optically shifted by using the vertical and horizontal lens shift.

If a lens shift beyond what is possible with the optical shift is desired, a digital lens shift can be performed. This digital shift will occur on the DMD, rather than the lens holder. So take into account that this additional shift is minimal and restricted to the limits of the chip used.

For more info on the optical zoom and lens shift, see “Optical zoom and focus”, page 88.

Lens shift is only possible when the used lens has been fully calibrated. For more info on how to calibrate the lens, see “Lens calibration”, page 189.

The effect of digital zoom

This function zooms in the picture digitally. When zooming in, the center of the image will increase in size. This means that the outer part of the picture will be outside the picture frame. When zooming out, the result is that the picture will be smaller than the projectors picture frame. The area outside the rendered picture will then be black.

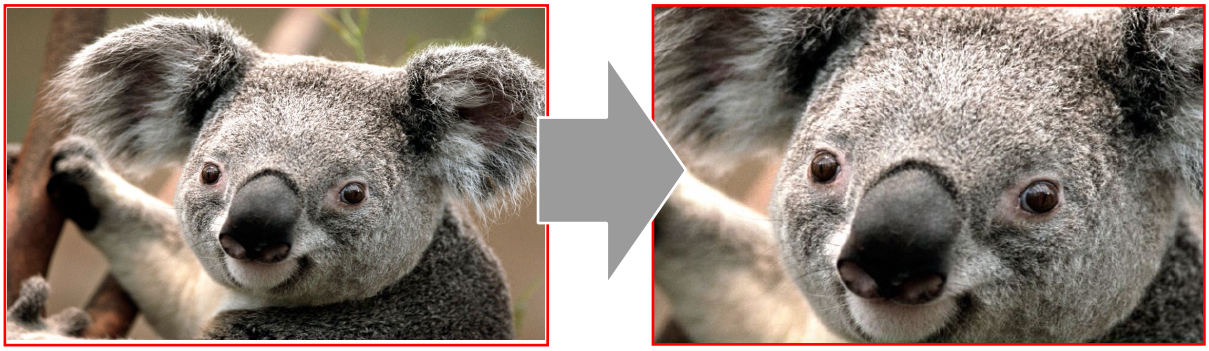


Image 6–21 Example of zooming in digitally

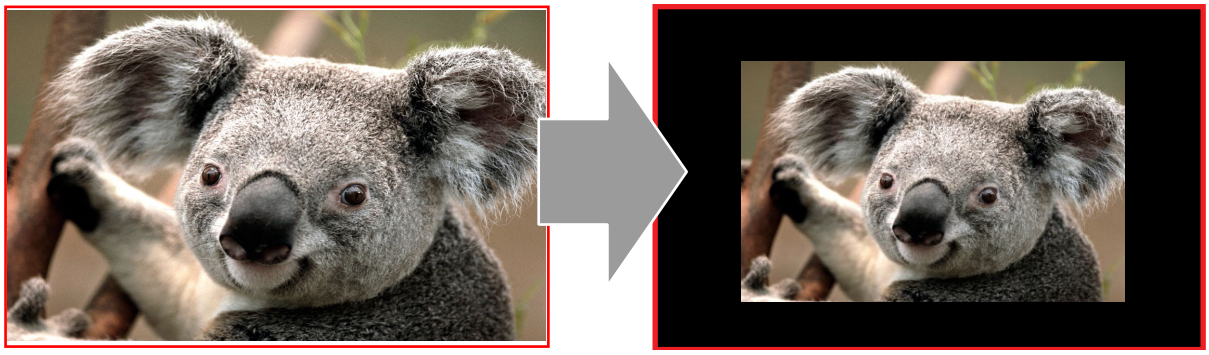


Image 6–22 Example of zooming out digitally

The effect of digital shift

This function will shift the picture digitally, meaning that the picture will be moved in any direction. As a result, some parts of the picture might be shifted outside the DMD range.

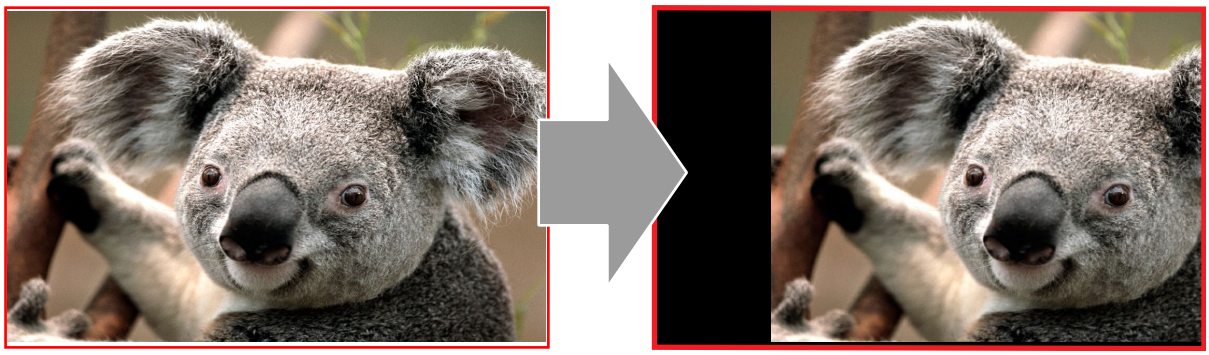


Image 6–23 Example of shifting digitally on the horizontal axis

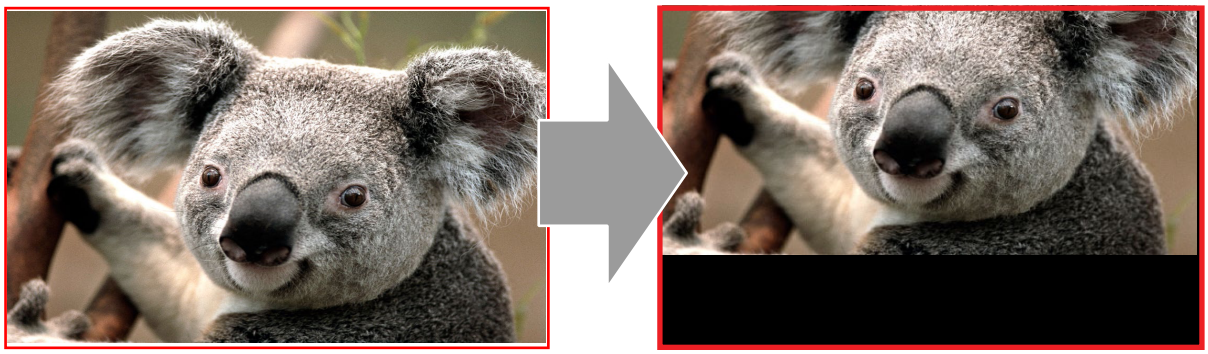


Image 6–24 Example of shifting digitally on the vertical axis

Digital shift and zoom

1. In the Image menu, select *Digital zoom and shift*.

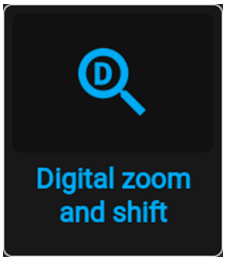


Image 6–25 Image menu, digital zoom and shift

The *Digital zoom and shift menu* is displayed.

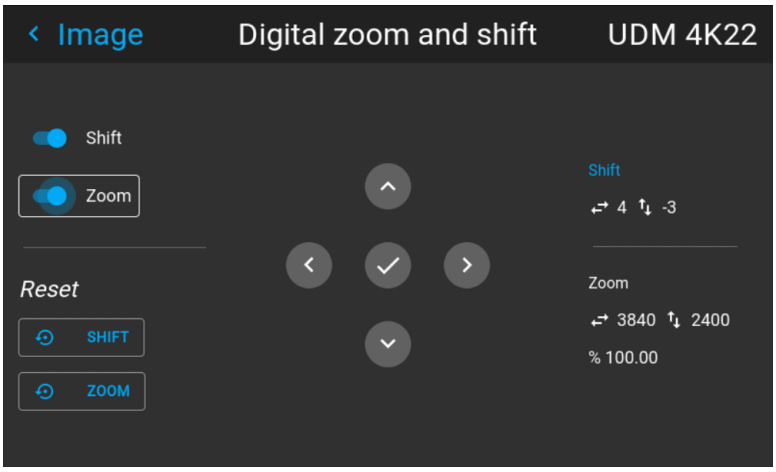


Image 6–26 Example of the digital zoom and shift menu

2. Enable the *Shift* and/or *Zoom* sliders to enable digital shift and/or digital zoom respectively.

3. When one or both of the modes are enabled, use the arrow keys to select the mini-keypad in this menu. Use the **enter** key to activate this mini-keypad.

   If digital shift is enabled, the keypad will transform into the keypad for digital shift. If only digital zoom is active, it will automatically transform in the keypad for digital zoom.

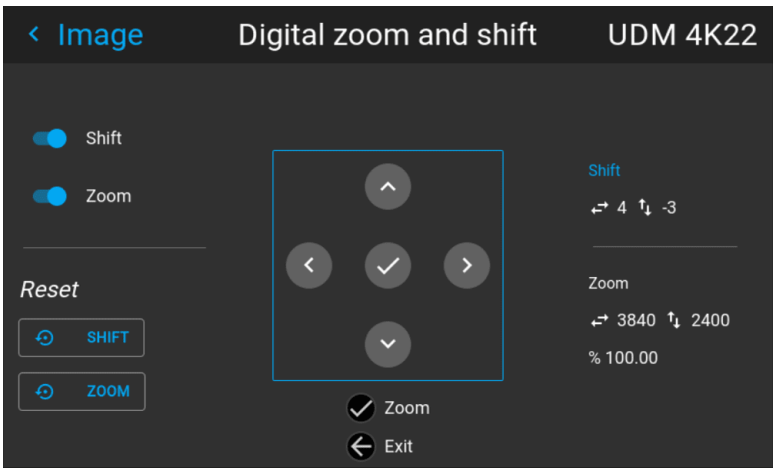


Image 6–27 Example of the enabled digital shift mode

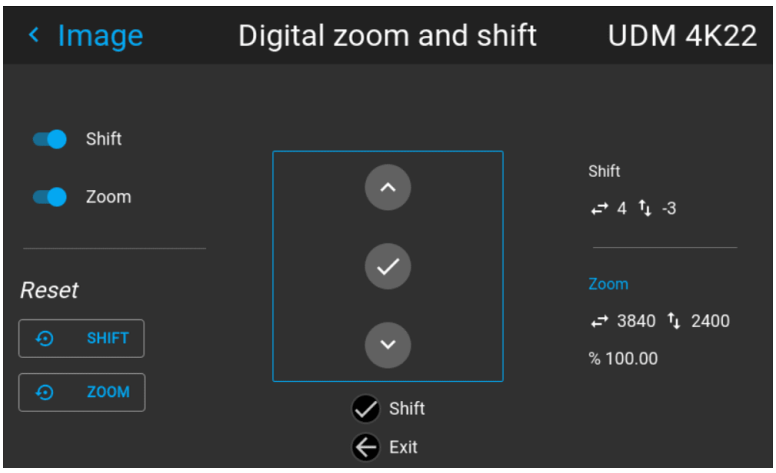


Image 6–28 Example of the enabled digital zoom mode

4. If digital shift is enabled, do the following:
   - Use the ◄ or ► key to shift the lens (image) in horizontal direction.
   - Use the ▲ or ▼ key to shift the lens (image) in vertical direction.
   - Use the **enter** key to transform the keypad to digital zoom mode (if enabled).
   - Use the **return** key to exit without saving.
5. If digital zoom is enabled, do the following:
   - Use the ◄ or ► key to zoom the lens in or out.
   - Use the **enter** key to transform the keypad to digital shift mode (if enabled).
   - Use the **return** key to exit without saving.

6.9 Cinemascope – Cropping the image

Location and availability

- **Menu**: *Image* > *Cropping*
- **Access level**: all
- **Models**: Bragi Cinemascope, Balder Cinemascope, Njord Cinemascope, Hodr Cinemascope

On non-Cinemascope projectors, this feature is replaced with the *16:9 centered* function. For more info, see “Cropping the image to 16:9 centered”, page 77.

About this chapter

This chapter talks about how to crop content according to the used media player and/or content mastering.

6.9.1 Introduction to Cinemascope and image cropping

About Cinemascope and home media releases

Today, most movies released in commercial theaters are mastered with the 2.39:1 aspect ratio of Cinemascope. When a Cinemascope movie is released through modern media, it uses a 1920x800 (or 3840x1620 in 4K) resolution.

However, home media content like Blu-Rays and DVDs are released with an aspect ratio of 16:9, either in 1920x1080 or 3840x2160 (in 4K). Due to the limitations of the approach used, the pixel difference between Cinemascope content and home media content is shown as the much-dreaded “black horizontal bars”.

When this image with black horizontal bars is projected on a high-end 2.35:1 aspect ratio screen, then end result will be an undesired image with black bars on all sides.

Image 6–29 Example of a Cinemascope movie projected on a 2.35:1 aspect ratio screen without image cropping enabled

About image cropping

To avoid the situation with “surrounding black bars”, the image cropping feature uses advanced image processing to scale the image diagonally.

The Cropping feature is a process where the image maintains a perfect geometry while utilizing more pixels. This way it is ensured that the entire 2560x1080 (or 5120x2160 in 4K) space is fully used and real Cinemascope can be experienced.

Image 6–30 Example of the same Cinemascope movie on the same 2.35:1 screen, but with image cropping enabled

There are three cropping modes: preset, manual and auto.

- **Auto cropping**, or cropping using the automatic aspect ratio detection algorithm. For more info, see “Image cropping – auto cropping”, page 63.
- **Cropping via aspect ratio presets**. For more info, see “Image cropping – using aspect ratio presets”, page 64.
- **Manual cropping**. For more info, see “Image cropping – manual cropping”, page 65.

All cropping is done dynamically. For best result Barco recommends to pause the movie currently on screen, making sure that any subtitles or other text is visible. Once paused, activate the cropping function.

6.9.2 Image cropping – auto cropping

Auto aspect ratio detection

The “Auto” mode has the unique automatic aspect ratio detection function. This will check if the provided media is mastered in 2.39:1 content and will automatically scale the image to fit the 2560x1080 (or 5120x2160 in 4K) resolution. It will also change back to 16:9 (1920x1080 or 3840x2160 in 4k) if the content in this format.

The function will also change the aspect ratio when a 2.39:1 format movie has content menus outside of the active picture frame (as shown in the following example image). When activating this type of menu, or when changing to 16:9 content, the projector will then automatically adjust the image shape.

Image 6–31 Example of the projected image changing due to the content menu popping up above the movie content

The auto detection feature will only work in the aspect ratios mentioned in the presets list. Unlisted aspect ratios will not be recognized. If the content aspect ratio does not match any of the listed presets, use manual cropping instead. “Image cropping – manual cropping”, page 65

Watermarks and graphic content in the horizontal black bars

One thing to keep in mind with the auto-cropping feature is the potential of content being present in the horizontal black bar area. This content can take shape in the way of watermarks and logos (e.g. the BBC logo), hard coded subtitles, or other visual flair added by the content publisher. If present, these graphic additions will be considered as “content” by the detection algorithm and the image will be projected with black bars on all sides instead.

If content is present in the black horizontal bars, enable the **Video content** slider. When enabled, only the movie area will be shown. Content outside of the movie area will be removed by the cropping algorithm. This will ensure the projected image remains stable without interference from any added graphic content.

Image 6–32 Example of the projected image decreasing due to the presence of the BBC logo

How to use auto aspect cropping

1. In the Image menu, select *Cropping*.

   The Cropping menu is displayed.

2. Select *Auto*.

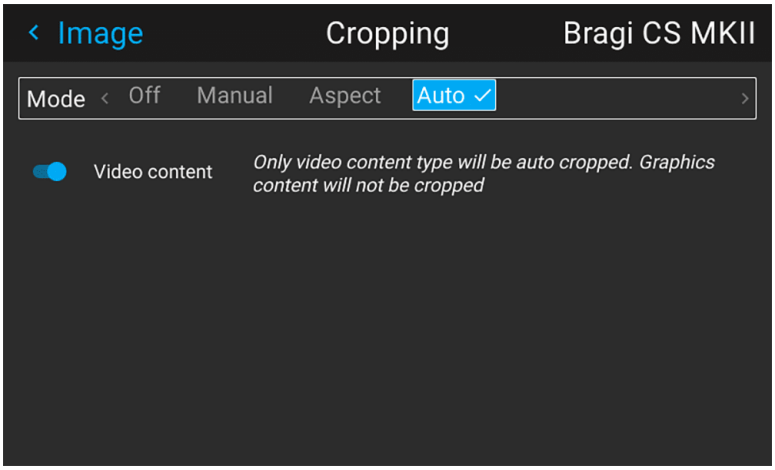


Image 6–33 Example of the Cropping menu – Auto

3. If content in the black bars needs to be removed, enable the *video content* slider.

6.9.3 Image cropping – using aspect ratio presets

Available cropping presets

If the provided content fits with one of the more common aspect ratios, select the applicable preset to automatically fix the projected image.

The available presets are the following:

- *16.9*: HDTV standard, used in most home media releases.
- *1.85:1*: “Flat” widescreen cinema standard for 35 mm film

- *1.9:1*: DCI standard for 4K, 2K and digital IMAX
- *2.0:1*: Univisium standard
- *2.2:1*: Standard for 70 mm film (e.g. Super Panavision)
- *2.35:1* Cinemascope standard for 35 mm film (mastering pre 1970)
- *2.37:1*: Near-cinematic widescreen. Also known as 21:9 or 64:27
- *2.39:1*: Cinemscope standard for 35 mm film (mastering post 1970).

When one of these presets is selected, the projected image will be scaled to fill the projection screen vertically, while respecting the selected aspect ratio at the same time. This means that, depending on the chosen aspect ratio and projection screen, there may be vertical black bars at the side of the picture.

Image 6–34 Example of 16:9 mastered content on a 2.35:1 screen, with black bars on the left and right of the image

In the case where the content format is mastered in a format not covered by the list of presets, it is advised to use manual cropping instead. For more info, see “Image cropping – manual cropping”, page 65.

How to use the aspect ratio presets

1. In the Image menu, select *Cropping*.

   The Cropping menu is displayed.

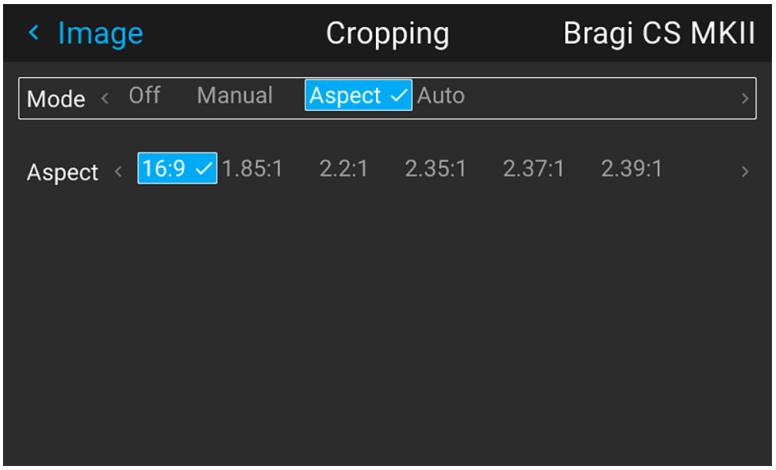


Image 6–35 Example of the cropping menu

2. Select *Aspect* to display the Aspect ratio presets.
3. Select the desired Aspect ratio and confirm.

6.9.4 Image cropping – manual cropping

About manual cropping

When the provided media content does not match any of the provided aspect ratio presets, it is advised to use manual mode instead.

In order to do know how many lines need to be cropped, calculate how large the area is that has black bars.

For example, the Cinemascope 2.37:1 format distributed on a regular Blu-ray disc will have 200 lines on the *Top* and *Bottom* area that will need to be cropped out.

How to perform manual cropping

1. In the Image menu, select *Cropping*.

   The Cropping menu is displayed.

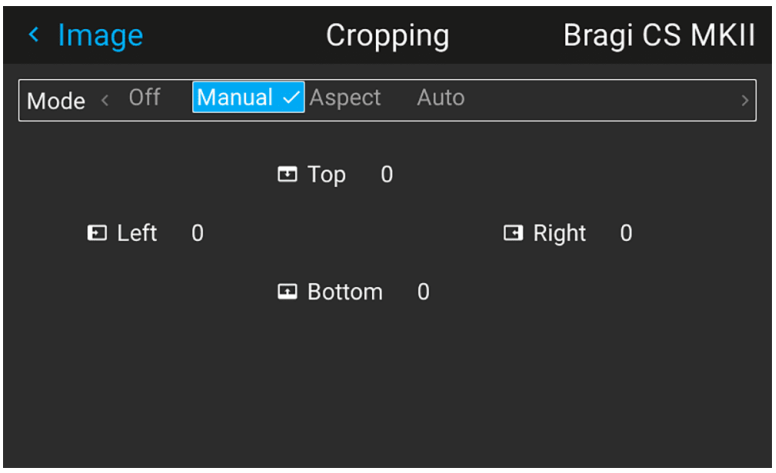


Image 6–36 Example of the cropping menu

2. Select one of the four sides where black bars are visible.

   Tip: As black horizontal bars are the most common occurrence in the world of media (when compared to vertical bars), it is advised to start cropping with the Top area and then the Bottom area. Only if no perfect fit frame can be reached, crop the side areas.

3. Enter the number of lines that will need to be cropped out and confirm.
4. Repeat for each side where black bars are visible, until a complete picture is formed on screen.

If the provided content has subtitles hard coded into the black bars region, manually crop the picture to cut out as much as possible while retaining the area with subtitles.
For example, crop out the entire top black bar, and crop out just enough lines from the bottom black bar to make sure the subtitles are still readable.

6.10 Advanced image setting

6.10.1 RealColor P7 - Custom P7 settings

Location and availability

- **Menu**: *Image* > *Advanced settings* > *RealColor P7*
- **Access level**: all
- **Models**: all

Purpose

When blending images from multiple projectors, the measured color coordination of each projector can be altered to a desired common level. This so that the projected colors are identical over all projectors used.

Alternatively, there are a number of presets available, which forces the color output to specific color standards.

How to set custom P7 values

1. In the Advanced settings menu, select *RealColor P7*.

Image 6–37 Advanced settings menu – RealColor P7

The *RealColor P7* menu is displayed.

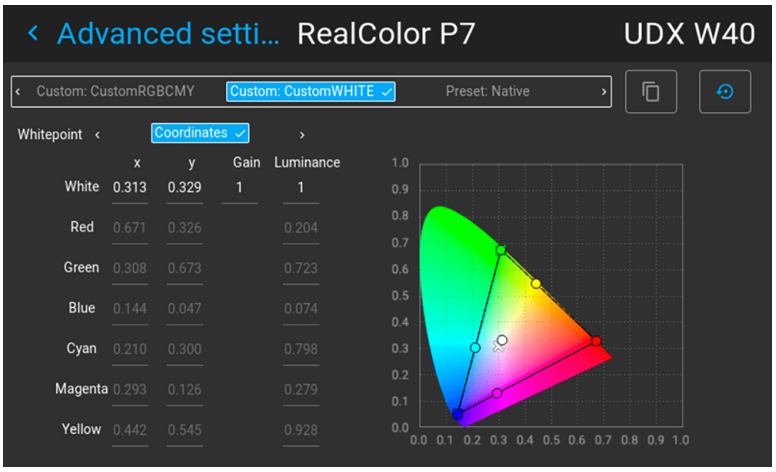


Image 6–38 Example of the RealColor P7 menu, here on a UDX

2. Select the desired *Custom Mode*. Select one of the following *Custom* options and confirm:
   - **Custom RGB**: 3–point color configuration.
     In RGB mode, the C, M and Y coordinates will be calculated automatically based on the R, G and B coordinates.
   - **Custom RGBCMY**: 6–point color configuration (both RGB and CMY).
     In RGBCMY mode, each color can be given a specific coordinate within the measured color triangle.
   - **Custom WHITE**: Configure only the White temperature.
3. Choose how to determine the *Whitepoint*. Choose one of the following:
   - **Coordinates**: Configure the white point via specific coordinates.
     The white point is specified using an x, y coordinate in the CIE 1931 Chart.
   - **Temperature**: Configure the white point via a color temperature slider.
     The white point is specified on a Kelvin scale between 3200K and 13000K tracking along the black body curve.

4. Define the coordinates for each available color.

   Click on a coordinate value and select the current value. Enter the desired value with the numeric keys.

   Note: Only pick coordinates within the measured color triangle.

Click the Reset icon to reset all coordinates to the default native value.

6.10.2 RealColor P7 - Presets

Location and availability

- **Menu**: *Image* > Advanced settings > *Realcolor P7*
- **Access level**: All
- **Models**: All

Purpose

When blending images from multiple projectors, the measured color coordination of each projector can be altered to a desired common level. This so that the projected colors are identical over all projectors used.

Alternatively, there are a number of presets available, which forces the color output to specific color standards.

How to choose one of the P7 presets

1. In the *Advanced settings* menu, select *Realcolor P7*.

Image 6–39 Advanced settings menu – RealColor P7

The *Realcolor P7* menu is displayed.

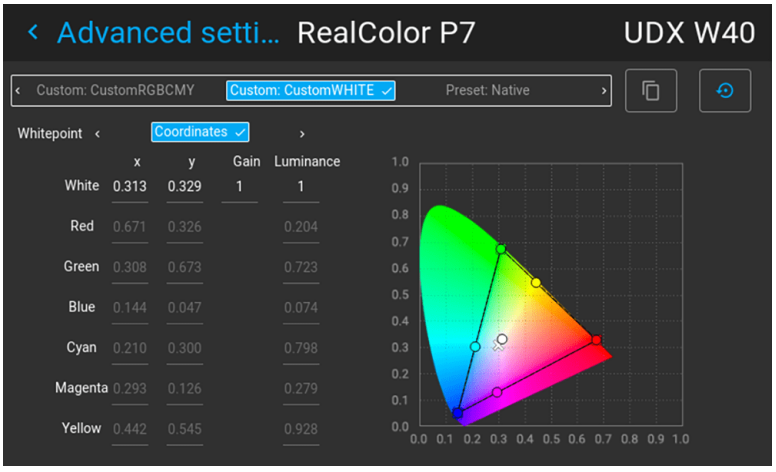


Image 6–40 Example of the RealColor P7 menu

2. Select one of the pre-defined presets:
   - **Standard**: A color standard, specifically for UDX projectors.
   - **Native**: Projector native color settings.
   - **DCI-P3**: Color standard for Cinema.
   - **EBU**: European color standard for broadcasting.
   - **SMPTE-C**: American color standard for broadcasting.

- **Rec. 709**: Color standard for high-definition televisions (HDTV).

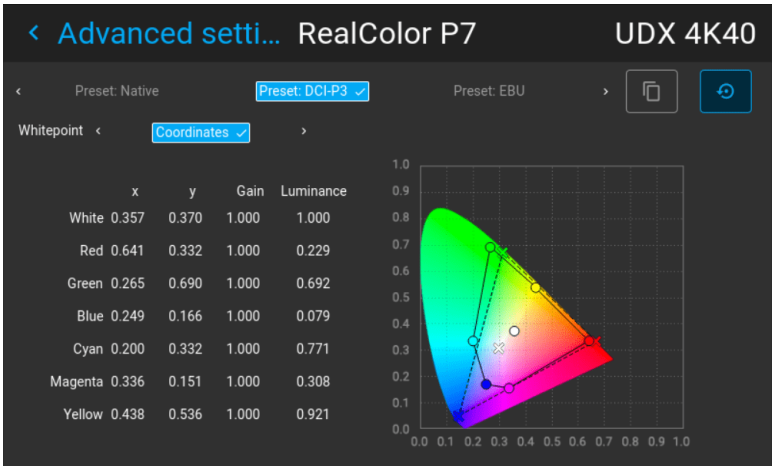


Image 6–41 Example of one of the presets, here DCI-P3

Note: After choosing one of the presets, the values of the coordinates can still be altered to your own choosing, similarly to how the custom P7 values can be altered.

Use the **Reset** icon to return to the default values of the chosen preset.

6.10.3 Setting the output resolution

Location and availability

- **Menu**: *Image* > *Advanced settings* > *Output resolution*
- **Access level**: all
- **Models**: UDM 4K, UDX 4K, I600 4K, F40 4K, F70 4K, F80 4K, F400 4K, Njord, Hodr, Medea, Balder, Bragi

How to determine the desired output resolution

While the native output resolution of this projector is 4K in Ultra-High Definition (4K-UHD), sometimes it can be better to choose an alternate resolution, depending on the main purpose of the projected content:

- If the main purpose of the projection is **image** (e.g. photographs, movie, or similar purpose), use the **4K UHD** output resolution for the best image at the highest possible light output.
- If the main purpose of the projection is **text** (e.g. spreadsheets, presentations, or similar purposes), use the **4K UHD S** output resolution for the for the most stable and sharpest possible output.
- If the main purpose of the projection is **HFR video** (content with **high framerate**, e.g. racing games), use the **WQXGA** output resolution. This will disable the actuator and allow content of up to 120 FPS to be played.

4K-UHD-S is only available on UDX-4K and UDM-4K projector models, as well as Njord and Hodr

How to choose the output resolution

1. In the *Advanced settings* menu, select *Output resolution*.

Image 6–42 Advanced settings menu, Output resolution

The *Output resolution* menu is displayed.

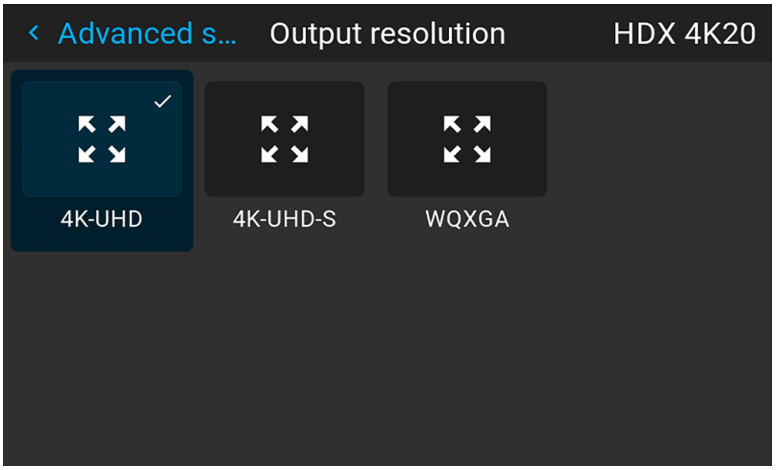


Image 6–43 Example of the available output resolutions

2. Select the desired output resolution and confirm.

   Possible resolutions:

   - **4K UHD**: 4k images, using the actuator at normal frequency.
   - **4K UHD S**: 4k extra sharp images, using the actuator at a higher frequency
   - **WQXGA**: 2k images. In this mode, the actuator is disabled.

6.10.4 Displaying HDR content

Location and availability

- **Menu**: *Image* > *Advanced settings* > *HDR*
- **Access level**: all
- **Models**: all

PQ
Perceptual Quantizer (PQ) is a non–linear electro-optical transfer function (EOTF) that allows for the display of High Dynamic Range (HDR) content with a luminance level of up to 10 000 cd/m² and can be used with the Rec. 2020 color space.

How to properly display HDR content?

HDR content has been mastered specifically for HDR capable displays that are watched in living rooms. These conditions are different from a non-HDR projector and darker cinema-like environments. If the provided HDR content has been mastered with PQ (e.g. HDR10 or Dolby Vision), a few changes can be made in order to project the intended mastering on screen.

The projected HDR content depends on the following factors:

- **Mastering luminance**: This is content-specific and cannot be changed.
- **Screen luminance**: Every projection screen has a specific luminance, measured in either “nits” (nt) or “foot-Lambert” (fL). Entering this luminance in the projector will adapt the content towards the intended HDR result.
- **HDR Boost**: A variable “booster” that may amplify or downplay the HDR output.

If no changes are made and there is a mismatch between content mastering and the settings in the HDR menu, the projected image can look either washed out or too dark.

How to know if content is HDR encoded?

If the source signal is HDR encoded, an HDR icon will be visible next to the source signal. This icon is visible both in the *Source* selection menu, as well as the *Dashboard* menu.

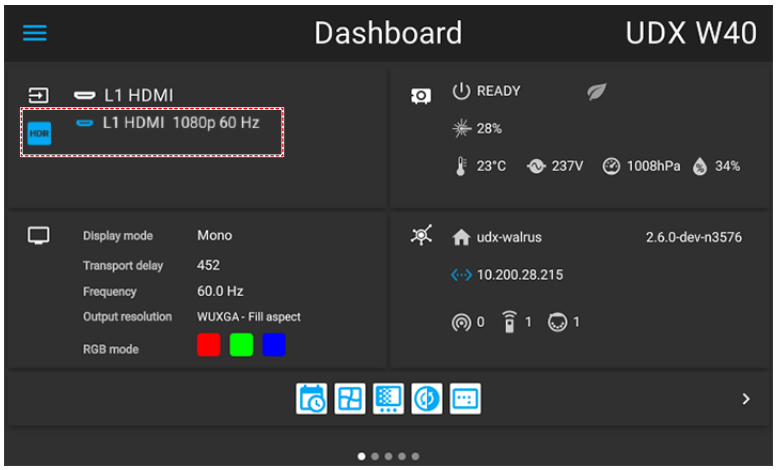


Image 6–44 Example of the HDR icon on the Dashboard menu

How to set the HDR-related parameters?

1. Make sure the chosen Gamma Type is set to *AUTO*. For more info, refer to "Setting the desired Gamma type", page 54.
2. In the *Advanced settings* menu, select *HDR*.

Image 6–45 Advanced settings menu, HDR

The *HDR* menu is displayed.

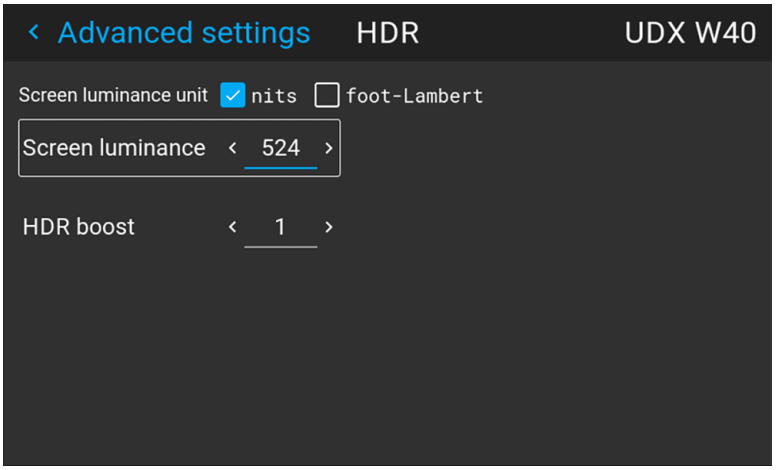


Image 6–46 Example of the HDR menu

3. Select the desired *Screen luminance unit* (nits or foot-Lambert).
4. Enter the *Screen luminance* (which is measured in nits or foot-Lambert).
5. Enter the desired luminance unit (nits or foot-Lambert).

   Tip: 1 foot-Lambert equals ~3.426 nits. Make sure the selected unit is a match when compared to the measured unit.

6. Select the Screen luminance.
7. Alter the HDR boost if necessary.
   - Range: between 0.8 and 1.2

- Default: 1.0

6.10.5 Dynamic contrast

Location and availability

- **Menu**: *Image* > *Advanced settings* > *DynaBlack*
- **Access level**: all
- **Models**: UDM, UDX, I600

DynaBlack: What is Dynamic contrast?

Projectors rely on contrast to showcase dark scenes or black parts on the projected surface. Whites and light areas are usually projected without issue, but blacks and dark areas are a different matter. With low contrast, blacks and dark areas appear more grey. The **DynaBlack** menu is here to improve the accuracy of dark scenes.

Using advanced algorithms, the DynaBlack menu checks the projected content dynamically and adapts the contrast of the light source accordingly to create the best possible outcome.

Take note that dynamic contrast isn't magic. Adapting the light source to change its contrast according to the played content will have an impact on the total light output of the projector. If this feature does not matter to the end result, turn off this feature.

How to set the dynamic contrast?

1. In the *Advances settings* menu, select *DynaBlack*.

Image 6–47

The DynaBlack menu is displayed.

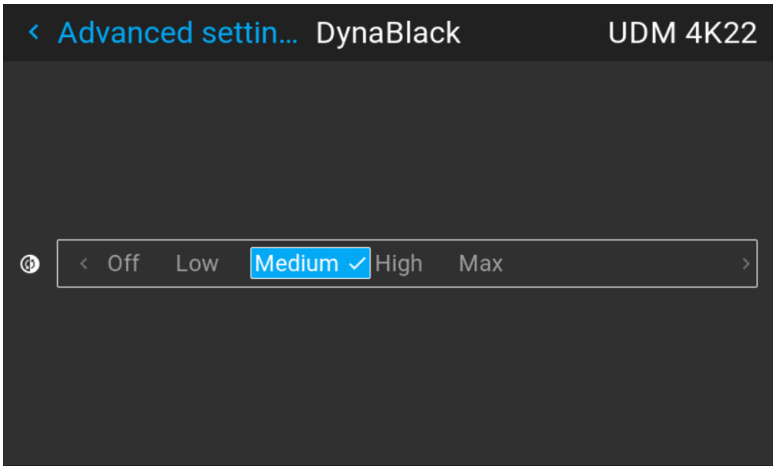


Image 6–48 Example of the DynaBlack menu

2. Select the desired dynamic contrast setting, or leave the default on (medium).

   The result will slowly become visible.

Do not panic if there isn't a visible change after a few seconds. Each change in the dynamic contrast menu has an impact on the light source, thus these changes will only become visible over time.

6.10.6 BrilliantColor™

Location and availability

- **Menu**: Image > *Advanced settings* > *BrilliantColor™*
- **Access level**: all
- **Models**: I600, FL40, FS40, F70, F80, F400, Bragi, Balder, Medea

About BrilliantColor™

The BrilliantColor™ mode has an effect on the color rendering.

With BrilliantColor™ mode set to **Off**, only primary colors are generated by the light source. In **Native** and **Video** mode, a secondary color is added (C1). This has the effect of increasing the color intensity, and by that also the perceived light intensity.

The options available in the BrilliantColor™ menu depend on the projector type and the installed color wheel type (if applicable). For an overview of what options are available, see "Menu variations in Smear reduction and BrilliantColor™", page 74.

How to select a BrilliantColor™ mode

1. In the *Advanced settings* menu, select *BrilliantColor™*.

Image 6–49 Advanced settings menu, BrilliantColor™

The BrilliantColor™ menu is displayed.

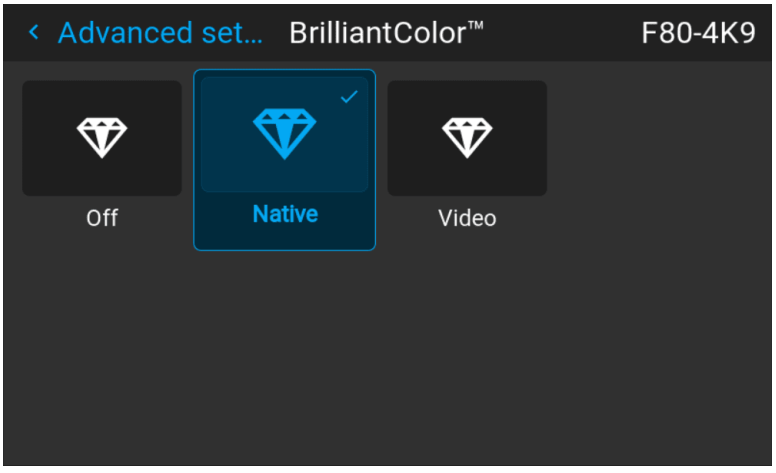


Image 6–50 Example of the BrilliantColor™ menu

2. Select the desired BrilliantColor™ mode from the available listing and confirm.

6.10.7 Smear reduction

Location & availability

- **Menu**: *Image* > *Advanced settings* > *Smear reduction*
- **Access level**: all
- **Models**: FL40, FS40, F70, F400, Bragi, Balder

About smears and smear reduction

A smear is a phenomenon that typically occur when objects in the picture moves in high speed over the screen. It appears like there is a “tail” behind the object, or a lag in the moving parts of the picture.

In order to avoid this the Smear Reduction Process (SRP™) is developed. This process reduces this perceived rendering.

The options available in the *Smear reduction* menu depend on the projector type and the installed color wheel type (if applicable). For an overview of what options are available, see “Menu variations in Smear reduction and BrilliantColor™”, page 74.

How to activate smear reduction

1. In the *Advanced settings* menu, select *Smear reduction*.

Image 6–51 Advanced settings, Smear reduction

The *Smear reduction* menu will be displayed.

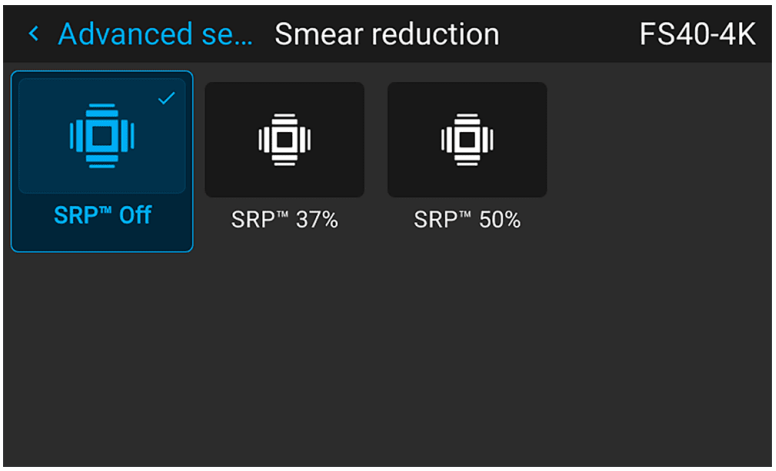


Image 6–52 Example of the Smear reduction menu

2. Select the desired smear reduction option from the available listings and confirm.

6.10.8 Menu variations in Smear reduction and BrilliantColor™

About the menu variations

The projector is delivered with a standard color wheel which is suitable for most applications. Other color wheels are available upon request.

The *Smear reduction* and *BrilliantColor™* menus will be different, depending on the following variants:

- Projector family and model (e.g. F70 family, FS70-4K6 model)
- Projection mode (e.g. WQXGA @60Hz)
- Installed color wheel (e.g. Color type color wheel).

The following tables are here to help clear up what the possible differences are in the Smear reduction and BrilliantColor™ menus.

Identifying the installed color wheel

The installed color wheel can be identified in the *Status / Dashboard* menu.

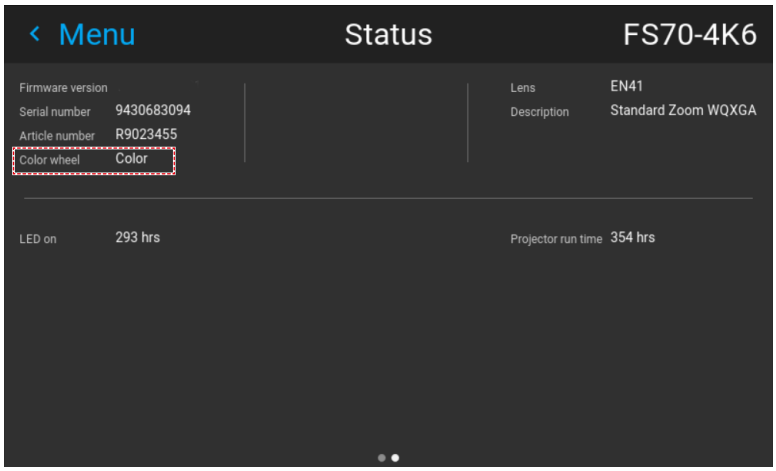


Image 6–53 Example of the Status menu, with a mention of the installed color wheel

The projector is delivered with a standard color wheel, which is suitable for most applications. Other color wheels may be available upon specific request.
Consult Barco in order to find the most suitable color wheel for the desired application.

Menu variations with color wheel type “Color”

Mode	Smear reduction	BrilliantColor™
WQXGA @60Hz	SRP Off	Off
		Native
		Video
	SRP Half	Off
		Native
	SRP Full	Off
		Native
	SRP Half Plus	Native
		Off
	BSI (Black Sub Frame Insertion)	Native
		Off
		Video
		Graphics
	SRP Half BSI	Native
		Off
	SRP Half Plus BSI	Native
		Off
		Video
WQXGA@120Hz / 4K mode	SRP Off	Off
		Native
		Video
		Graphics
	SRP Half	Off
		Native
	SRP Half Plus	Off

Mode	Smear reduction	BrilliantColor™
		Native
		Video
4K @ 60Hz	BSI (Black Sub Frame Insertion)	Native
		Off
		Video
		Graphics
	SRP Half BSI	Native
		Off
	SRP Half Plus BSI	Native
		Off
		Video
	SRP Off	Off
		Native
		Video
	SRP Half	Off
		Native
	SRP Half Plus	Native
		Off

Menu variations with color wheel type “Bright”

Mode	SRP	Brilliant Color
WQXGA @60Hz	Off	Off
		Native
WQXGA@120Hz / 4K mode	Off	Off
		Native
4K @ 60Hz	BSI	Native
		Off
	SRP Off	Native
		Off

Menu variations with color wheel type “VizSim”

Mode	SRP	Brilliant Color
WQXGA @60Hz	SRP Off	Off
		Native
		Video
	SRP Half	Off
		Native
		Video
	SRP Full	Off
		Native
		Video
	SRP Half Plus	Off
		Native
		Video

Mode	SRP	Brilliant Color
WQXGA@120Hz	SRP Off	Off
		Native
		Video
	SRP Half	Off
		Native
		Video
4K mode	SRP Off	Off
		Native
		Video
	SRP Full	Off
		Native
		Video

6.10.9 Cropping the image to 16:9 centered

Location and availability

- **Menu**: *Image* > Advanced settings > *16:9 Centered*
- **Access level**: all
- **Models**: Njord, Hodr, Balder, Medea

For Cinemascope Residential projectors, this feature is replaced with the more advanced *Cropping* menu. For more info, see “Cinemascope – Cropping the image”, page 62.

About the 16:9 Centered functionality

Barco residential projectors project in 16:9 aspect ratio by default. However, when content in 16:9 aspect ratio is projected on a Cinemascope screen, the lower and upper part of the picture will go outside the screen (also known as “content overshoot”).

When the *16:9 Centered* function is enabled, the picture will center the image and crop the content to fit the height of the screen. Therefore, in order to keep the aspect ratio, the image will not exploit the entire screen width.

Image 6–54 Example of 16:9 content on a Cinemascope scren without (left) and with (right) the 16:9 feature enabled

Activating the 16:9 Centered preset will neglect all other warping options.

How to activate a centered 16:9 image

1. In the Advanced settings menu, enable the *16:9 Centered* slider.

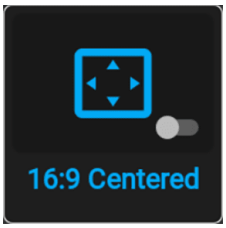


Image 6–55 16:9 Centered is off

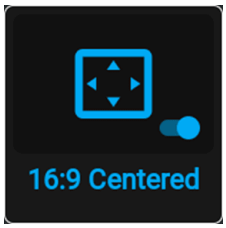


Image 6–56 16:9 Centered is on

The projected image will be cropped and centered to a 16:9 aspect ratio.

6.10.10 Night vision

Location and availability

- **Menu**: *Image* > *Advanced settings* > *Night vision*
- **Access level**: all
- **Models**: FS40, FS70, FS400

About

It is important that both the night vision goggles as well as the projector have their daylight image and the night vision image on an identical channel (e.g. daylight on DisplayPort 1 for both goggles and projector).

However, if a different type of goggles are used, or somebody made a mistake during installation, the *Swap channels* option in the *Night vision* menu can be used to quickly correct this without requesting a service technician or installer to dismantle the simulation booth.

How to swap channels

1. In the Advanced settings menu, select *Night vision*.

Image 6–57 Advanced settings menu, Night vision

The *Night vision* menu will be displayed.

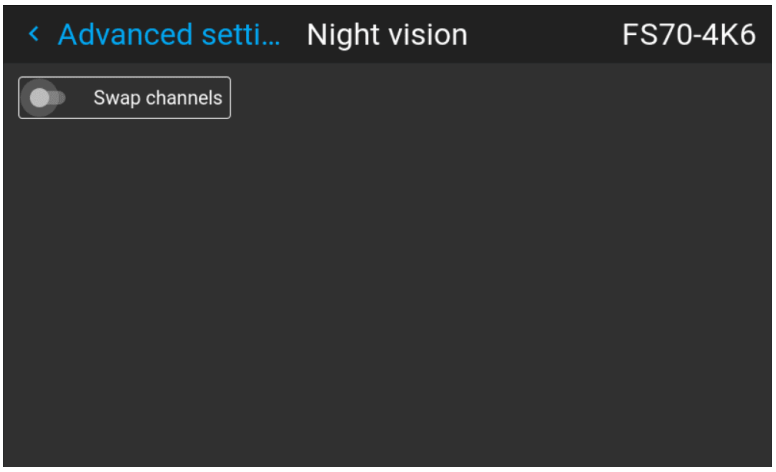


Image 6–58 Example of the Night vision menu

2. Enable or disable the Swap channel function.

7 Installation

7.1 Configuring the projector position

Note regarding the position menu

On Pulse 2.3 and later, several software features related to the positioning of the projector have been grouped together in the *Position* submenu.

When consulting these features in older software versions, these can be found directly in the installation menu.

7.1.1 Orientation

Location and availability

- **Menu**: *Installation* > *Position* > *Orientation*
- **Access level**: all
- **Models**: all

What can be done?

The way of physical installation of the projector can be defined to the projector.

The following installation are possible:

- **Desktop front**: Projected image will not be flipped or mirrored.
- **Desktop rear**: Projected image will be flipped horizontally (left side switches to the right side).
- **Ceiling front**: Projected image will be flipped vertically (top side switches to the bottom side).
- **Ceiling rear**: Projected image will be flipped both vertically and horizontally.
- **Auto front**: The tilt sensor will detect if the projector is desktop or ceiling mounted and will project a readable image accordingly.
- **Auto rear**: The image will be flipped horizontally. The tilt sensor will detect if the projector is desktop or ceiling mounted and will project a readable image accordingly.

How to set the correct orientation

1. In the *Position* menu, select *Orientation*.

Image 7–1 Position menu, Orientation

The *Orientation* menu is displayed.

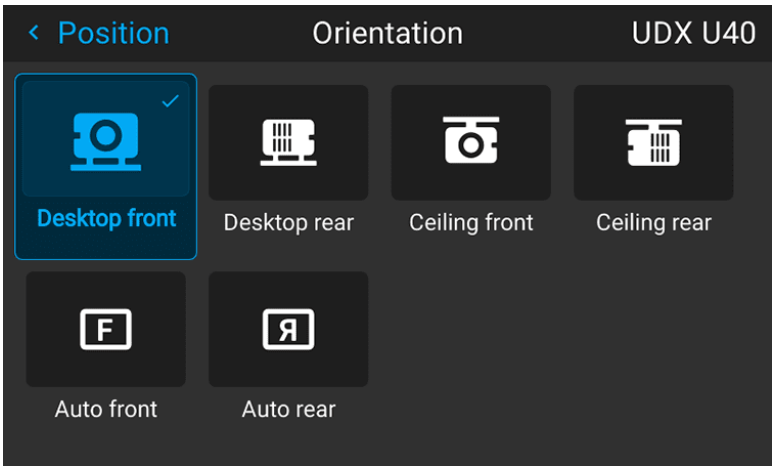


Image 7–2 Example of the orientation menu

2. Select the desired projector orientation mode and confirm.

   The projected image will be flipped according to the chosen orientation.

7.1.2 Laser ranging

Location and availability

- **Menu**: *Installation* > *Position* > Laser ranging
- **Access level**: all
- **Model**: UDM, UDX
- **Requirements**: Distance meter and camera kit

An updated version of the *Laser ranging* menu is available on Pulse 2. 3 and later. Update the projector to the latest available version to have access to the new features in this menu.

What can be done?

When the optional distance meter and camera kit is installed on the projector, the laser source can be used to measure the distance between the front of the projector and the projected surface. Use this to fine-tune the position of the projector.

The measured distance can also be stored as a reference value. Using this, the current distance can be verified at certain time intervals (e.g. during startup). When the projector is changed from its original reference position, a notification will be triggered.

Take into account that while a laser ranging session is active, the projected image will be off. This to have no interference between laser pointer and projected image.
Instead, a red border will be projected giving the outline of where the projected image should be.

How to measure the distance between projector and screen?

1. In the *Position* menu, select *Laser ranging*.

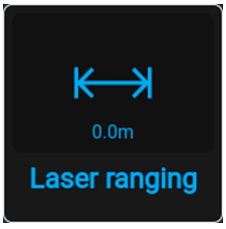


Image 7–3 Position menu, laser ranging

The *Laser ranging* menu will be displayed.

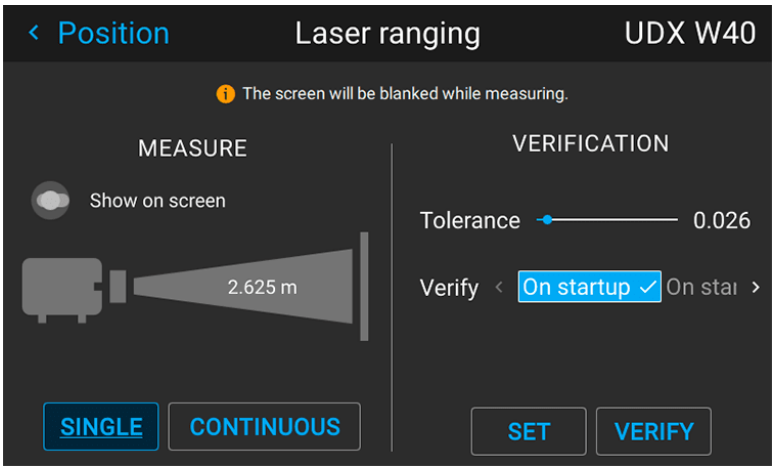


Image 7–4 Example of the laser ranging menu

2. Enable the *Show on screen* slider to project the distance being measured while performing a laser ranging session.

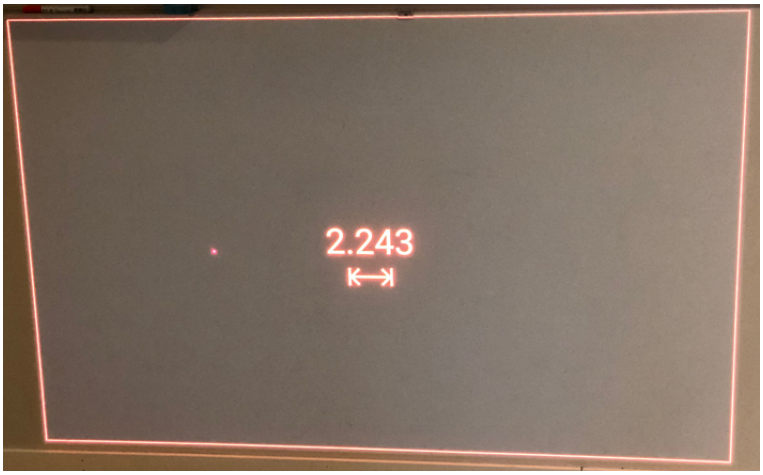


Image 7–5 Example of projected image during laser ranging session with measurement on screen

3. For a single laser ranging calculation, press **Single**. This will continue the laser for 30 seconds straight.

   or

   For a continued laser ranging (e.g. when fine-tuning the position of the projector), press **Continuous** instead.

   Tip: If pressed, the **Continuous** button will be replaced with a **Stop** button. Press the **Stop** button to stop the measurement.
   Take note that when Stop is pressed, it will take a few more seconds to finish up the measurement. The measurement is only completed when the regular source image is returned to the screen.

4. Press **Set** to store the measured distance as a reference value.

   If a reference distance was already stored, a message will be prompted asking to confirm to overwrite the existing reference.

By default the measurement is in meters. To measure in feet instead, change the measurement system in the settings menu. For more info, refer to “Units (measurement) system setup”, page 163.

How to verify the measured distance?

Once a measured reference distance has been stored in the projector, the currently measured distance can be verified with the stored reference distance as follows:

- Set a *Tolerance* (in meters by default). Use the slider to set the desired tolerance between reference distance and measured distance.

- Set on which moment the projector will verify the measured distance. Choose one of the following:
  - On startup
  - On standby
  - Off

If the verified distance ends up being different compared to the set reference distance, a notification will be prompted and the measured distance will be marked red.

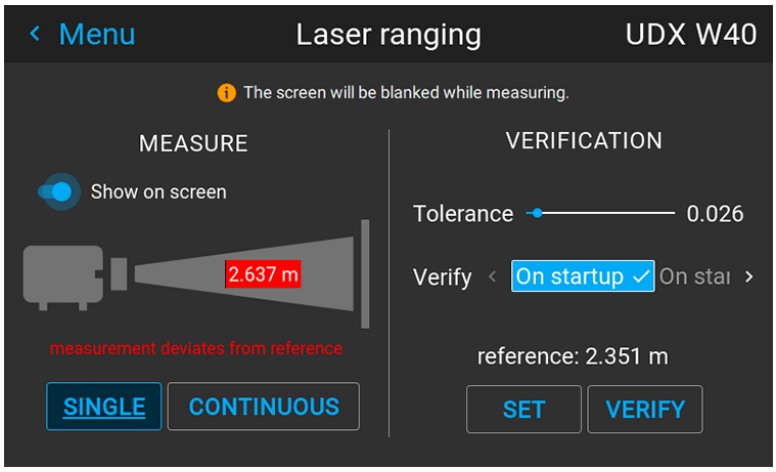


Image 7–6 Example of the measured distance being different than the set reference distance

7.1.3 Tilt sensor

Location and availability

- **Menu**: *Installation* > *Position* >> *Position*.
- **Access level**: All
- **Models**: All

When to use the tilt sensor menu

The projector has a built-in tilt sensor that detects the angle at which the projector is mounted. In a situation where the projector needs to be fine-tuned to achieve a picture at a specific angle (e.g. perfectly level, or a perfect fit in a multi-projector setup), the tilt sensor menu can be used as a visual aid when adjusting the projector feet, rigging frame or other used mounting mechanisms.

About Pitch & Roll

The *Pitch* and the *Roll* is indicated in degrees.

Pitch tilt: A positive value for the Pitch means that the projector is projecting upwards when compared to the beam axis. A negative value means the projector is projecting downwards.

Roll tilt: Seen from the front of the projector, a positive value means that it rolls to the right. A negative value means the projector has rolled to the left.

How to read the tilt sensor values

1. In the Position menu, select *Tilt sensor*.

Image 7–7 Position menu, Tilt sensor

The Tilt sensor menu is displayed.

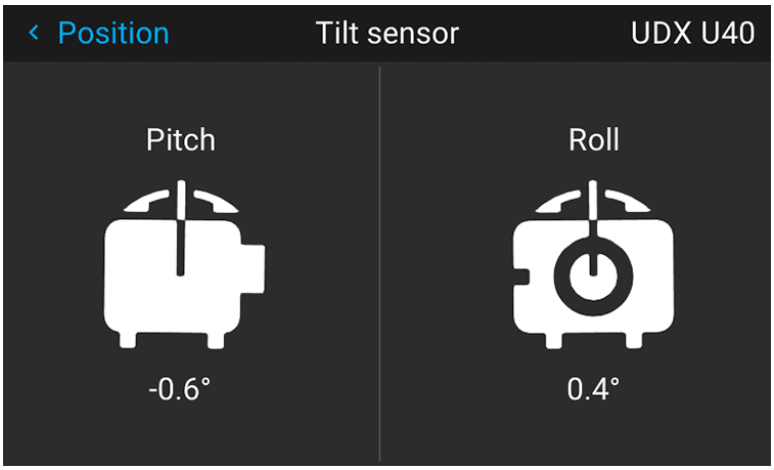


Image 7–8 Example of the tilt sensor menu

If the tilt sensor isn't working correctly (e.g. when compared to a level), the sensor can be calibrated. For more info, see "Advanced settings – Tilt sensor calibration", page 208.

7.1.4 Manipulating the rigging frame, center position

Location and availability

- **Menu** : *Installation* > *Position* > *Center motorized frame*.
- **Access level**: all
- **Models**: UDM, UDX, F70, F80
- **Requirements**: Motorized rigging frame

Using the front XLR connector on UDX and UDM

When using a motorized frame on UDX and UDM, the motorization is connected with the front XLR connector.

When using the front XLR connector, make sure it is enabled and powered to 24V. For more info on how to power the XLR connector, see "Controlling the front XLR connector", page 178.

CAUTION: Do not enable the front XLR connector at 0V while the motorized frame is connected. Having the motorized frame connected to the projector while the connector is active and set at 0V will cause connection issues. If the frame is not used, disable the front XLR connector. Do not just place the connector at 0V.
A future version will resolve this issue.

How to return the motorized frame to center position?

1. In the *Position* menu, select *Center motorized frame*.

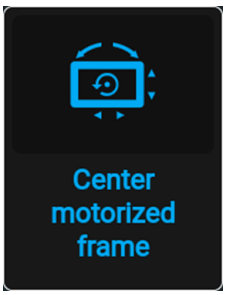


Image 7–9 Lens menu, Center motorized frame

A *confirm action* dialog box will be prompted.

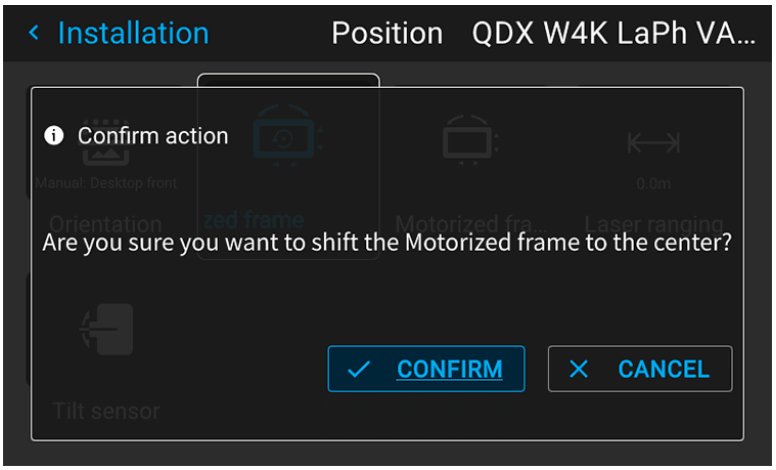


Image 7–10 Example of the Center motorized frame action prompt

2. Confirm to reset the frame to its center position.

Note: Wait until the frame motors have stopped before doing other actions.

7.1.5 Manipulating the motorized rigging frame

Location and availability

- **Menu** : *Installation* > *Position* > *Motorized frame*.
- **Access level**: all
- **Models**: UDM, UDX, F70, F80
- **Requirements**: Motorized rigging frame

Using the front XLR connector on UDX and UDM

When using a motorized frame on UDX and UDM, the motorization is connected with the front XLR connector.

When using the front XLR connector, make sure it is enabled and powered to 24V. For more info on how to power the XLR connector, see “Controlling the front XLR connector”, page 178.

CAUTION: Do not enable the front XLR connector at 0V while the motorized frame is connected. Having the motorized frame connected to the projector while the connector is active and set at 0V will cause connection issues. If the frame is not used, disable the front XLR connector. Do not just place the connector at 0V.
A future version will resolve this issue.

How to manipulate the rigging frame?

1. In the *Position* menu, select *Motorized frame*.

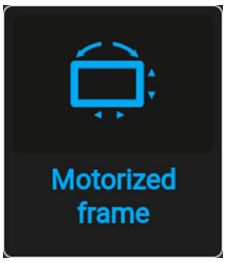


Image 7–11 Position menu – Motorized frame

The Motorized frame menu is displayed.

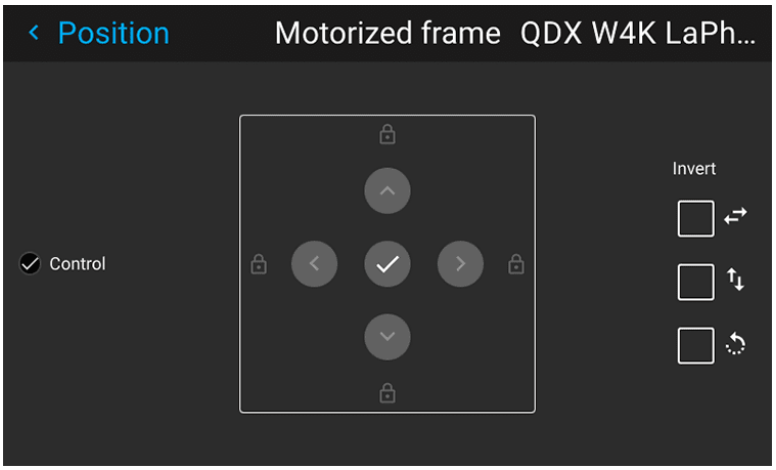


Image 7–12 Example of the Motorized frame menu

2. To enable inverted controls, make sure the checkboxes are selected next to the invert icons:
   - Invert horizontal
   - Invert vertical
   - Invert rotation
3. Press the **OK** key or button to activate the vertical frame shift motors.

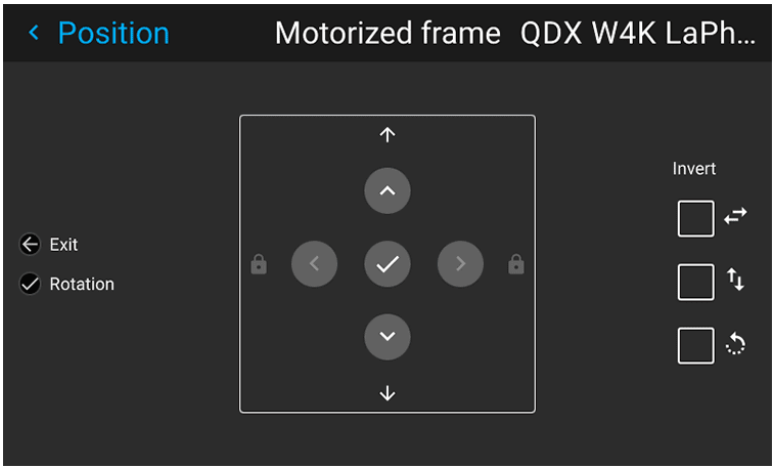


Image 7–13 Example of vertical frame shift

4. Use the ▲ or ▼ button to shift the rigging frame (image) in vertical direction.
5. Press the OK button to shift between shifting and rotation.

   The frame rotation menu is displayed.

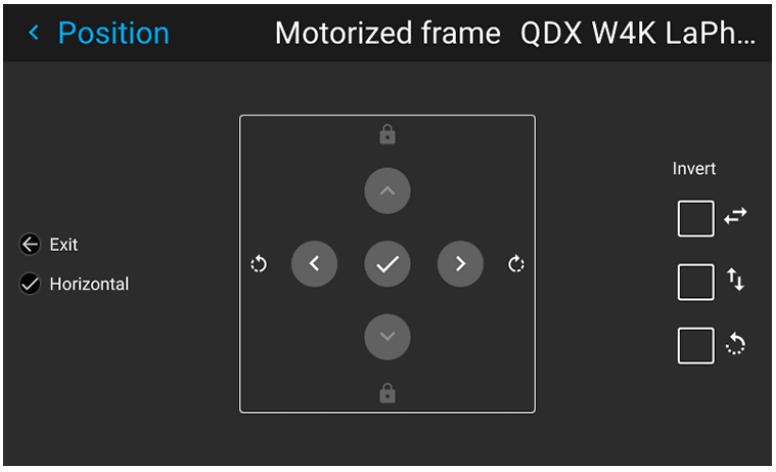


Image 7–14 Example of frame rotation

6. Use the ◄ or ► button to rotate the rigging frame (image) either clockwise or counterclockwise.
7. Press the OK button to shift between rotation and horizontal shifting.

   The horizontal shift menu is displayed.

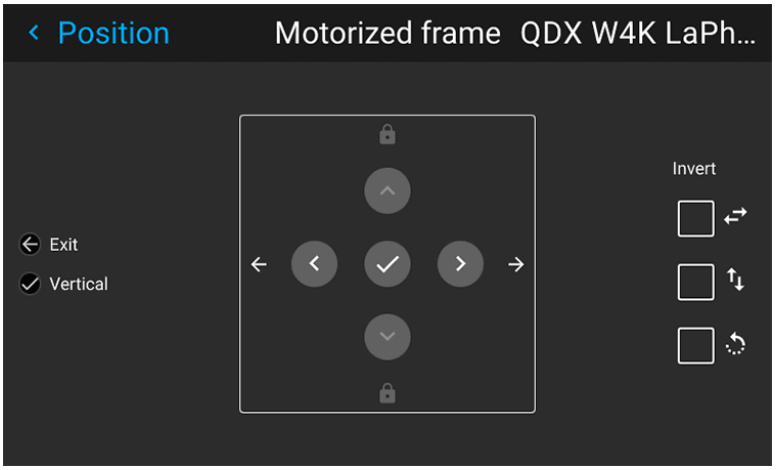


Image 7–15 Example of the horizontal frame shift

8. Use the ◄ or ► button to shift the rigging frame (image) in horizontal direction.
9. Confirm with the OK button to return to the vertical frame shift menu, or use the Menu back button to return to the Position menu.

7.2 Configuring optics

Note regarding the Optics menu

On Pulse 2.4 or later, the *Lens* submenu has been renamed into the *Optics* menu.

While the name has changed, the functionality of the menu remains the same.

7.2.1 Optical zoom and focus

Location and availability

- **Menu**: *Installation* > *Optics* > *Zoom focus*
- **Access level**: All
- **Models**: all
- **Requirements**: Motorized lens

About the Zoom and focus menu

When a motorized lens is mounted in the projector this menu can be used to fine-tune the projected image.

How to configure zoom and focus

1. In the *Optics* menu, select *Zoom focus*.

Image 7–16 Optics menu, Zoom & focus

The *Zoom focus* menu will be displayed.

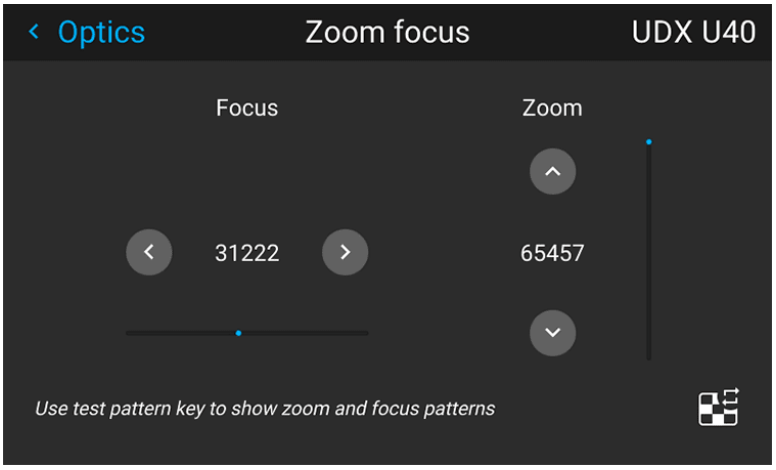


Image 7–17 Example of the zoom and focus adjustment menu

2. Press the **test pattern** key to enable a test pattern.
3. Use the ▲ or ▼ key to zoom the lens in or out and confirm.
4. Use the ◄ or ► key to focus the lens to far or near and confirm.

7.2.2 Configuring lens shift

Location and availability

- **Menu**: *Installation* > *Optics* > Shift

- **Access level**: All
- **Models**: all

What can be done?

The image can be optically shifted by using the vertical and horizontal lens shift.

Optical lens shift is only possible when the used lens has been fully calibrated. For more information, see “Lens calibration”, page 189.

When a lens shift beyond what is possible with the optical shift is desired, Alternatively a digital lens shift can also be performed. This digital shift will occur on the DMD, rather than the lens holder. So take into account that this additional shift is minimal and restricted to the limits of the chip used. For more info on digital lens shift, see “Digital zoom and shift”, page 59.

Digital shift and zoom is not available for High End Residential devices.

Vertical and Horizontal Shift

1. In the *Optics* menu, select *Shift*.

Image 7–18 Optics menu, lens shift

The *Shift* menu is displayed.

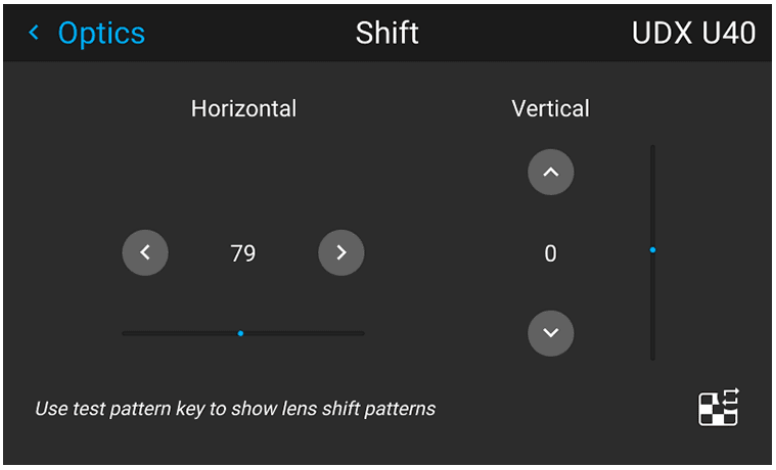


Image 7–19 Example of the lens shift menu

2. Press the **test pattern** key to enable a test pattern.
3. Use the ◄ and ► keys to shift the lens (image) in horizontal direction.
4. Use the ▲ and ▼ keys to shift the lens (image) in vertical direction.

7.2.3 Configuring dynamic focus

Location and availability

- **Menu**: *Installation* > *Optics* > *Dynamic focus*
- **Access level**: all

- **Models**: UDM, UDX, Njord, Hodr
- **Requirements**: Light source must be on

About focus drift and dynamic focus

Due to the design of TLD+ lenses and ultra-short throw lenses (UST lenses), these type of lenses tends to heat up over time when used in projectors. This has the side-effect of a slight shift in focus between the lens in its cold state and the lens in its heated state, which is referred to as “focus drift”.

While there are external solutions available that perform a “focus drift compensation”, a dynamic focus feature has been implemented that handles this focus drift on projectors that support these type of lenses. While enabled, the projector will perform the necessary calculations in order to handle this drift in focus.

The amount of focus drift can differ between lenses. For that reason it is important to calibrate the focus drift when a new lens is mounted in the projector.
Use the calibration wizard in the Pulse Prospector or Projector Toolset to calibrate focus drift. For more info on the focus drift calibration, consult the Pulse Prospector or Projector Toolset user guide.

How to enable dynamic focus?

1. In the Optics menu, enable the *Dynamic focus* slider.

Image 7–20 Optics menu, Dynamic focus enabled

Image 7–21 Optics menu, Dynamic focus disabled

7.2.4 Shift to center

Location and availability

- **Menu**: *Installation* > *Optics* > *Shift to center*
- **Access level**: all
- **Models**: all

What can be done?

The lens shift can be forced back to the center position by selecting **Shift to center**.

How force a lens to center position

1. In the Optics menu, click *Shift to center*.

Image 7–22 Optics menu, Shift to center

A Confirm action dialog will be prompted.

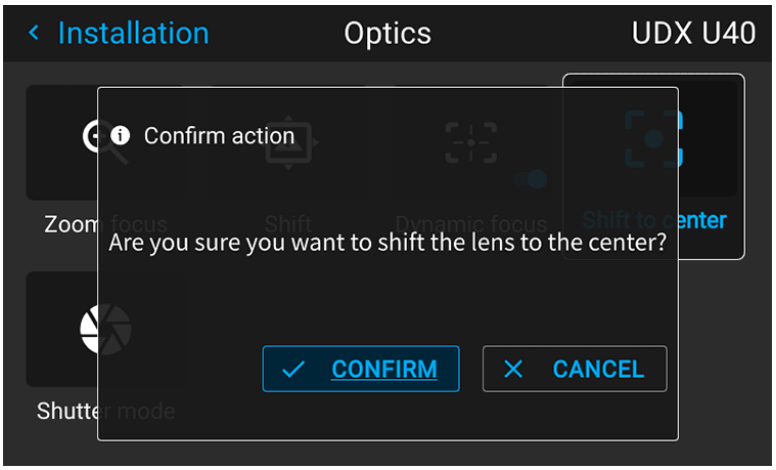


Image 7–23 Example of the Shift to center action

2. Press the **CONFIRM** button.

   The lens will calibrate itself and return to the center position.

7.2.5 Configuring the Iris

Location and availability

- **Menu**: *Installation* > *Optics* > *Iris*
- **Access level**: all
- **Models**: FL40, FS40, F70, F400, Bragi, Balder

About the iris

Iris controls the contrast and focus depth of the image, and will also have an impact on the output light.

Decreasing the iris opening will increase contrast and image depth, at the same time as it decreases the output light.

The projector has two irises; one in the lens, and one in the illumination path. Both irises share a similar function, albeit with a small difference.

Lens iris

Located in the lens, and will increase the contrast and depth of the focus area when used. Will also have an effect of the output light

Illumination iris

Located in the illumination path, and has less, but still an effect on the contrast and the depth of the focus area, but will to a greater extent have an effect on the amount of output light.

How to adjust

1. In the *Optics* menu, select *Iris*.

Image 7–24 Optics menu, Iris

The *Iris* menu is displayed.

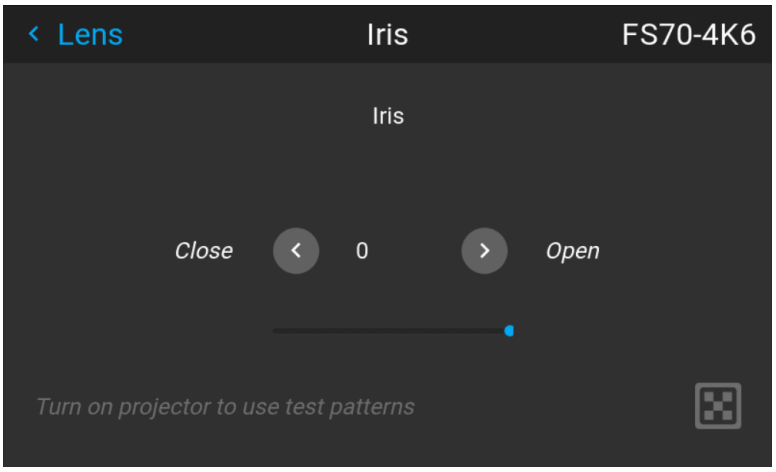


Image 7–25 Example of the Iris menu

2. Use the arrow keys to adjust Iris until preferred rendering is obtained. The numeric value in the menu indicates the degree of opening of the iris.
   - Value = 0 >> Iris fully opened (iris feature not active).
   - Value > 0 >> Iris opening decreases (iris feature active)

7.2.6 Shutter mode

Location & availability

- **Menu**: *Installation* > *Optics* > *Shutter mode*
- **Access level**: all
- **Models**: UDM, UDX
- **Requirements**: Pulse 2.3 or later

About the shutter

All projectors have a shutter. This can be either a mechanical shutter (on W and U models), or an electronic shutter (on 4K models). When the shutter is closed, the light source will turn off. When the shutter is opened, the light source will turn on.

When the light source turns on again, the laser banks have to turn on sequentially, with different types of laser banks having a different startup time. This may lead to a short timeframe where the colors of the projected image are not displayed in an optimal fashion.

The Pulse OSD software provides a configuration option for the behavior of the electronic shutter:

- **Optimal colors**: The projector will wait to open the shutter until all laser banks are fully operational and the colors can be displayed as intended. The time this takes will vary depending on projector type, but it will be minimum two seconds.
- **Fast transitions**: The shutter opens immediately and the image will be projected, regardless of laser bank status. This will cause the projected colors to be slightly “off” for a few seconds until all laser banks are fully operational.

How to set shutter mode

1. In the *Optics* menu, select *Shutter mode*.

Image 7–26 Optics menu, Shutter mode

The *Shutter mode* menu will be displayed.

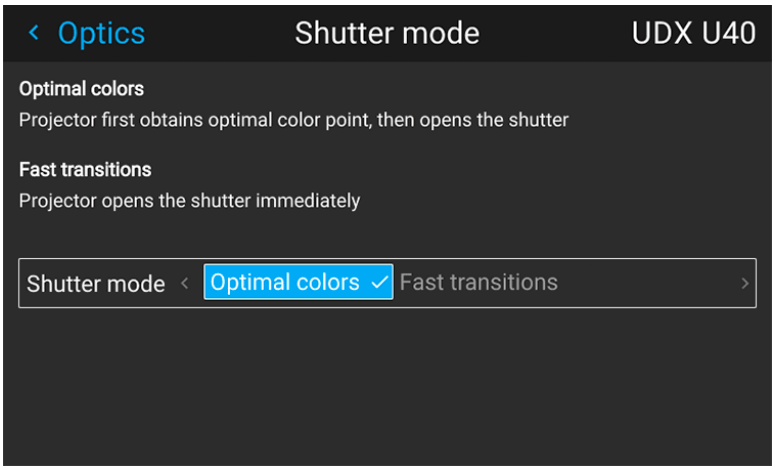


Image 7–27 Example of the Shutter mode menu.

2. In the *Shutter mode* menu, select the desired *Shutter mode* and confirm.

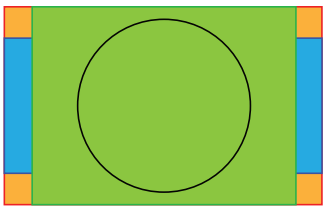
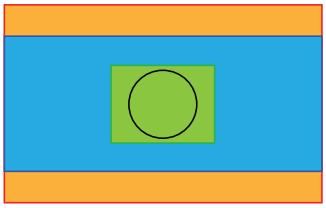
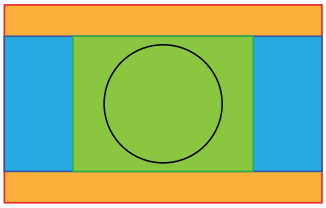
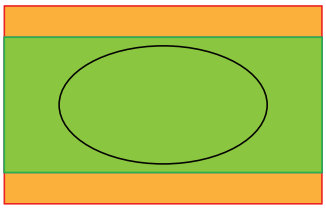
7.3 Scaling modes

Location and availability

- **Menu**: *Installation* > *Scaling*
- **Access level**: all
- **Models**: all

About scaling modes

While the default mode of projection is to fill the screen while respecting the aspect ratio (fill aspect), it is also possible to stretch the image in a different way. Choose one of the following scaling methods:

Scaling Mode	Explanation	Example image[6]
Fill aspect	**Default scaling mode**. Stretches the image to the native resolution of the DMD, while respecting the original aspect ratio.	
1:1	An exact rendering of the source signal, which may be smaller than the native resolution	
Fill screen	Fills the screen to the screen size defined in the Screen Size menu, while respecting the original aspect ratio. For more info on adjusting the Screen Size menu, see “Warping – Screen size”, page 96.	
Stretch	This mode stretches the image to the screen size defined in the Screen Size menu, while ignoring the original aspect ratio. For more info on adjusting the Screen Size menu, see “Warping – Screen size”, page 96.	

Setting a scaling mode

1. In the *Installation* menu, select *Scaling*.

Image 7–28 Installation menu, scaling

The *scaling* mode menu will be displayed.

6. Example using a screen of 2,35:1, an input signal of 4:3 and a projector with a native resolution of 3840 x 2400

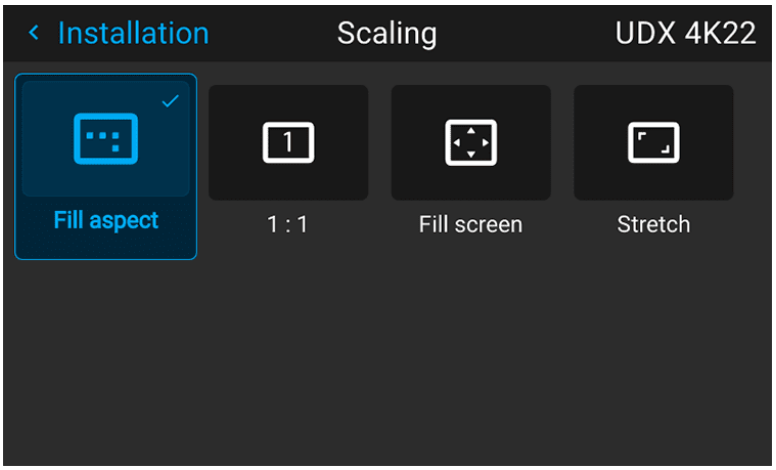


Image 7–29 Example of the scaling mode menu

2. In the *Scaling* menu, select the desired scaling mode and confirm.

7.4 Warping

About warping

Image warping is the process of digitally manipulating an image to compensate for the distortion of the screen. Consequently, it can also be used to generate an image with irregular shape.

While an image can be transformed in various ways, pure warping doesn't affect the colors.

7.4.1 Warping – on/off

Location and availability

- **Menu**: *Installation* > *Warp*
- **Access level**: all
- **Models**: all

About warping on/off

By toggling between on and off the warping functionality can be enabled or disabled.

How to toggle

1. In the *Warp* menu, click *Warp* to toggle between *On* and *Off*.

Image 7–30

Image 7–31

If any warp has been configured, the projected image will be warped accordingly.

7.4.2 Warping – Screen size

Location and availability

- **Menu**: *Installation* > *Warp* > *Screen size*
- **Access level**: All
- **Models**: All

About (Warp) screen size adjustment

If the used source aspect ratio is different than the projector aspect ratio (e.g. source is 16:9 and projector is 16:10), then black bars will be projected. In this example case a black bar on top and bottom of the image will be projected. The warp area contains not only the image information but also the black bars.

If the projector needs to be positioned specifically (e.g. the active left top corner exactly on the screen using 4 corner warp), then it is very hard to do that when moving the black left top corner and not having control over the exact position of image left top corner. By moving the outline of the warp screen size to the active image information, the corner points of the warp area are now exactly on the corner points of the active image information and makes warping much easier.

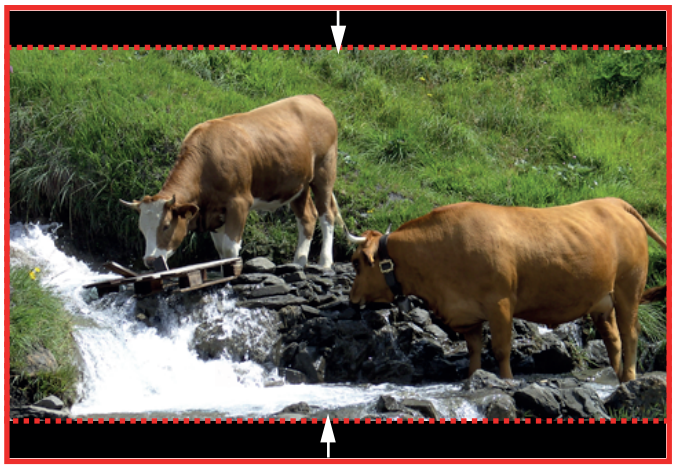


Image 7–32 Warp outline example

Using the screen aspect ratio presets

1. In the Warp menu, select *Screen size*.

Image 7–33 Warp menu, screen size

The *Screen Size* menu is displayed.

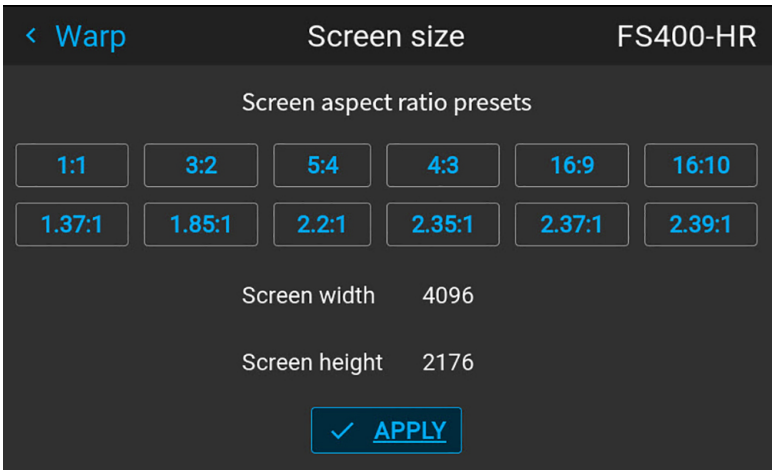


Image 7–34 Example of the screen size menu

2. Click on one of the predefined presets for the screen aspect ratio.

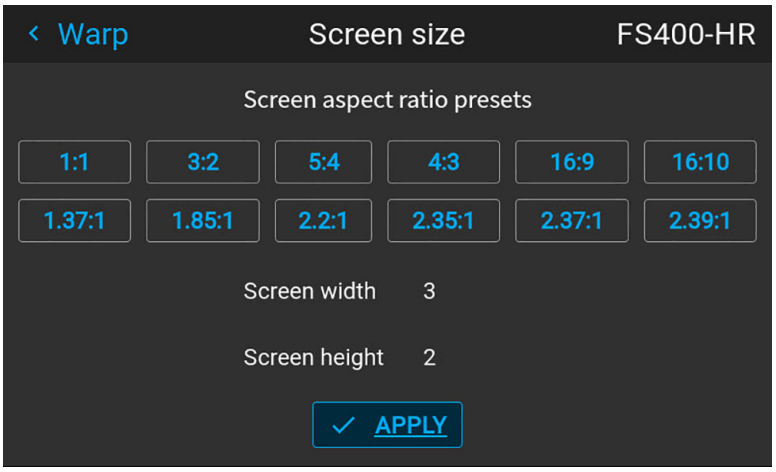


Image 7–35 Example of the screen size menu, with preset “3:2” selected.

The selected ratio is filled out next to *Screen width* and *Screen height*.

3. Click **Apply**.

How to adjust the image with pixels?

1. In the Warp menu, select *Screen size*.

Image 7–36 Warp menu, screen size

The *Screen size* menu will be displayed.

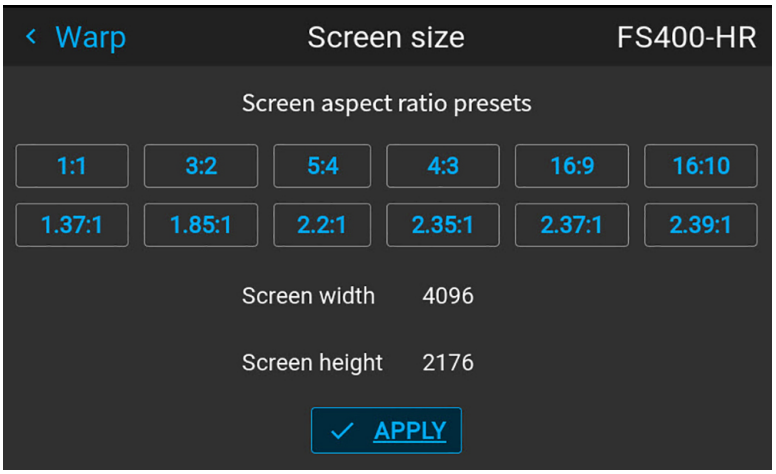


Image 7–37 Example of the screen size menu

2. Select either *Screen width* or *Screen height*.
3. Set the new value to shrink either the width or height of the warp outline so that the outline is equal with the active source.

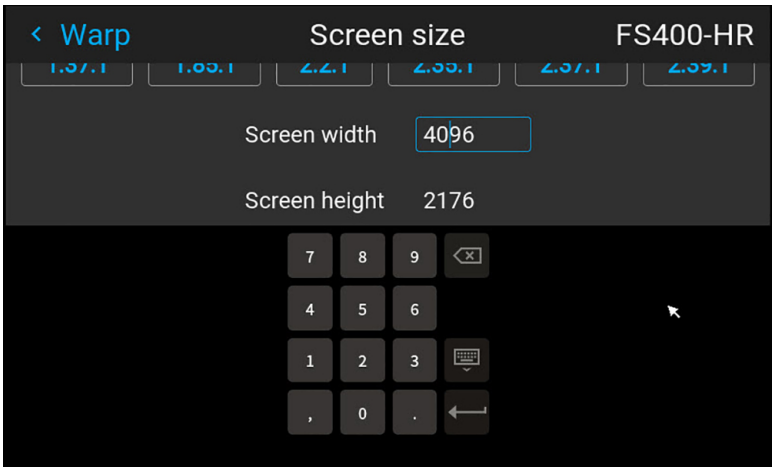


Image 7–38 Example of the Screen size menu, editing the screen width

Tip: A red border will be projected along with the current image. The border is a visual tool, showing the result of the adjusted outline.

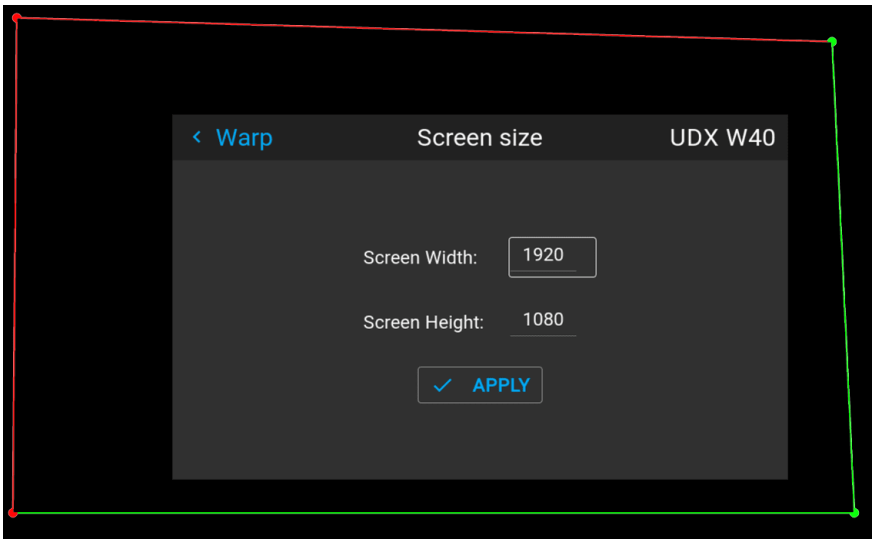


Image 7–39

Tip: The value can also be entered by the numeric keys on the remote control. Press * to delete existing numbers, and enter the new value by the numeric keys.

4. Click **Apply**.

7.4.3 Warping – 4 corners adjustment

Location and availability

- **Menu**: *Installation* > *Warp* > *4 corners*
- **Access level**: all
- **Models**: all

About 4 Corners adjustment

4 corner adjustment is typically used when the mechanical installation of the projector prevents it from pointing perpendicularly at the screen. For example, the projector overshoots the screen and 4 corner adjustment is needed to pull the projected image corners back into the screen.

Some visual examples:

Image 7–40 4 corner adjustment

How to adjust the image?

1. In the Warp menu, select *4 Corners*.

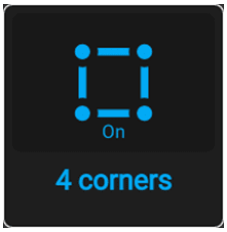


Image 7–41 Warp menu, 4 corners

The *4 corners* menu is displayed.

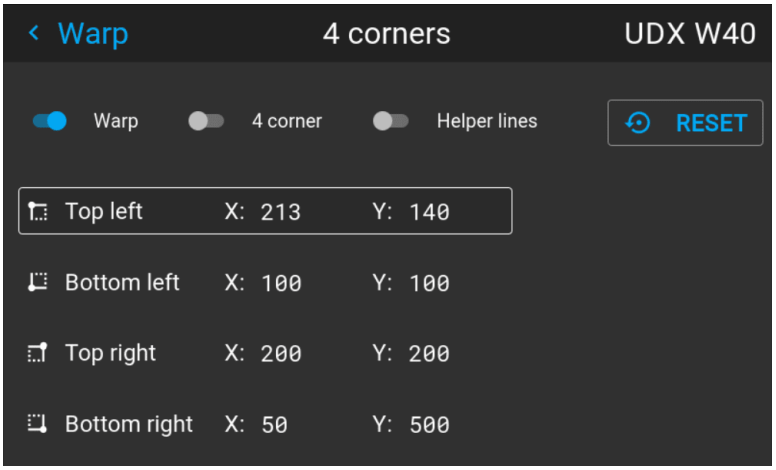


Image 7–42 Example of the 4 corners menu

2. Enable the *4 corner* slider.
3. To have a visual representation of what the warp will look like, enable the Helper lines slider.

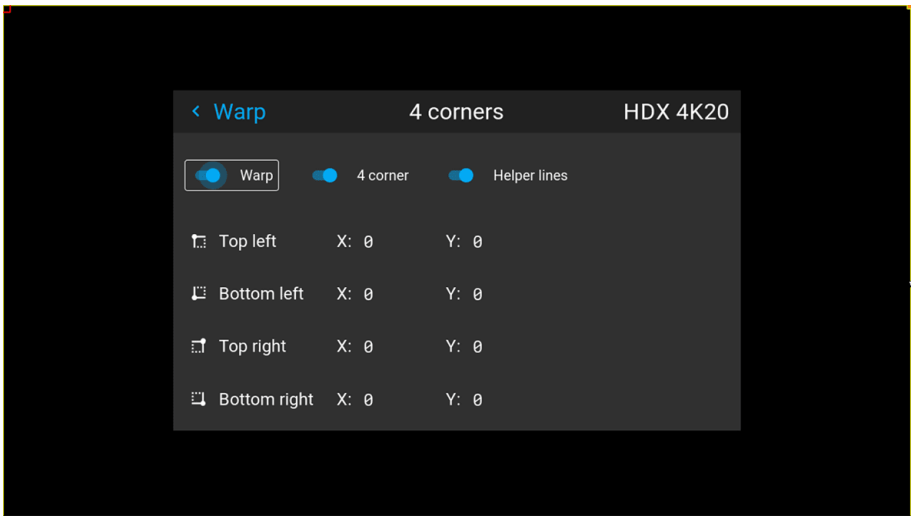


Image 7–43 Example of 4 corners warping menu, with helper lines active on the edges of the screen

4. To set warping on one of the four corners, select one of the four corners and confirm.
5. Set the desired X and Y coordinates for this corner, using the arrow keys, and confirm.

   After confirming, the helper lines for that corner will jump to the entered XY coordinate (if helper lines were enabled).

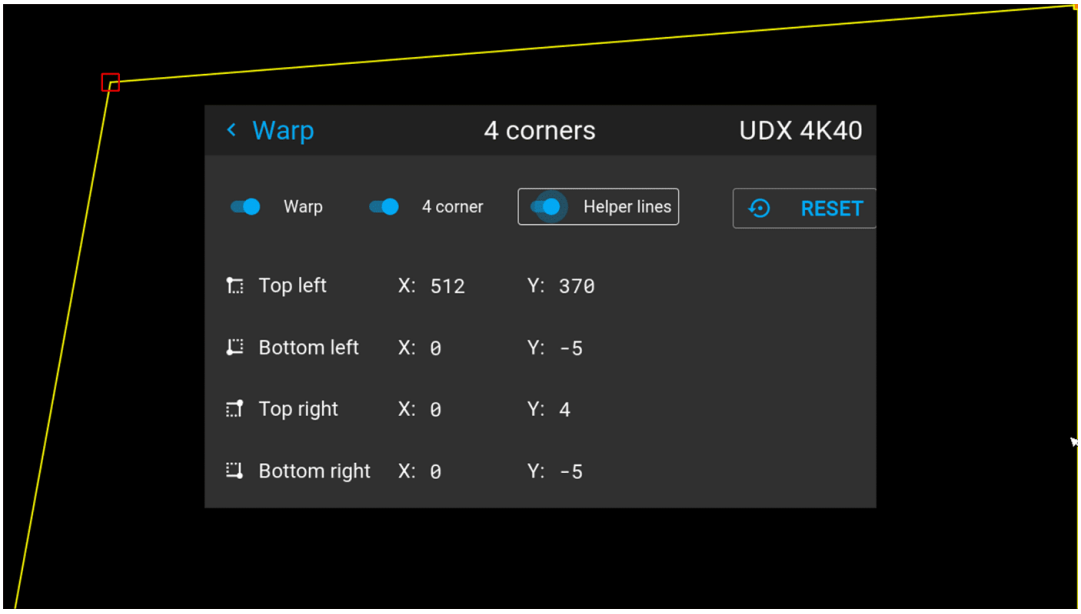


Image 7–44 Example of the 4 corners menu, with 4 corner warping and helper lines enabled

6. Repeat from step 4 for each corner, until all corners are warped in the desired position.

To reset the 4 corner adjustments, select *Reset* and press the **OK** button.

7.4.4 Warping – Bow

Location and availability

- **Menu**: *Installation* > *Warp* > *Bow*
- **Access level**: all
- **Models**: all

About bow adjustment

A bow distortion can be adjusted so that a normal image is displayed.

- Positive adjustments introduce more outside bow distortion.
- Negative adjustments introduce more inside bow distortion.

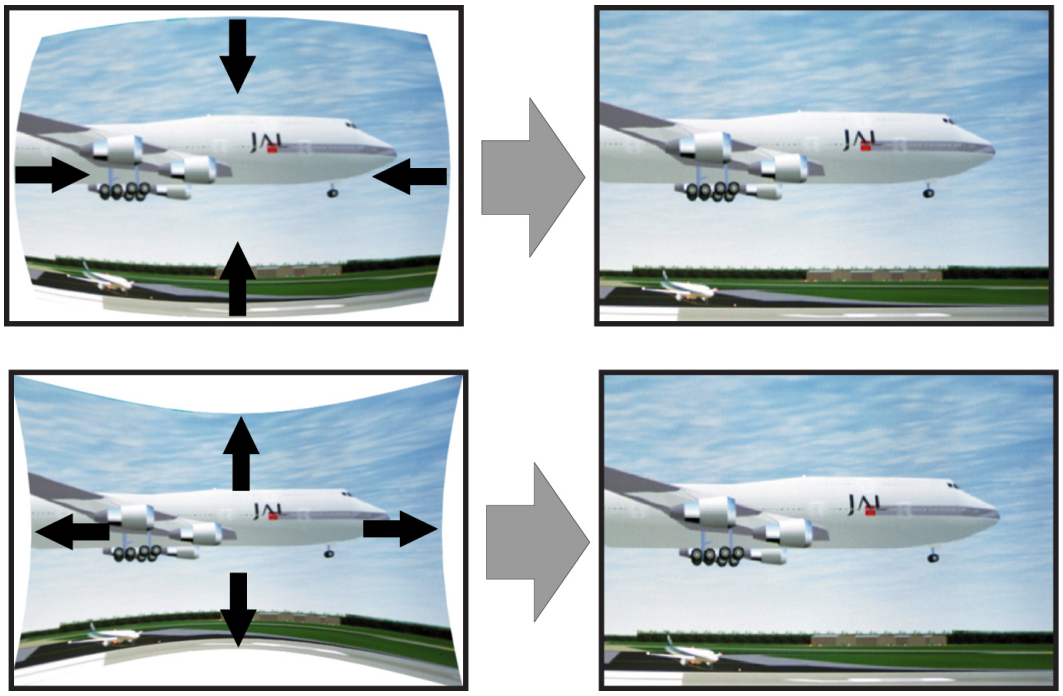


Image 7–45 Bow distortion

Angle and linearity (length) in bow warping

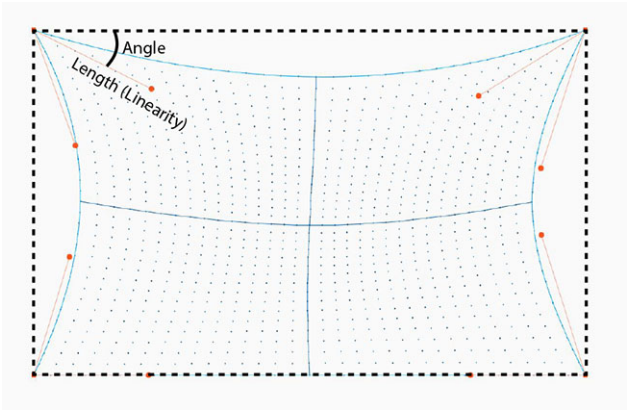


Image 7–46

Symmetric bow correction

1. In the Warp menu, select *Bow*.

Image 7–47 Warp menu, Bow

The *Bow* menu is displayed.

2. Enable the *Bow* slider.
3. To perform a symmetric adjustment , enable the *Symmetric* slider.

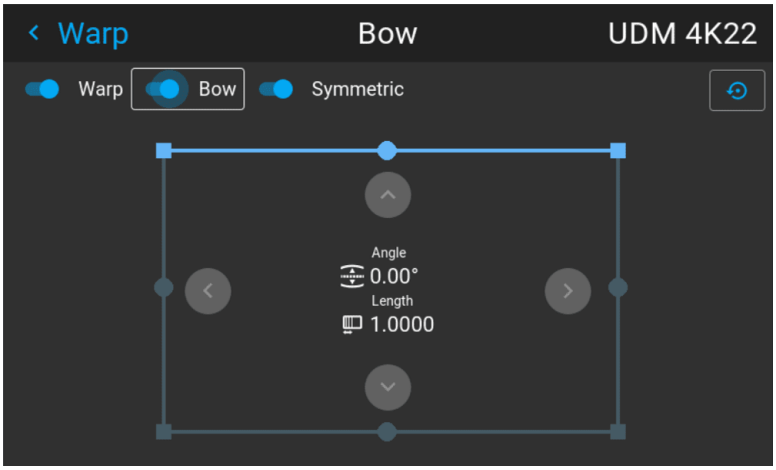


Image 7–48 Both the Bow and Symmetric sliders are set to on

4. Use the arrow keys to select the helping lines that represent the picture and confirm.

   The helping lines that represent the projected picture are now colored blue, while the others are colored white.

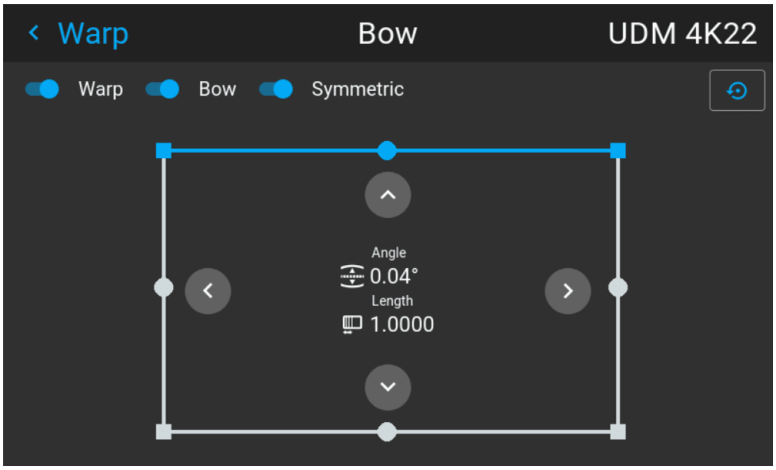


Image 7–49 The upper line is colored blue, the other sides are colored white

5. Use the arrow keys to select the side of the picture that needs a correction and confirm.

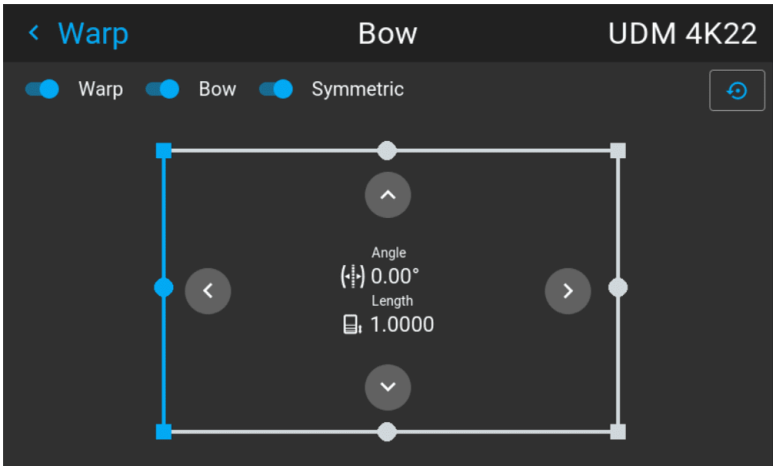


Image 7–50 Symmetric bow correction

6. Use the arrow keys to adjust the angle and linearity (length) of the vectors. Press enter to confirm and switch between angle and length.

Tip: The angle is adjusted by using the up and down arrow keys. The linearity is adjusted by using the left and right arrow keys.

The correction will occur symmetrically on each side of the center of the highlighted side.

7. Repeat this step for all sides of the picture that has to be corrected, until the desired transformation has been achieved.

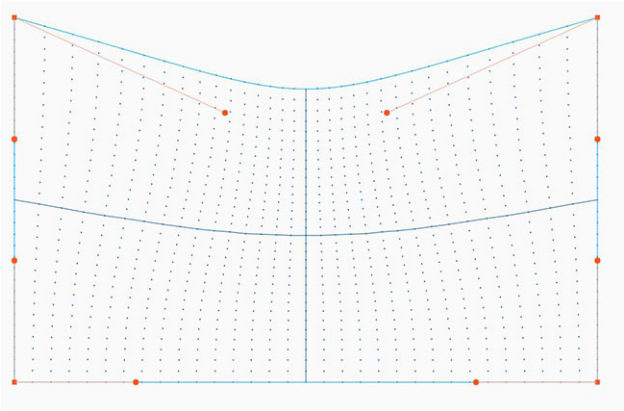


Image 7–51 Example of a symmetric bow correction

Asymmetric bow correction

1. In the *Bow* menu, enable the *Bow* slider and disable the *Symmetric* slider.

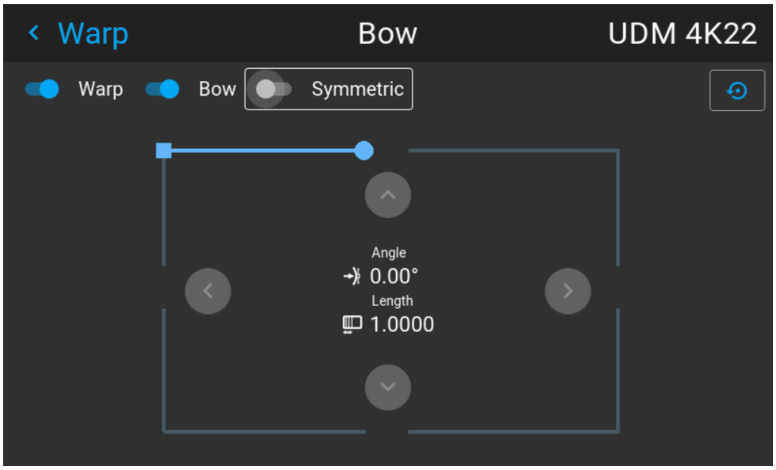


Image 7–52 Example of the bow menu, with the Symmetric slider disabled

There are now two vectors on each side of the picture that can be adjusted individually.

2. Use the arrow keys to select the helping lines that represent the picture and confirm.

The helping lines that represent the projected picture are now colored blue, while the others are colored white.

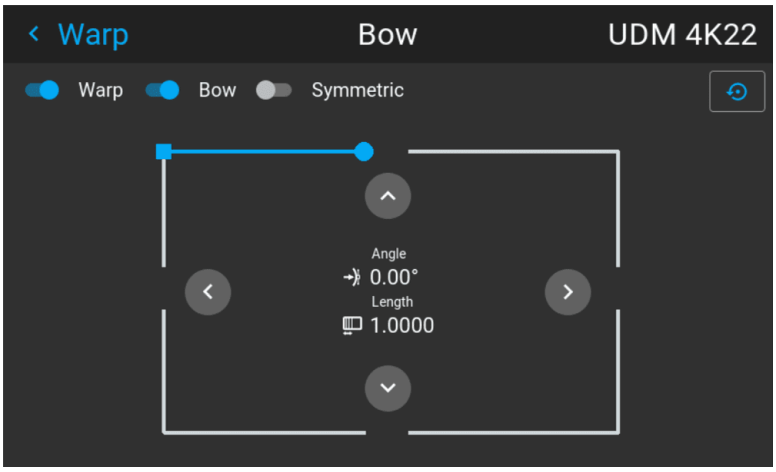


Image 7–53

3. Select the desired slider and confirm.

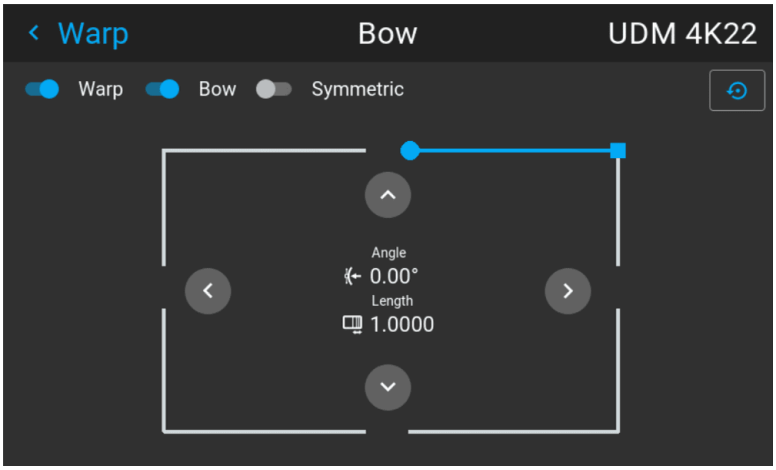


Image 7–54

4. Adjust angle and linearity (length) individually to obtain the correct correction. Press enter to confirm and to switch between angle and length.

Tip: Adjust the angle by using the up and down arrow keys. Adjust the linearity by using the left and right arrow keys.

5. Repeat the previous steps for each side of the picture that must be corrected.
6. When completed, a transformation will occur in a way similar to the following example. Observe that the upper side of the picture now has an asymmetric correction.

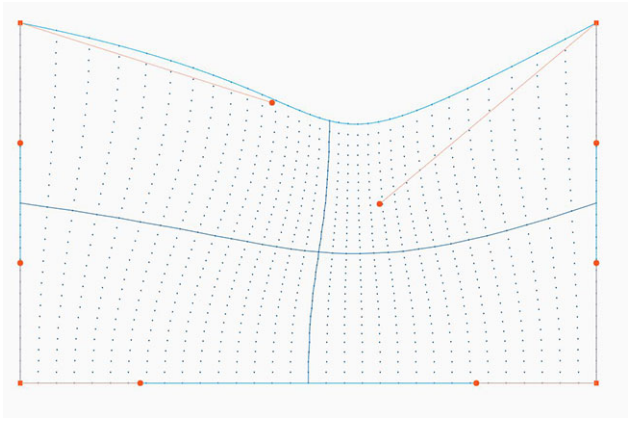


Image 7–55 Example of an asymmetric bow correction

To reset the bow adjustments, select *Reset* and confirm.

7.4.5 Warping – Warp files

Location and availability

- **Menu**: *Installation* > *Warp* > *Warp files*
- **Access level**: all
- **Models**: all

About custom warp files

Next to setting specific warp configuration in the OSD software, a custom warp grid in xml format can also be uploaded or downloaded to/from the projector. This is a time-saving option when multiple projectors need an identical warp configuration.

The OSD software cannot be used to upload or download warp files. In order to upload or download warp files, do one of the following:

- use external tools like Pulse Prospector to upload/download the warp grid in the format of an xml file. For more info, see Pulse Prospector user guide.
- use the pulse API to upload or download the warp grid in the the format of an xml file. For more info, see the projector API reference guide

When uploading a warp file that is too big, or with warp parameters outside the limits of the projector, some irregularities can occur. It will show up in two ways:
1: No warp enabled, picture still unwarped.
2: Distortions and artifacts in the edges of the picture.
There will be no error messages or warnings in the display when this occurs. The above mentioned symptoms is the only indication of this case.

How to activate an uploaded warp grid?

1. In the *Warp* menu, select *Warp files*.

Image 7–56 Warp menu, Warp files

The *Warp files* menu is displayed.

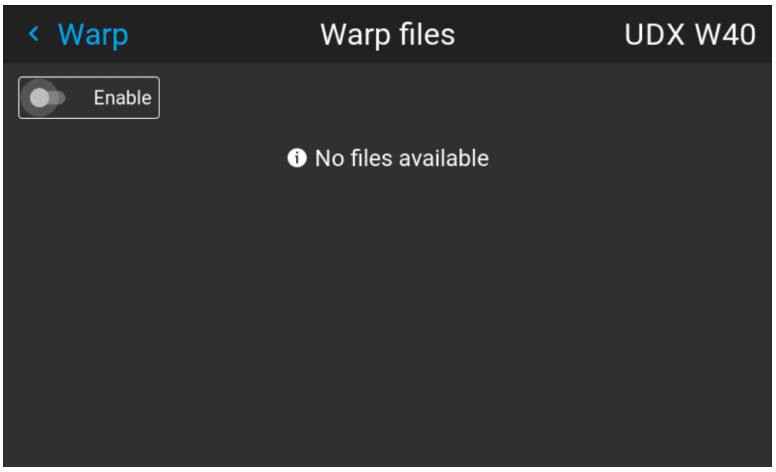


Image 7–57 Example of the warp files menu

2. Enable the Enable slider.
3. Select the desired warp file and confirm.

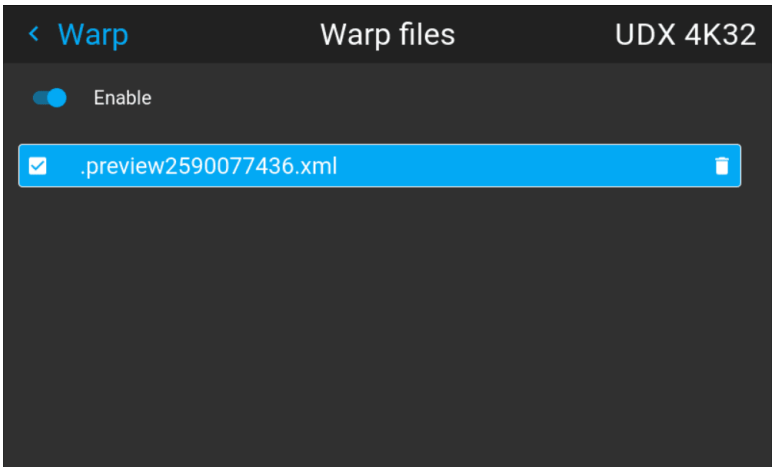


Image 7–58 Example of the Warp files menu

7.4.6 Warping – Latency control in a multi projector setup

Transport delay
The added delay in the image processing chain. The value is the number of lines relative to the output resolution.

Latency
The total time from the first pixel is coming in on an input source, until the first light representing that pixel is visible on the screen. This includes the transport delay. The value is normally given in milliseconds.

Location and availability

- **Location**: *Installation* > *Warp* > *Transport delay*
- **Access level**: all
- **Models**: all

Functional description

Every projector in a multi–projector setup will have a different latency. This latency depends on the amount of warp and on the frequency of the projected image. In order to have no visible difference in the overall projected image, the user needs to be able to control the latency of each projector.

The latency value can be read out in the Dashboard menu for each individual projector.

How to configure transport delay?

1. Read out and note the latency of each projector in the multi-projector setup. This latency can be found under **Transport delay** in the *Dashboard* menu for each projector.

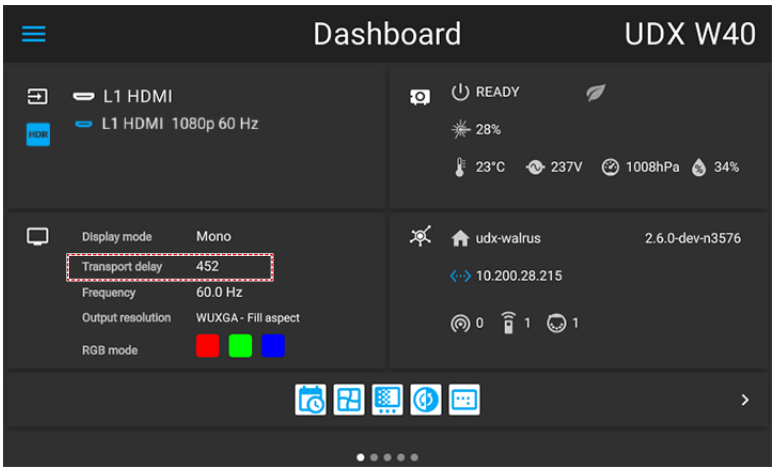


Image 7–59 Example of the Transport delay in the Dashboard menu

2. Identify the projector with the longest delay.
3. In the Warp menu, select *Tranport delay*.

Image 7–60 Warp menu, Transport delay

The *Transport delay* menu is displayed.

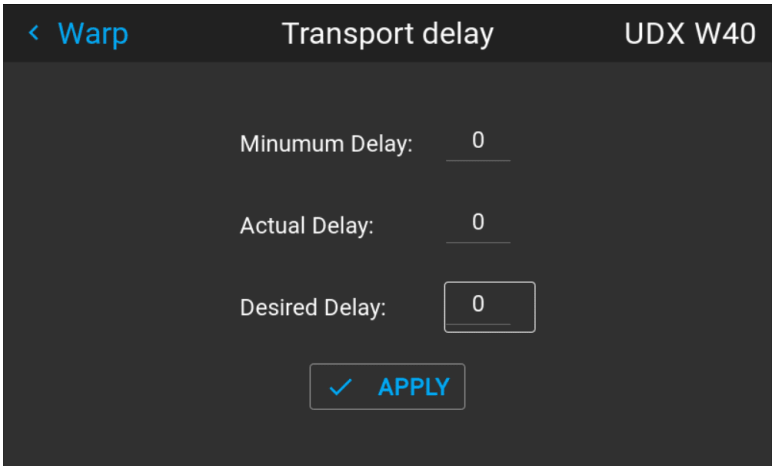


Image 7–61 Example of the Transport delay menu

4. Enter the values for the delays.
5. Click *Apply* to confirm the entered delays.
6. Repeat this process for every projector in the setup.

7.5 Blending & masking

About blending

Blending is used in multi channel installation to have a seamless transition between the channels. Image blending gives the appearance of a single view, thus achieving realistic immersion for the majority of wide screen applications.

The principle is that the light intensity in the blend zone from each projector will be adjusted individually, so that the rendering on the screen is perceived as from one projector.

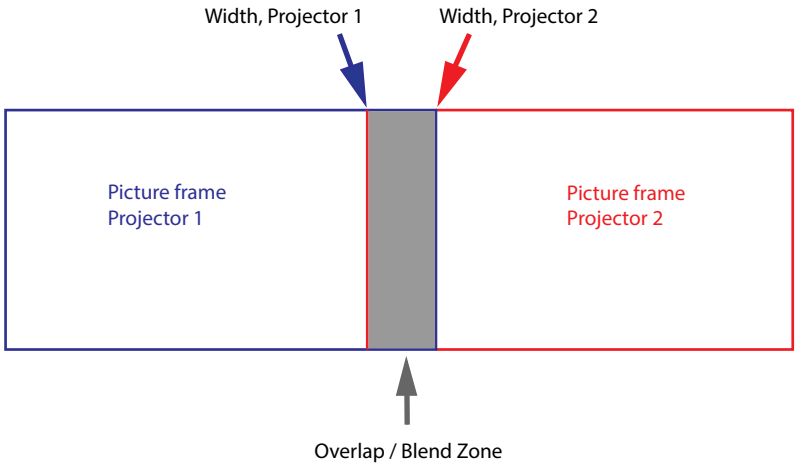


Image 7–62

From the start (mask) position, set the blend zone size per edge (left, top, right, bottom). For each edge there will be a drop-off curve for the blend zone.

Waiting period and blend maintenance period

The heating and cooling down of the lens in a projector startup and shutdown cycle can have a minor drifting effect on the blending and masking areas. Due to this, it is advised to wait 15–20 minutes after projector startup before performing blending and masking actions. This to make sure the drift on the blend region is as minimal as possible. For a similar reason, it is advised to wait 15–20 minutes after projector startup before starting any blending maintenance in the existing setup.

It is recommended to perform a blend maintenance after every 10–20 startup-shutdown cycles of the projector.

Blend, mask and black level icon

On Pulse 2.5 and later, the Blend Mask Black level icon has three dots added that are either greyed out or lit blue.

When the three dots are greyed out, no version of blending and masking or black level adjustment is enabled.

When the *Enable* sliders in one the following menus are toggled on, the icons will be lit blue:

- Blending and masking (both in *Basic blend* menu and in Blend mask menu)
- Black level
- Blend files
- Black level files

Image 7–63 All options in Blend Mask Black level disabled

Image 7–64 Blending and masking or black level enabled

7.5.1 Basic blend

Location and availability

- **Menu**: *Installation* > *Blend and mask* > *Basic blend*
- **Access level**: all
- **Models**: all

How to set up a basic blend zone?

1. In the *Blend and mask* menu, select *Basic blend*.

Image 7–65 Blend menu, Basic blend

The *Basic blend* menu will be displayed.

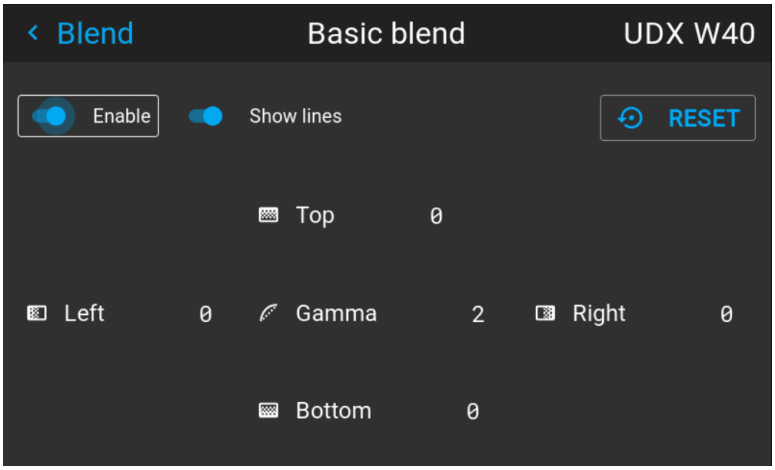


Image 7–66 Example of the basic blend menu

2. Enable the **Enable** slider.
3. To project masking lines on the screen, enable the **Show lines** slider.
4. Determine the start position of the blend area height and width to determine the dimension of the blend zone.

   When the helping lines are activated, a visual indication of the screen of the installed blending area will be visible.

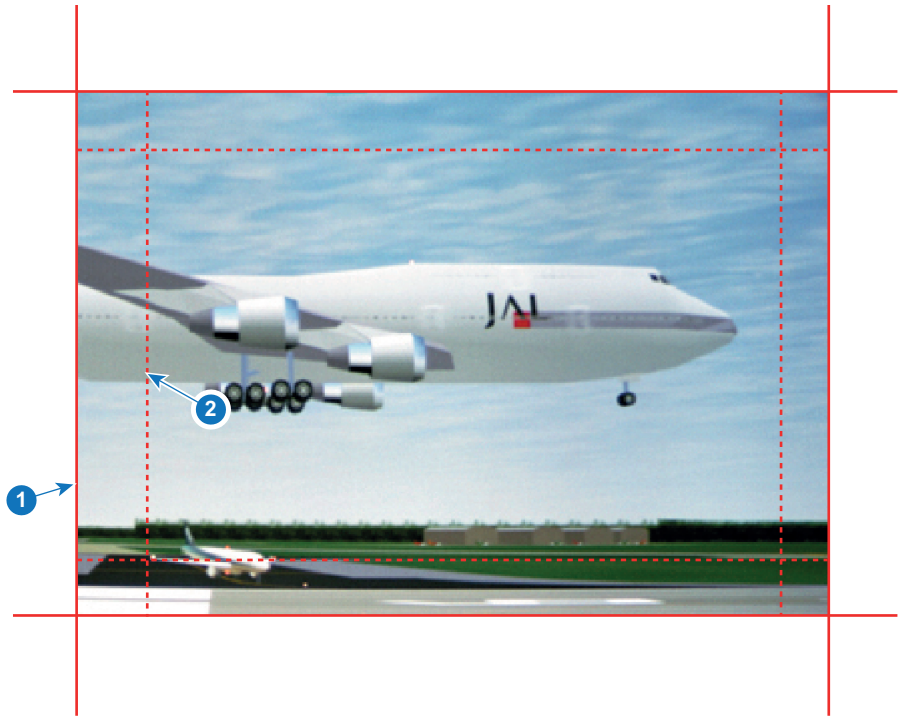


Image 7–67

1 Start position (mask)
2 Blending width

5. Select one of the four starting positions values with the arrow keys and confirm.
6. Use the arrow keys or remote digits to change the value of the blend zone and confirm.
7. Repeat this process for all other desired sides.
8. Continue by creating the blend mask. For more info, see “Blend mask”, page 111.

Do not forget to disable the **Show lines** slider after the desired blend zone has been achieved.

7.5.2 Blend mask

Location and availability

- **Menu**: *Installation* > *Blend and mask* >> *Blend mask*
- **Access level**: all
- **Models**: all

About masking and blending width or height

Offset is used to clip the image on one or multiple sides (masking). This is used to hide parts of the picture that should not be shown on the screen. For example: if the source is a Windows PC, the menu bar can be hidden using this method.

The larger the Mask value, the more the image is masked (by black bar) at the corresponding side. E.g. Top mask of 100 will blank the top 100 lines.

Height or width is used to create a blending zone with a smooth brightness drop off. This is used to compensate for the double brightness in overlap areas. The value is the size of the blended area in pixels.

How to set up basic blend zones?

1. In the *Blend mask* menu, select *Blend mask*.

Image 7–68 Blend menu, Blend mask

The *Blend mask* menu is displayed.

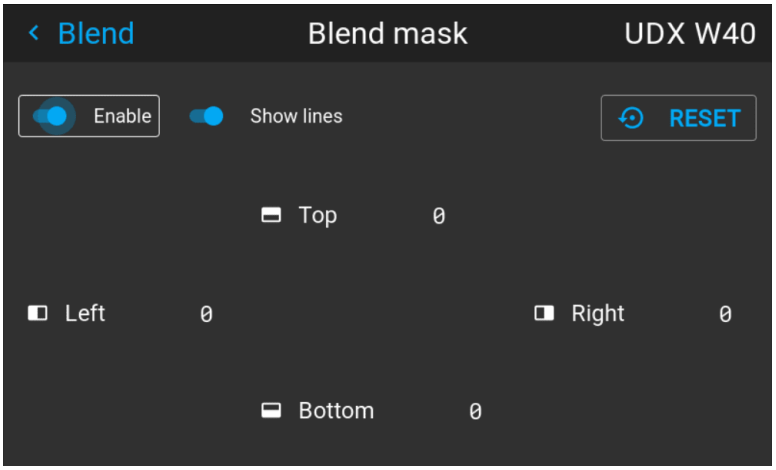


Image 7–69 Example of the blend mask menu

2. Enable blending by toggling the **Enable** slider on.
3. To project masking lines on the screen, enable the **Show lines**.
4. Determine the start position of the mask (1) for the masking height and width, together with the desired size of the mask (2) to determine the width of the masked area.

   When the helping lines are activated, a visual indication of the screen of the installed blending area will be visible.

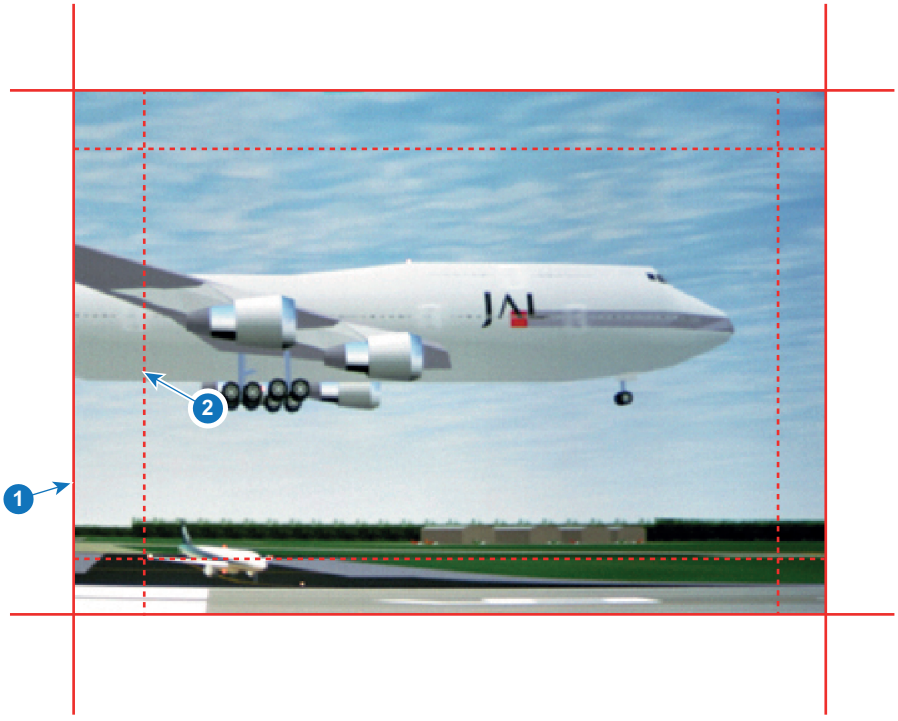


Image 7–70

1 Start position (mask)
2 Blending width

5. Select one of the four starting positions values with the arrow keys and confirm.
6. Use the arrow keys or remote digits to change the value of the mask and confirm.
7. Repeat this process for all other desired sides.

Do not forget to disable the **Show lines** button after the desired blend zone has been achieved.

Example of the use of blending

When projecting an image with 2 or more projectors, there is always a small overlap that should be corrected by using the blending function.

In order to obtain a satisfying result for the Blend function, the overlap / mask zone are recommended to be at least 10% of the picture width.

The basic principle is that the overlap setup in the source shall correspond with the mask width setup for the projector. That means that if the overlap zone for the source is set to 500 pixels, the width of the mask zone for the projector also must be set to 500 pixels.

First step is to align the image from the projectors as accurate as possible in a mechanical way, meaning without any optical corrections. At the same time, establish an overlap in the pictures between the two screens.

Then adjust the remaining irregularities by using the shift and warp features in the projectors to obtain the last fine tuning of the alignment.

Enable blending and activate Show lines.

First set the mask width for the right edge of the first projector. Enter a width value equal to the overlap area (width1).

Repeat for the left edge of the second projector.

Adjust the offset to cut the image on each side (masking).

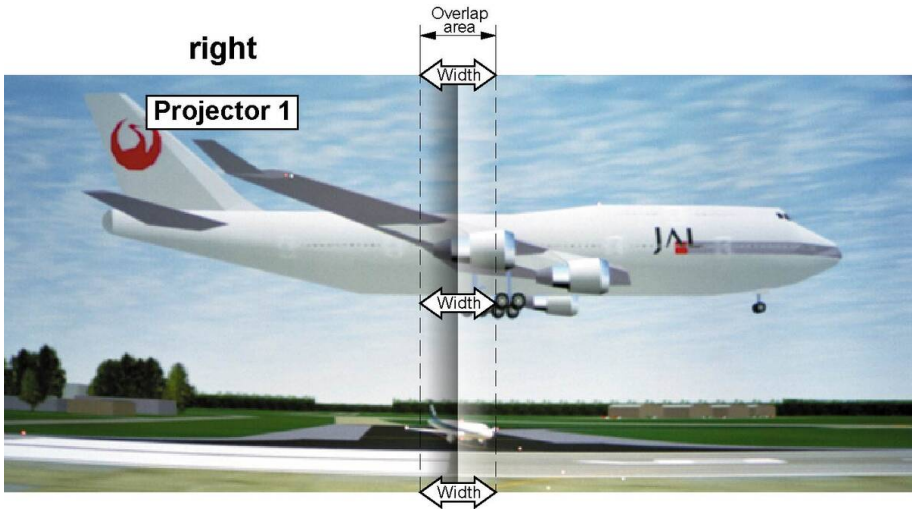


Image 7–71 Set up for projector 1

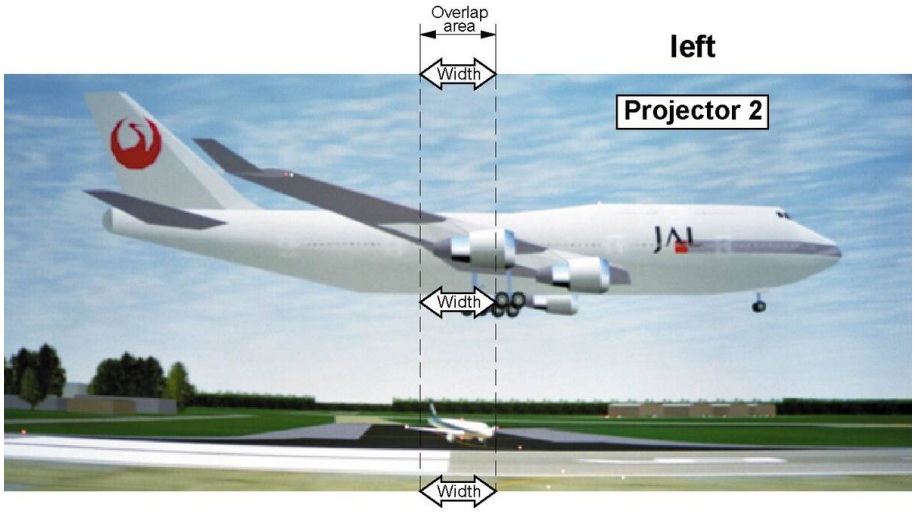


Image 7–72 Set up for projector 2

7.5.3 Blend files

Location and availability

- **Menu**: *Installation* > *Blend and mask* > *Blend files*
- **Access level**: all
- **Models**: all

About custom blend files

Next to setting the specific blending configuration in the OSD software, a custom blend configuration can also uploaded or downloaded to/from the projector. This is a timesaving option when multiple projectors need an identical blending configuration. Custom blend files should be in .png, .jpg or .tiff format.

The OSD software cannot be used to upload or download blend files. In order to upload or download blend files, do one of the following:

- use external tools like Pulse Prospector to upload/download the blend grid in the format of a png, jpg or tiff file. For more info, see the Pulse Prospector user guide.
- use the pulse API to upload or download the blend grid in the the format of a png, jpg or tiff file. For more info, see the projector API reference guide

When uploading custom blend files onto multiple projectors, make sure that the resolution of the blend file is supported by the projector. A mismatch of projector resolution and blend mask resolution will result in a sub-optimal image performance. Verify the supported resolutions for the specific projector model via the Introspection tool [Introspection – image – resolution – alpha]. For more info on the introspection tool, consult the Pulse API reference guide.

How to activate an uploaded blend configuration file?

1. In the *Blend and mask* menu, select *Blend files*.

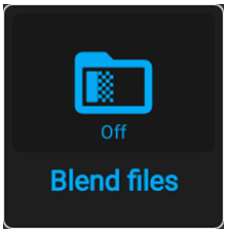


Image 7–73 Blend and mask menu, Blend files

The *Blend files* menu is displayed.

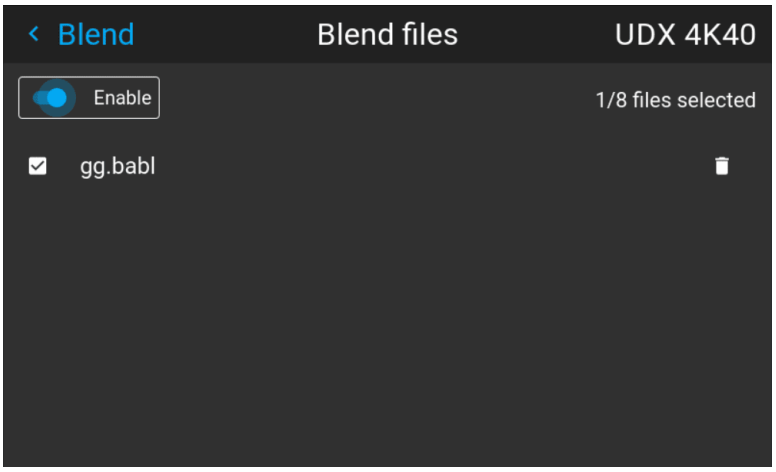


Image 7–74 Example of the blend files menu

2. Enable blending by toggling the **Enable** slider on.
3. If any custom blend files are available, select the desired file and confirm.

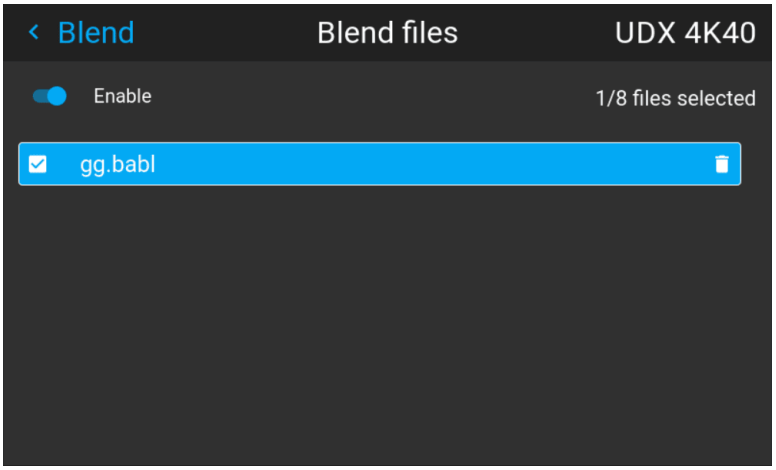


Image 7–75 Example of selecting a custom blend file

The custom blend file will be applied to the projector.

7.5.4 Black level adjustment

Location and availability

- **Menu**: *Installation* > *Blend and mask* > *Black level*
- **Access level**: All
- **Models**: all

About adjusting the black level

In a multi-projector setup, there will be a area where the image of the projectors overlap (the blend zone). The black level in the blend zone will be significantly brighter than the areas outside of the blend zone. This happens because the light beams from multiple projectors are projecting on this area at the same time.

Image 7–76 Example of a blend zone without black level adjustment

The purpose of the black level adjustment is to align the black levels in the blend zone to make it similar to the areas outside the blend zone.

The size of the black level area is calculated automatically from the blend zones. This is done by using the start position and size of each edge of the blend and adding an additional size of 8 pixels to reduce the effect known as "**sea of mirrors**".

Alternatively, the offsets can be manually specified by turning off the automatic calculation. The black level value is adjusted in a 16-bit resolution from 0 to 65535.

How to adjust the black level

1. In the *Blend and mask* menu, select *Black Level*.

Image 7–77 Blend and Mask menu, Black level

The *Black level* menu is displayed.

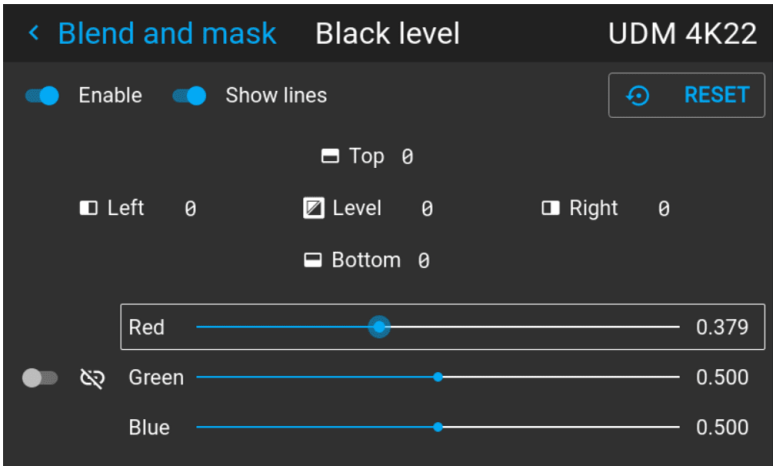


Image 7–78 Example of the default black level menu

2. Enable Black level by toggling the **Enable** slider on.
3. Enable the **Show lines** slider to have a visual aid on the screen.
4. Move the cursor to the side where the current overlapping area occurs (*Top*, *Left*, *Right* or *Bottom*) and confirm.

5. Do one of the following:
   - ► Adjust the level with the arrow keys and press enter when the desired black level zone is reached.
   - ► enter the black level value with the numeric keys in the remote control.
6. Move the cursor to *Level*, press enter and adjust this level until the black level equals the level in the blend zone.

   This value can also be entered by the numeric keys on the remote control.
7. Repeat the procedure for any other projector projecting to this blend zone.
8. Repeat the procedure for every other blend zone in the multi-projector setup.

Note: Do not forget to disable the **Show lines** button after the desired blend zone has been achieved.

7.5.5 RGB gain adjustment

Location and availability

- **Menu**: *Installation* > *Blend and mask* > *Black level*
- **Access level**: all
- **Models**: all

About RGB gain adjustment

The purpose of black level correction is to ensure a uniform black level in multi-projector setups. Even when two projectors are of the same type, different projectors will output slightly different colors for black due to minor variations in their optical components. So if the projected image of the projectors overlap, there will be 3 different black levels: one for the zone where only the picture of the left projector (zone 1), one for the Blend zone (zone 2), and one for the zone where there is only the picture of the right projector (zone 3).

Image 7–79

The black levels for zone 1 and zone 3 are typically corrected by defining a black level mask, which is applied to the image of each projector. This system is already in place but the applied mask is monochrome.

Using the RGB adjustment of the Basic Black Level menu, the multiplication factors (gains) for the Red, Green and Blue colors can be adjusted separately.

How to perform an RGB adjustment

1. In the *Blend and mask* menu, select *Black Level*.

Image 7–80 Blend and Mask menu, Black level

The *Black level* menu is displayed.

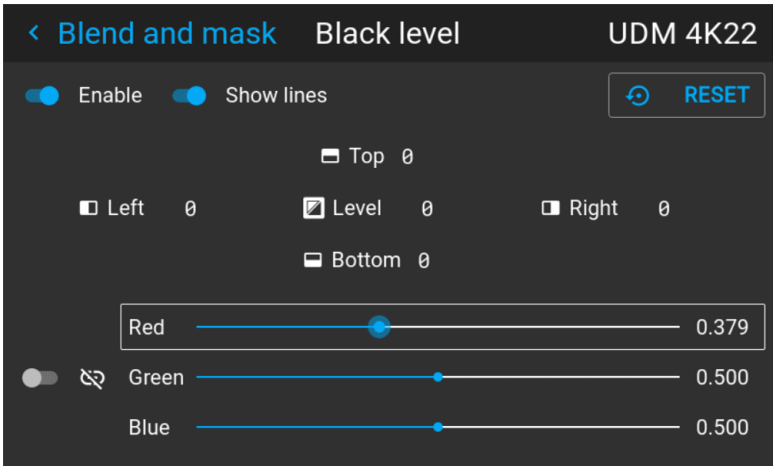


Image 7–81 Example of the default black level menu

2. Enable Black level by toggling the **Enable** slider on.
3. Enable the **Show lines** slider to have a visual aid on the screen.
4. Select one of the three sliders on the bottom of the menu (Red, Green or Blue).
5. Use the left and right arrow keys to modify the gain of the chosen color and confirm.
6. Repeat for every slider until the desired result is achieved on screen.
7. Repeat the procedure for any other projector projecting to this blend zone.
8. Repeat the procedure for every other blend zone in the multi-projector setup.

Note: Do not forget to disable the **Show lines** button after the desired blend zone has been achieved.

7.5.6 Black level files

Location and availability

- **Menu**: *Installation* > *Blend and mask* > *Black level files*
- **Access level**: all
- **Models**: all

About custom black level files

Next to setting the specific black level adjustment, a custom black level adjustment file can be uploaded or downloaded to/from the projector. This custom file should be in png, jpeg or tiff format.

To upload or download black Level adjustment files, use Pulse Prospector or upload/download the black level adjustment file in the format of an XML file. Alternatively, can contact the “file endpoint” directly via the curl program or some other tool that supports HTTPS upload.

For more information on uploading/downloading black level files using Pulse Prospector, refer to the Pulse Prospector user manual. For more information on uploading/downloading black level files using curl or other tools that supports HTTPS upload, refer to the Pulse API Reference Guide.

When uploading custom black level files onto multiple projectors, make sure that the resolution of the file is supported by the projector. A mismatch of projector resolution and black level file resolution will result in a sub-optimal image performance. Verify the supported resolutions for the specific projector model via the Introspection tool [Introspection – image – resolution – alpha]. For more info on the introspection tool, consult the Pulse API reference guide.

How to activate an uploaded Black Level adjustment file?

1. In the *Blend and mask* menu, select *Black level files*.

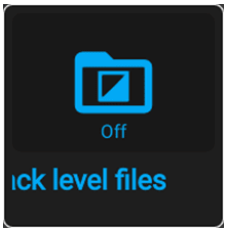


Image 7–82 Blend and mask menu, Black level files

The *Black level files* menu is displayed.

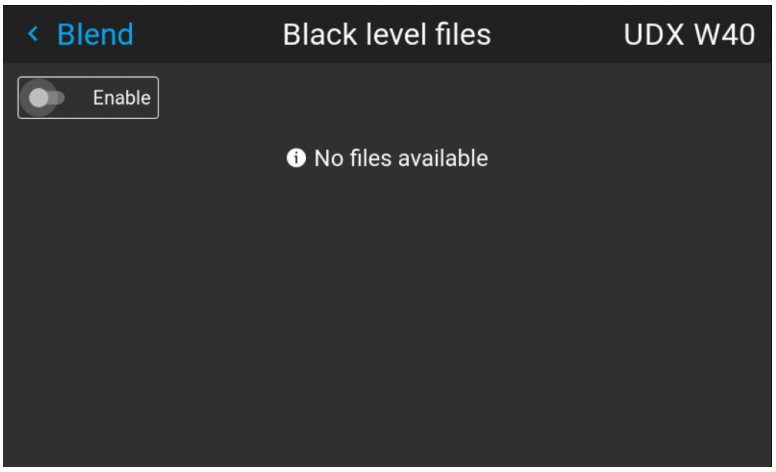


Image 7–83 Example of the black level files menu

2. If any custom black level adjustment files are available, select the desired file.

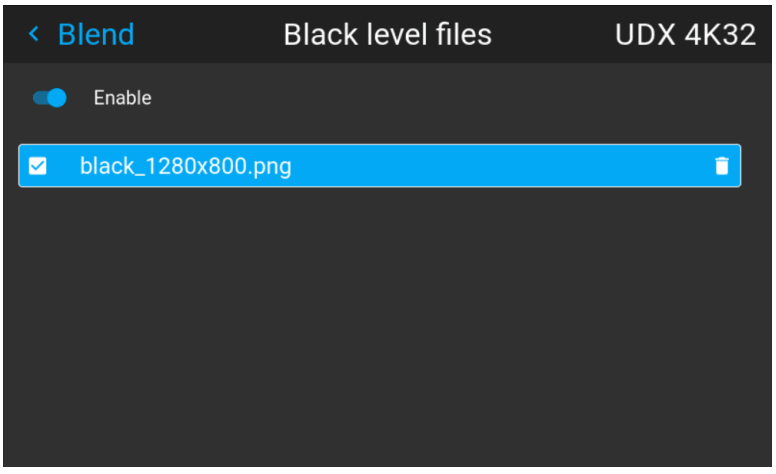


Image 7–84 Example of custom black level files selected

3. Make sure the *Enable* slider is toggled on to activate the selected black level file.

7.6 Illumination

Location and availability

- **Menu**: *Installation* > *Illumination*
- **Access level**: all
- **Models**: all
- **Requirements**: Light source must be on, shutter must be open

What can be done?

Within a certain limit, the light output of the light source can be reduced by reducing the power slider.

Alternatively, CLO mode (Constant light output) can be enabled for a constant light output over a longer period of time.

About CLO mode

All light sources naturally decrease their intensity over time. In order to prevent a decreasing output in a multi-projector setup, CLO mode can be activated.

CLO mode will ensure that the projector regulates its illumination power to maintain the same level of output light during the lifetime of the light source. This requires that the light source power is not set to 100% from the start, but to a lower value. The lower this value is set, the longer the projector will be able to maintain the output level.

CLO can not be used when the light source is off, the shutter is closed or if the Dynamic Black feature is active (if available).

How to adapt the power

1. In the Installation menu, select *Illumination*.

Image 7–85 Installation menu, illumination

The *Illumination* menu will be displayed.

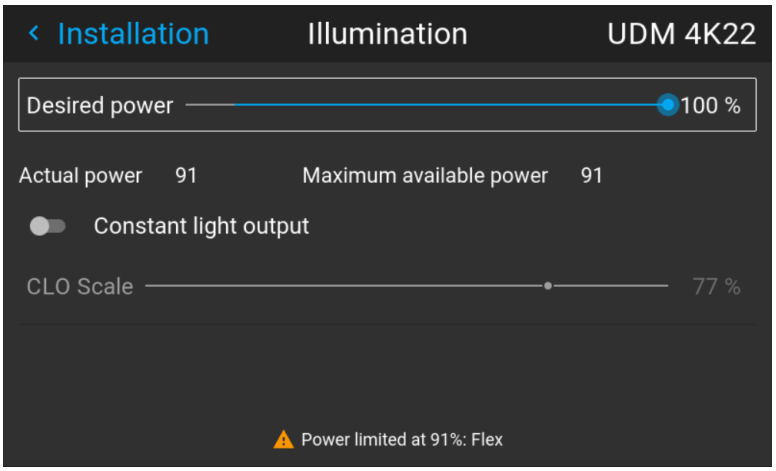


Image 7–86 Example of the Illumination menu

2. Use the Slider to change the power value.
3. If CLO mode is desired, enable the *Constant light output* slider.

4. If CLO mode is enabled, use the *CLO Scale* slider to the desired value.

   Note: The CLO scale can not be higher than the maximum available power of the light source.

7.7 IR illumination – Night vision functionality

Location and availability

- **Menu**: *Installation >> IR illumination*
- **Access level**: all
- **Models**: FS40, FS70, FS400

About

In combination with Night Vision Goggles (NVG), Night vision mode will give a realistic rendering of the environment during night time. This will visualize in a realistic way, night time, dusk and dawn, and limited visibility scenarios.

Night Vision projectors have two light sources. A standard light source available on all projector models of the same family, and an IR LED light source, exclusive to “FS” models the projector family.

- The standard light source of the projector is used to visualize visible light (VL).
- The IR LED light source is used to visualize the infrared spectrum (IR).

The IR light source has a wavelength of 740 nm

Displaying infrared

In night vision mode with 2 separate inputs, the projector displays the two inputs alternating every other frame. The output is displayed a double speed of the inputs, i. e. at 120Hz in case of 60Hz input. The DMD is illuminated with visible RGB light every other frame, while the IR “light” is illuminating the DMD all the time.

For more info on specific color component mapping, see “Nightvision color component mapping”, page 231.

How to achieve Night Vision mode

The power output of each light source can be individually controlled. To set up a proper night vision mode, two things must be done:

- Reduce the *Desired power* slider of the regular light source to the lowest possible setting to reduce the light intensity (daylight).
- Set the *IRLED desired power* slider of the IR LED light source to the desired maximum light output.

By doing this, the IR LED light source will become the dominant light source and the image on screen will be visible with night vision goggles.

To set up the IR illumination, navigator to the appropriate Illumination menus. There are two Illumination menus, each with a power slider; one for the LED Desired power (daylight), and one for the IR LED Desired power (Night Vision).

While wearing the night vision goggles, the IR LED slider can be adjusted, as well as the contribution level of each individual LED color (red / green / blue).

Alternatively, the power level of both light sources can be mixed. By mixing both light sources it is possible to simulate other visibility scenarios for other times of the day, such as “twilight mode”.

When enabling IR mode (Night Vision), the Vizsim Bright will be set as default. If another approach to IR (Night Vision), is performed, e.g. by selecting Auto Stereo Mode and at the same time turn off the LED’s, Vizsim Bright must be set manually.“BrilliantColor™”, page 73 If not then set to Vizsim Bright, the picture will be distorted.

Disable this function in IR mode

The Vizsim Bright mode will not cause this distortion.

Lightsource and DMD lifetime versus ambient temperature.

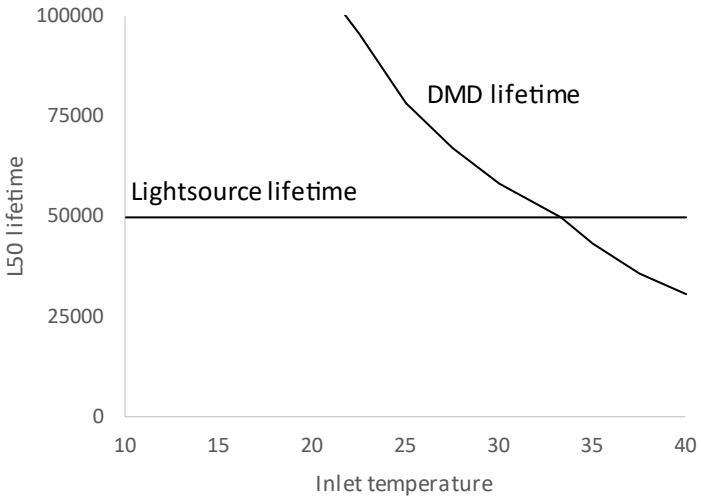


Image 7–87

How to enable Night Vision

1. In the *Installation* menu, select *IR illumination*.

Image 7–88 Installation menu, IR Illumination

The IR illumination menu will be displayed.

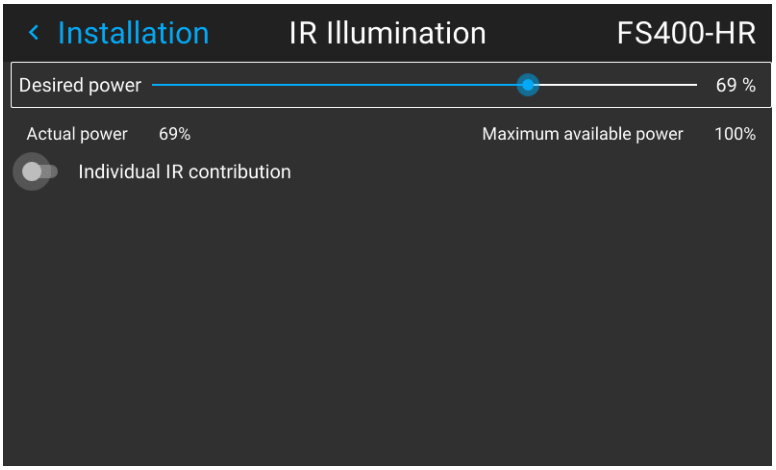


Image 7–89 Example of the IR Illumination menu

2. Use the *Desired power* slider to change the power value.
3. Enable the *Individual IR contribution* slider, if the contribution of individual colors of the IR LEDs needs to be decreased.

> *Note:* Individual IR contribution does not work while CLO is enabled. For this reason, if CLO is enabled, the enable slider will automatically become disabled.

The individual LED sliders will become visible and enabled.

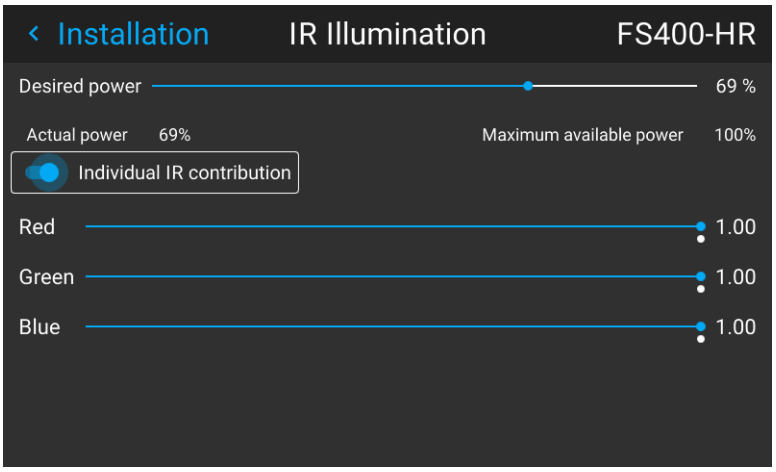


Image 7–90 Example of the IR illumination menu with the Red, Green and Blue sliders visible

4. Set the contribution level of each color by dragging the sliders to the desired output level.
   - Available range: 0.00 to 1.00
   - Default value: 1.00
   - Step: 0.01

7.8 3D projection

3D setup

The projector is capable of displaying 3D images and movies in active stereoscopic 3D.

Setup of a 3D installation requires an advanced understanding of 3D systems, both for the projector as well as for the system the signal source originates from. In a 3D setup it is crucial that the projected images are perfectly synchronized through the whole signal path, from the signal source to the picture viewed through the 3D goggles.

Regarding setting up the proper signal source, please refer to the user manual or online help for that graphic card. For example: when using NVIDIA Quadro cards, use the NVIDIA Control Panel to manage the 3D settings of the graphics card.

7.8.1 About Active Stereo & Passive Stereo

Passive Stereo

Passive Stereoscopic 3D (also known as “Passive Stereo”) is the standard method of creating the illusion of depth in an image, by means of stereopsis for binocular vision.

To present stereoscopic pictures, two images are projected superimposed onto the same screen through polarizing filters or presented on a display with polarized filters. For Digital Cinema, a silver screen is used so that polarization is preserved. On most passive displays every other row of pixels are polarized for one eye or the other. This method is also known as interlacing.

The viewer wears glasses which contain a pair of opposite polarizing filters. As each filter only passes light which is similarly polarized and blocks the opposite polarized light, each eye only sees one of the images, and the effect is achieved.

Active Stereo

Field sequential 3D (also known as active 3D or “Active Stereo”) is a technique of displaying stereoscopic 3D images. It works by only presenting the image intended for the left eye while blocking the right eye's view, then presenting the right-eye image while blocking the left eye, and repeating this so rapidly that the interruptions do not interfere with the perceived fusion of the two images into a single 3D image.

This system setup uses liquid crystal shutter glasses (also known as active shutter glasses). Each eye's glass contains a liquid crystal layer which has the property of becoming opaque when voltage is applied, being otherwise transparent. The glasses are controlled by a timing signal that allows the glasses to alternately block one eye, and then the other, in synchronization with the refresh rate of the screen. The timing synchronization to the video equipment may be achieved via a wired signal or via wireless communication, this by using either an infrared or radio frequency (e.g. Bluetooth, DLP link) transmitter.

Projection method used

This projector can only show active 3D images, used in combination with a 3D emitter and active shutter glasses. While it is allowed to connect passive stereo source signals, the image processing of the projector will convert those signals to an active 3D compatible image.

The 3D settings menu allows to fine-tune the 3D settings accordingly to the specifications of the 3D emitter.

If a 3D emitter is used that radiates IR beams, the IR beams may interfere with the IR communication between projector and the RCU. If such interference occurs, connect the RCU to the projector using the remote cable. It is advised to turn the IR receivers on the projector off to avoid the 3D emitter interference. To turn off the IR receivers on the projector, see “Remote control – IR sensors”, page 143.

7.8.2 Image Generators and IG pixel shift

Image Generator (IG)
An image generator (IG) creates visual scenes of a simulated environment from the perspective of a participant. The visual scenes can be displayed on multiple simulation projectors in a dome setup. The scenes can be rendered in the visible spectrum for an "out-the-window" experience, or in other wavelengths to simulate optical sensors. An image generator generates scenes very quickly to maintain a realistic sense of motion for the participant.

IG PixelShift
Image Generator Pixel Shift, hereafter referred to as IG pixel shift, is a method for achieving 4K resolution using the 4K actuator, where the phase offset between 2 subframes is generated by the source (the Image Generator, or IG). When the IG renders the subframes, the exact position of the rendered objects in the 3D model is known and the correct viewpoint for all objects is exact. This instead of the projector applying static filtering on the resulting 4K images to guess the subframes.

About IG pixel shift

On simulation projectors, the IG source can be connected on two identical connectors (e.g. DisplayPort 1 and 2, or DVI-D 1 and 2 (if available)). Using the Pixel shift module, a 4K rendering of the image will be displayed.

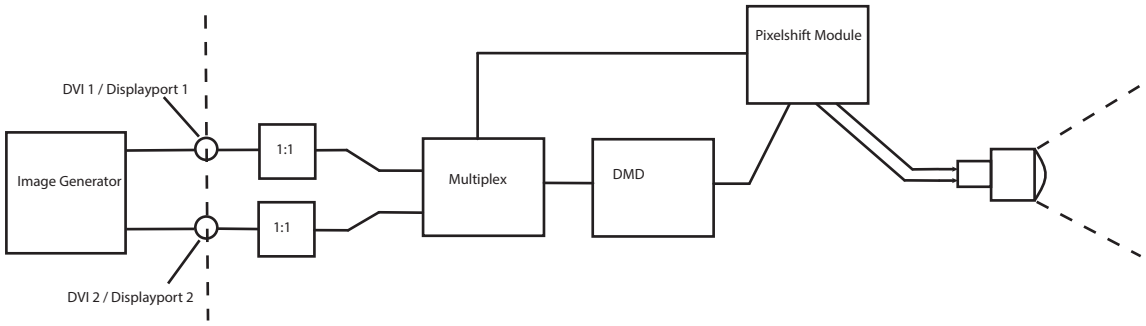


Image 7–91 IG Pixelshift. Principle of operation.

IG pixel shift in Night Vision mode

When having a “Stealth” variant projector, two image generators can be used to use pixel shift. One IG will generate the “daylight” or “out-the-window” image, whereas the other IG will generate the Infra-Red image.

The process of Night Vision pixel shift is identical, but the actuator will continue the pixel shift when the source switches from daylight to night vision.

7.8.3 Setup process 3D projection

How to setup 3D projection?

1. Connect the proper source cables to the projector. For more info, see “Connection possibilities”, page 126.
2. Set up and connect the 3D emitter to the projector. For more info, refer to the user manual of the 3D emitter.
3. Power on the projector completely.
4. Select the correct stitched source Input in the Source menu. See “Source”, page 35.
5. Depending on the chosen 3D emitter and chosen source, correct the 3D setup. For more info, see “3D Setup”, page 127.

7.8.4 Connection possibilities

Connecting with the projector connection panel

- **Models**: Fl40, FS40, F70, F80, Bragi, Balder and Medea
- **Connector**: DisplayPort 1.2 or DVI

Use one of the following methods. The resulting image will always be an Active Stereo image.

Source	Layout mode	Video Timing / cable	Fixed configuration?	Color depth
Active Stereo (sequential L/R)	Standard layout (1x1 layout)	2560 x 1600 @120 Hz		30 bpp
Passive Stereo (separate L/R)	Standard layout (1x1 layout)	3840 x 2160 @60 Hz	• Cable 1: left eye • Cable 2: right eye	30 bpp
Passive Stereo (dual pipe L/R)	2 Column mode (2x1 layout)	1920 x 2160 @60 Hz	• Cable 1: left eye • Cable 2: right eye	30 bpp

Connecting with the quad combo input panel

There is only one way of projecting Active stereoscopic 3D with the Combo input card, using the following setup:

- **Models**: UDM, UDX, I600, F400, Njord, Hodr.
- **Connector**: DisplayPort 1.2 or HDMI
- **Source**: Active Stereo (sequential L/R)
- **Layout mode**: Standard layout (1x1 layout)
- **Video Timing**: 2560 x 1600 (WQXGA) @120 Hz
- **Color depth**: 30 bpp

Connecting with the quad DP 1.2 Input pane

- **Models**: UDM, UDX, I600, F400, Njord, Hodr
- **Connector**: DisplayPort 1.2

Use one of the following methods. The resulting image will always be an Active Stereo image.

Source	Layout mode	Video Timing / cable	Fixed configuration?	Color depth
Active Stereo (sequential L/R)	Standard layout (1x1 layout)	2560 x 1600 @120 Hz		30 bpp
Active Stereo (sequential L/R)	4 Column mode (4x1 layout)	960 x 2160 @120 Hz		30 bpp
Active Stereo (sequential L/R)	4 Quadrant mode (2x2 layout)	1920 x 1080 @120 Hz		30 bpp
Passive Stereo (separate L/R)	Standard layout (1x1 layout)	3840 x 2160 @60 Hz	• Cable 1: left eye • Cable 2: right eye	30 bpp
Passive Stereo (dual pipe L/R)	2 Column mode (2x1 layout)	1920 x 2160 @60 Hz	• Cable 1: left eye, left column • Cable 2: left eye, right column • Cable 3: right eye, left column • Cable 4: right eye, right column	30 bpp

7.8.5 3D Setup

Location and availability

- **Menu location**: *Installation >> 3D Setup*
- **Access level**: all
- **Models**: all

Why change the 3D setup?

While Barco can provide a 3D emitter and active shutter glasses as options to this projector, other 3D emitters and active shutter glasses can be used. Since glasses and emitters can have various specifications compared to the ones Barco provides, the 3D setup menu allows the user to configure the output image to the specifications of the glasses and emitter. The following can be configured:

- **Swap eyes**: Inverts the stereo Sync output signal (depending on the chosen 3D emitter and glasses).
- **Swap frame pair**: Corrects the frame doubling sequence. If the frame rate of the projected moving 3D content doesn't look smooth, this option may help improve this.
- **Dark time**: Select how much dark time the projected image will have between frames.
- **Display mode**: Choose the desired output mode. For more details, see further.
- **Sync delay**: Increase or decrease the sync delay. The scale goes from –10 000 µs to +10 000 µs with a step of 100 µs.

Choosing the desired output mode

The following output modes are available:

- **AutoStereo**: Automatic mode (2D input = 2D output, 3D input = Active Stereo output).
- **Mono**: Forces all source signals to 2D output.
- **ActiveStereo**: Forces all source signals to Active Stereoscopic 3D.

Use the following table as an indicator of what display mode is required.

Source signal	AutoStereo	Mono	ActiveStereo
2D Source	Output is a 2D image	Output is a 2D image	Output is in Active Stereo
Active Stereo source	Output is in Active Stereo	Output is a 2D image	Output is in Active Stereo
Passive Stereo source	Output is in Active Stereo	Output is a 2D image	Output is in Active Stereo

When a different display mode is chosen compared to the source signal (e.g. Active Stereo source with Mono output), advanced image processing will make sure a desirable image is displayed.

Extra output modes for simulation and stealth projectors

On simulation projectors, the following extra output mode is available:

- **IGPixelshift**: Forces the source signals to an image ideal for simulation environments

On Stealth Simulation projectors, the following extra output modes are available:

- **NightVision**: Forces the source signal to Nightvision mode, using the IR LED light source
- **IGPixelshift**: Forces the source signals to an image ideal for simulation environments
- **IGPixelShiftNV**: Forces the source signals to an image for simation environments, while using the IR LED ligt source

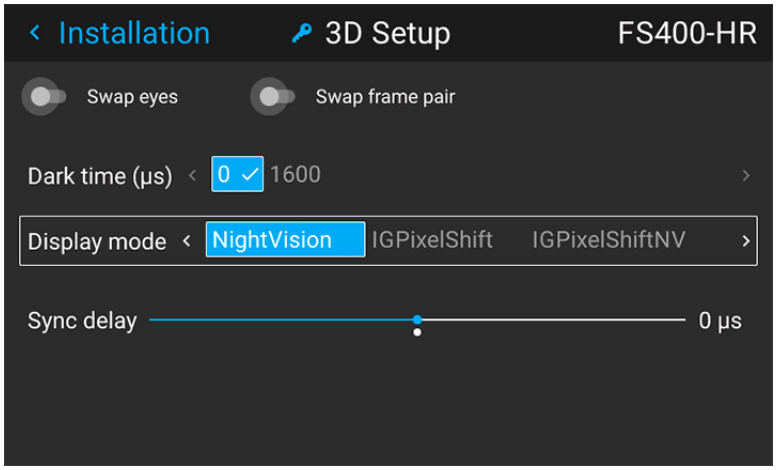


Image 7–92 Example of the extra options on a Stealth Simulation projector

How to adjust the projector to the 3D emitter?

1. In the *Installation* menu, select *3D Setup*.

Image 7–93 Installation menu, 3D setup

The *3D setup* menu is displayed.

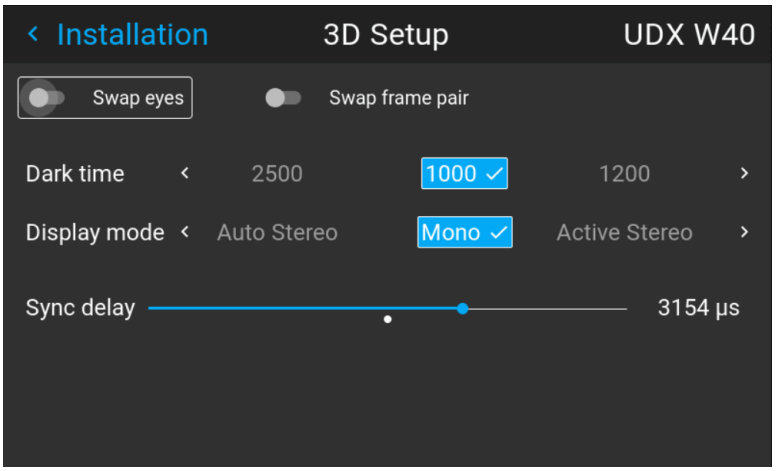


Image 7–94 Example of the 3D setup menu on a UDX

2. If it is necessary to invert the stereo sync output, enable the *Swap eyes* option.
3. If the projected moving 3D content doesn't look smooth enough, enable the *Swap frame pair* option to help improve this.
4. Select the desired the stereo *Dark Time*.
5. Select the desired *Display mode*.
6. Use the slider to set the desired stereo *Sync delay*.

8 Projector profiles

8.1 Profiles introduction

About Profiles

The profile function makes it possible to store different profiles / projector setups for different use cases, and quickly recall them when needed. This means that it is not necessary to enter a lot of different menus to adjust the projector setup for specific recurring use cases.

A few examples of different user cases are:

- Building temporary gaming setups in bright auditorium-level environment, versus a darker “gaming room” or “cave”.
- Playing content from an old DVD versus playing the latest release from an HDR-coded Blu-Ray.
- A rental projector that can be rented out for business presentations, concerts and other events that have different but recurring forms of content.

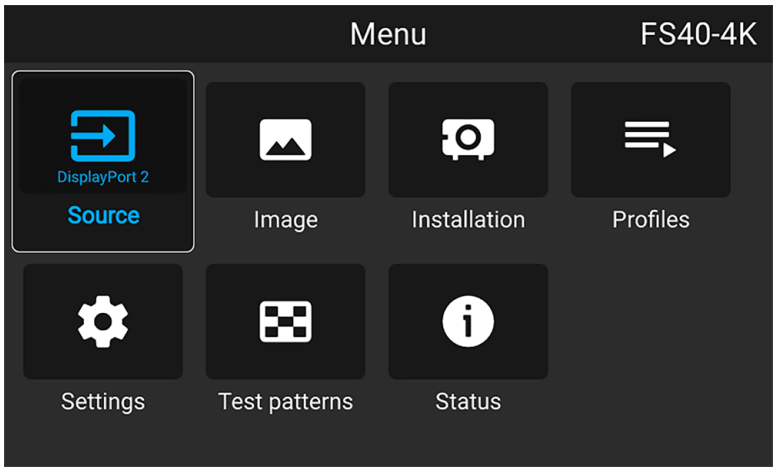


Image 8–1

Available profile settings

The following projector settings can be saved to a projector profile:

Profile domain name	Settings saved
Illumination	• Illumination power of light source • Light sensor enabled / disabled • Light sensor set point
Source	Active source selection & EDID
Image	• Contrast • Brightness • Saturation • Sharpness • Gamma • Used gamma type • Digital zoom (width / height / factor + enabled/disabled) • Digital shift (x / y + enabled / disabled) • Output resolution
Display (3D settings)	• 3D Display mode used • Swap eyes on / off • Swap frame pair on / off • Dark time and sync delay values
Realcolor™	• Brilliant Color mode (if available) • P7 desired values • P7 measured values
Warp	• Warp status enabled / disabled

Profile domain name	Settings saved
	• Screen size • Warp file selected (if available) • Transport delay **Note**: Bow and 4 corners warp cannot be saved.
Blend	• Blend mask enabled / disabled • All Masks (top / bottom / left / right) and heights (top / bottom / left / right) • Blend files enabled / disabled (if available) • Blend file selected (if available)
Black level	• Black level file enabled / disabled • Black Level file selected (if available) • Basic black level enabled / disabled • Black level settings (top / bottom / left / right) • RGB gain values (Red, Green and Blue values)
HDR	• Screen luminance (unit and value) • HDR Boost value • DynaBlack mode
Installation	• Lens parameters (lens zoom, focus, shift and iris (if available))[7] • Orientation (mounting & projection) • Scaling mode • Position of motorized frame (if used). • Shutter status (open or closed).
Cooling[8]	Selected Cooling mode
Operational mode[9]	Selected Operational mode

7. Only valid if recalled with same lens
8. Only if external cooler is installed
9. Only for applicable models

8.2 Saving the current projector settings in a profile

Make sure the projector is fully configured as desired before saving the settings.

Location and availability

- **Menu**: *Profiles* > *Edit*
- **Access level**: all
- **Models**: all

How to save the current projector settings?

1. In the *Profiles* menu, select *Edit*.

Image 8–2 Profiles menu, edit

The *Profile edit* menu is displayed.

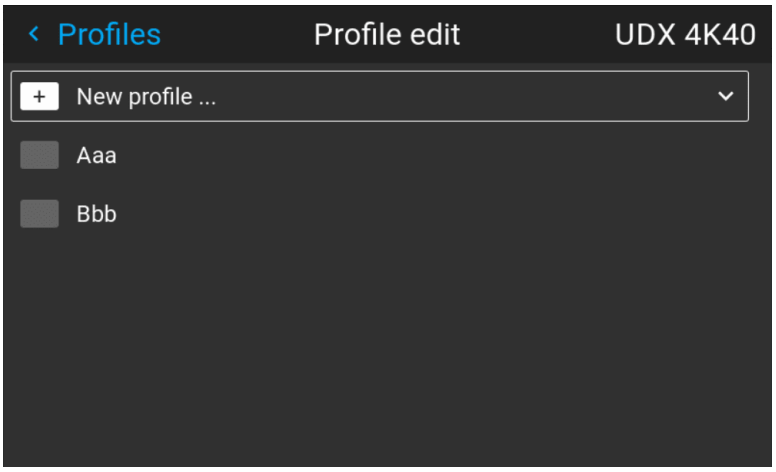


Image 8–3 Profile edit menu

2. Select *New Profile...* and confirm.

The *New Profile* pane is expanded and fully displayed.

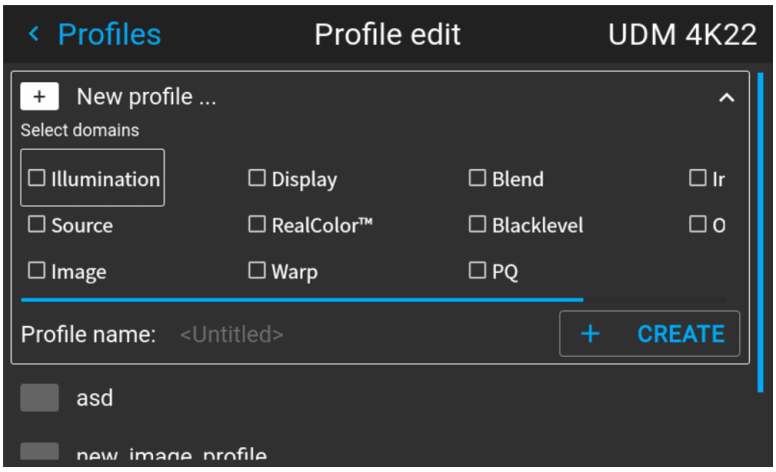


Image 8–4 Example of the new profile pane

3. Select and confirm each of the settings to be saved in this profile.
4. Select the field next to *Profile Name* and confirm.

   The on-screen keyboard will be prompted
5. Use the on-screen keyboard to enter a valid profile name.
6. Select *CREATE* and confirm to save the current profile settings.

8.3 Assigning a projector profile to a preset

This procedure assumes at least one projector profile has been created.

Location and availability

- **Menu**: *Profiles* > *Edit*
- **Access level**: all
- **Models**: all

How to assign a projector profile to a preset

1. In the *Profiles* menu, select *Edit*.

Image 8–5 Profiles menu, edit

The *Profile edit* menu is displayed.

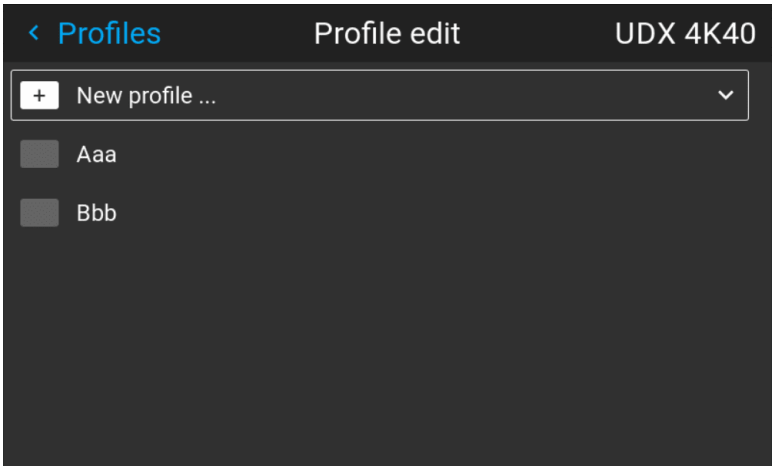


Image 8–6 Profile edit menu

2. Select the desired projector profile from the list and confirm.

   The profile pane for the selected profile will expand.

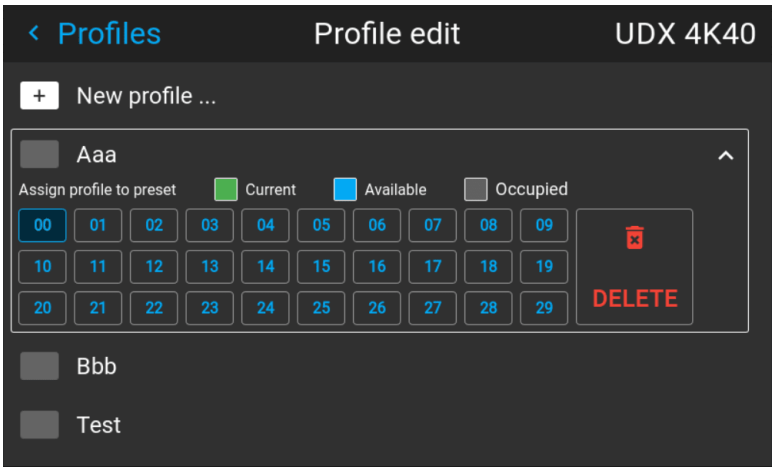


Image 8–7 Example of a projector profile with available preset slots

3. Select a preset slot and confirm.

   The selected preset slot is now shown next to the profile name.

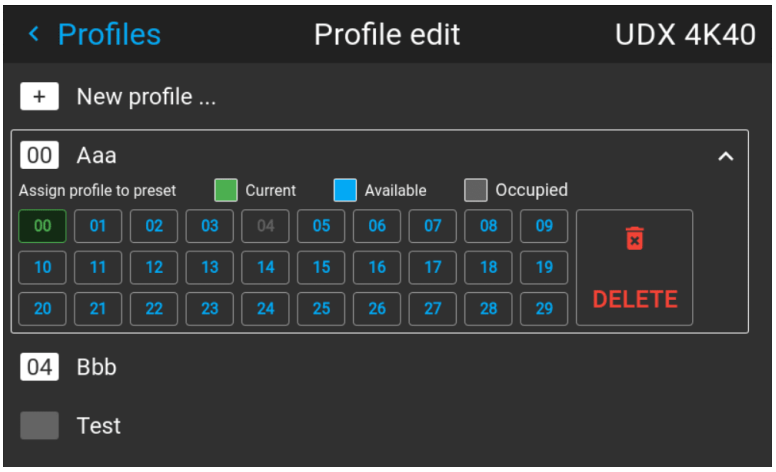


Image 8–8 Example of projector profiles allocated to preset slots (here slot 00 and 04)

8.4 Deleting a projector profile

Location and availability

- **Menu**: *Profiles* > *Edit*
- **Access level**: all
- **Models**: all

How to delete a profile

1. In the *Profiles* menu, select *Edit*.

Image 8–9 Profiles menu, edit

The *Profile edit* menu is displayed.

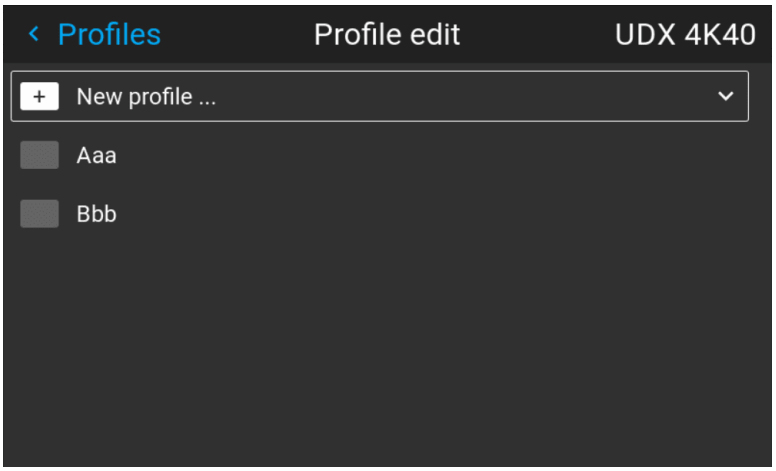


Image 8–10 Profile edit menu

2. Select the undesired projector profile and confirm to expand it.

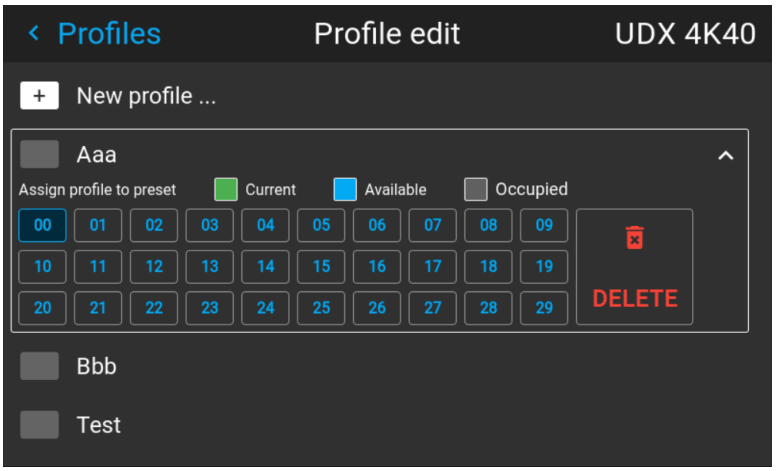


Image 8–11 Example of a projector profile with available preset slots

3. Use the arrow keys to select *Delete* and confirm.

   A confirm dialog will be prompted.

4. Confirm the delete action.

The profile will be deleted.

9 Settings

9.1 Communication

9.1.1 Remote control

9.1.1.1 Remote control – Broadcast address

Location and availability

- **Menu**: *Settings* > *Communication* > *Remote control*
- **Access level**: all
- **Models**: all

About broadcast address

Broadcast address is a common address that can be set on the projector. That can be “0” or “1”. The default broadcast address is '0'.

Any command coming from an RCU programmed with that common address will be executed.

How to change the broadcast address

1. In the *Communication* menu, select *Remote control*.

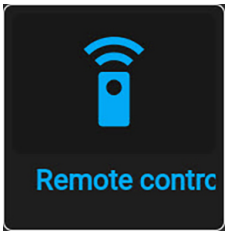


Image 9–1 Communication menu, Remote Control

The *Remote control* menu is displayed.

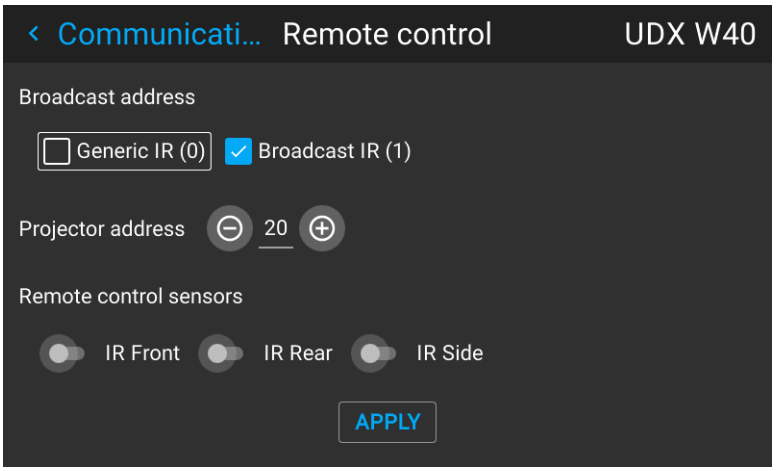


Image 9–2 Example of the Remote control menu

2. Select the desired broadcast address.
   - Generic IR (address 0)
   - Broadcast IR (address 1)
3. Select **APPLY** and confirm.

9.1.1.2 Remote control – Projector address

Location and availability

- **Menu**: *Settings* > *Communication* > *Remote control*
- **Access level**: all
- **Models**: all

About individual projector address

As more than one projector can be installed in a room, each projector should be separately addressable with an RCU or with a computer using serial communication. Therefore each projector has its own address. The factory default individual projector address is ‘0’.

When the address is set, the projector can be controlled with the RCU. Only addresses between 0 and 31 are supported for the RCU.

Next to an individual projector address, each projector has also a broadcast address for group control.

How to change

1. In the *Communication* menu, select *Remote control*.

Image 9–3 Communication menu, Remote Control

The *Remote control* menu is displayed.

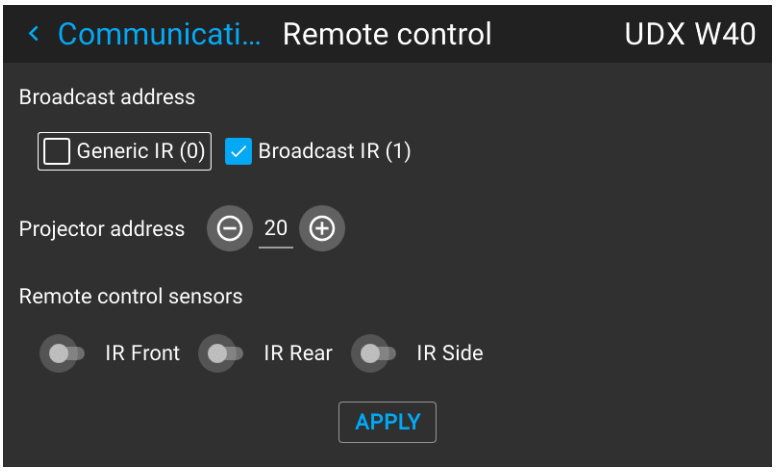


Image 9–4 Example of the Remote control menu

2. Select *Projector address*, enter the desired address and confirm.
3. Select **APPLY** and confirm to apply the changes.

   From now on the projector will only listen to this new address and to its broadcast address.

9.1.1.3 Remote control – IR sensors

Location and availability

- **Menu**: *Settings* > *Communication* > *Remote control*
- **Access level**: all
- **Models**: all

What can be done?

Every projector has a number of infrared (IR) sensors on different sides of the projector. The number depends on the projector model. The IR sensors are used to interact with the IR signal originating from either the basic RCU or the Pulse RCU.

However, when the projector is used in combination with other devices that emit or receive IR signals (e.g. a 3D emitter), the different IR signals can interfere with each other and can cause undesired reactions. In this case, it is advised to disable a number of IR sensors.

The IR sensors are enabled by default. Each IR sensor can be individually disabled or enabled.

When all IR sensors are disabled, the projector will no longer respond to IR signals from the remote control.
The Pulse RCU can still be used, using the wired connector. See the projector user manual on how to connect the Pulse RCU using the wired connector.

How to disable

1. In the *Communication* menu, select *Remote control*.

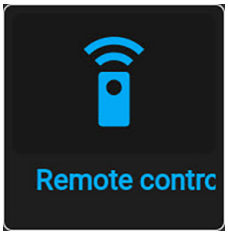


Image 9–5 Communication menu, Remote Control

The *Remote control* menu is displayed.

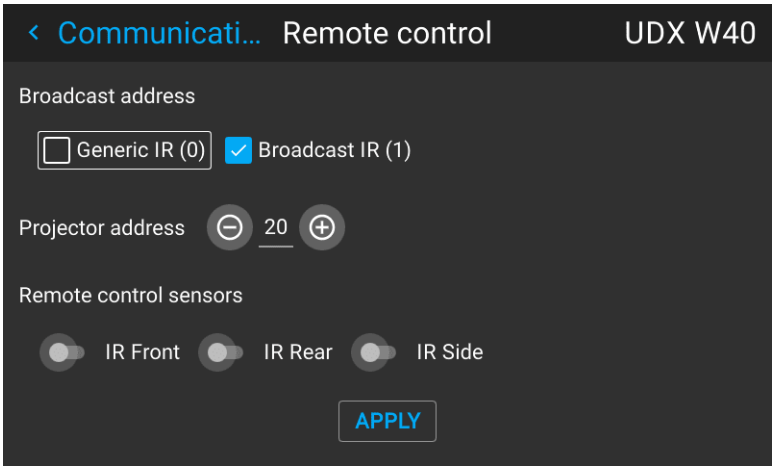


Image 9–6 Example of the Remote control menu

2. Enable or disable the desired IR sensor sliders.
3. To disable an IR sensor, disable the slider next to the undesired IR sensor.
4. Select **APPLY** and confirm with **OK** to apply the changes.

9.1.2 Host name - Custom projector name setup

Location and availability

- **Menu**: *Settings* > *Communication* > *Host name*
- **Access level**: all
- **Models**: all

What can be done?

The default host name of the projector is the projector type along with the serial number of the projector (e.g. “UDX-4K40-0123456789”).

The host name can be changed to make the projector easier to spot in a network with multiple devices or projectors.

How to set a different Host name

1. In the *Communication* menu, select *Host name*.

Image 9–7 Communication menu, Host name

The *Host name* menu is displayed.

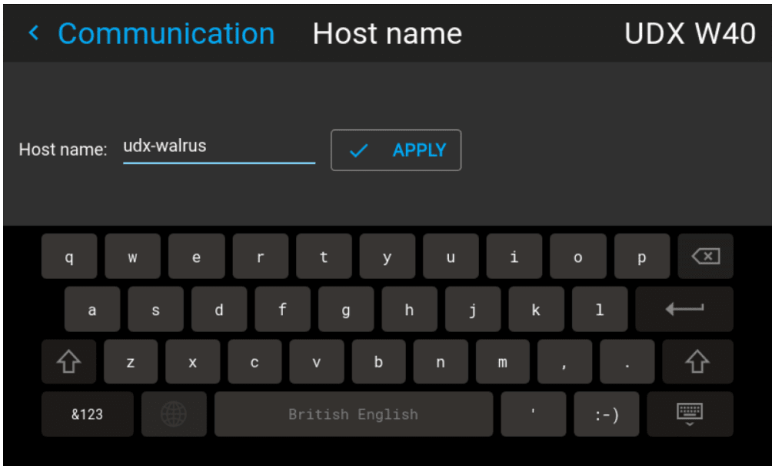


Image 9–8 Example of the host name menu

2. Enter the **Host name** field and confirm.

   The on-screen keyboard will be prompted.
3. Use the on-screen keyboard to change the Host name to the desired custom name.
4. Click **Apply** to save the updated host name.

9.1.3 Network setup

About a network connection

A network connection can be made via the LAN port, the HDBaseT™ input, or using the optional wireless module.

9.1.3.1 Introduction to a Network connection

DHCP
Dynamic host configuration protocol. DHCP is a communications protocol that lets network administrators manage centrally and automate the assignment of IP addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

IP
Internet Protocol. The network layer of TCP/IP. Required for communication with the internet.

Subnet mask
A number that is used to identify a subnetwork so that IP addresses can be shared on a local area network.

Default Gateway
A router that serves as an entry point into and exit point out of a network. For example, a local network (LAN) may need a gateway to connect it to a wide area network (WAN) or to the Internet.

MAC address
Media Access Control address. Unique hardware number, used in combination with the IP-address to connect to the network (LAN or WAN).

What should be set up for an Ethernet address?

Two ways can be used to assign an address:

- Use the *Automatic* setting so that an automatic address will be assigned.
- Manually assign an IP address, Net-mask (subnet-mask), (default) gateway address.
  - Set the IP-Address field to the desired value. This must NOT be 0.0.0.0 for static IP-Address assignment. The IP address identifies a projector's location on the network in the same way a street address identifies a house on a city block. Just as a street address must identify a unique residence, an IP address must be globally unique and have a uniform format.
  - Set the Subnet-Mask as appropriate for the local subnet.
  - Set the Default-Gateway to the IP-Address of the local router (MUST be on the local subnet!) on the same network as this projector that is used to forward traffic to destinations beyond the local network. This must not be 0.0.0.0. If there is no router on the projector's local subnet then just set this field to any IP-Address on the subnet.

Security when using a network

The local network can be accessible from anywhere by anyone within the operating range of the (wireless) network, if the security settings of the (wireless) network are insufficient. If people with malicious intent access the network, sensitive information may leak to outsiders, or the projector itself may be tampered with.

On the network side, Barco thus recommends the maximum amount of security for the network, in order to avoid this form of tampering. Some network devices may not be properly set for security when installed out of the box. Make sure to read the provided user documentation of the network device to properly set up the necessary security settings of the (wireless) network.

On the projector side, Barco recommends to make a limited amount of specific users on the external tools Barco provides (e.g. Pulse Prospector), and change all default passwords provided to strong passwords. For more information on user creation and password changing, please consult the Pulse Prospector user guide.

A strong password has a minimum of 8 characters and should be unique. The password should be a a mix of upper case letters, lower case letters, numbers and special characters.

About LAN over WiFi

When the optional Wi-Fi module or Wi-Fi dongle is installed on the projector, the projector can be configured in a way that it can access the network via Wi-Fi instead of a LAN cable.

For more information on how to install the Wi-Fi module, please refer to its installation manual.

About LAN over HDBaseT™

When a LAN cable is connected to the HDBaseT™ input, the HDBaseT™ menu will appear in the Settings menu. The projector can be configured in a way that it can access the network via HDBaseT™ instead of the default LAN port.

For F40, F70, F80, Bragi, Balder and Medea, the HDBaseT™ can be found on the connection panel.
For other projectors, the HDBaseT™ feature is only supported HDBaseT™ 1 on the Pulse Quad Combo Input MKII.

9.1.3.2 Wired IP address – Automatic setup

Location and availability

- **Menu**: *Settings* > *Communication* > *LAN*
- **Access level**: all
- **Models**: all

How to automatically set up the IP address

1. In the *Communication* menu, select *LAN*.

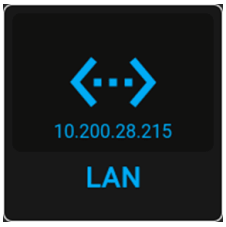


Image 9–9 Communication menu, LAN

The *LAN* menu is displayed.

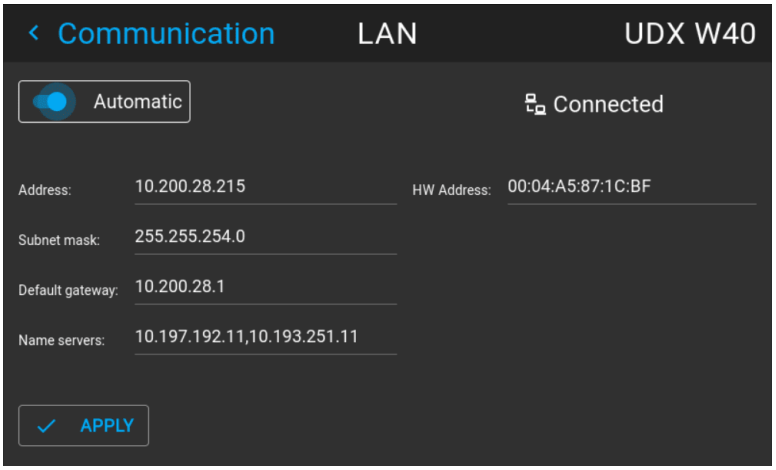


Image 9–10 Example of the LAN menu

2. Enable the *Automatic* slider.

   An IP address will be automatically assigned if it can make a connection to the network.

   When connected, it is indicated with the connection symbol and the indication *Connected*.

3. Select **APPLY** and confirm.

9.1.3.3 Wired IP address set up – Manual setup

Location and availability

- **Menu**: *Settings* > *Communication* > *LAN*
- **Access level**: all
- **Models**: all

How to manually set up the IP address

1. In the *Communication* menu, select *LAN*.

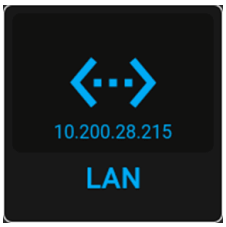


Image 9–11 Communication menu, LAN

The *LAN* menu is displayed.

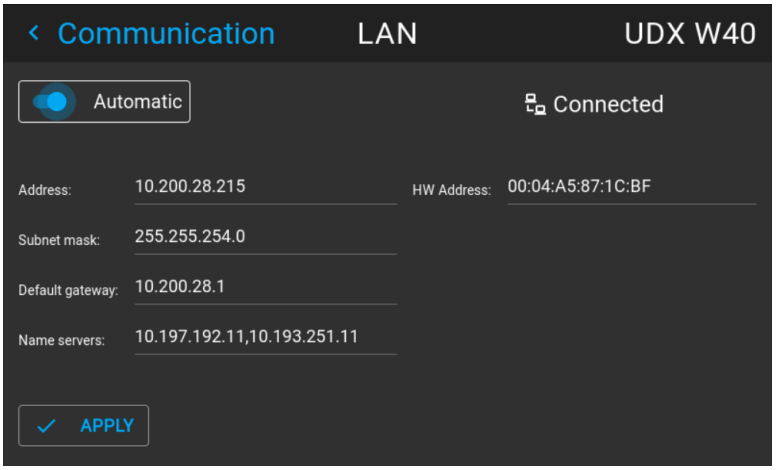


Image 9–12 Example of the LAN menu

2. Disable the *Automatic* slider.
3. Select the *Address* field and confirm.

   An on-screen keyboard will be prompted.

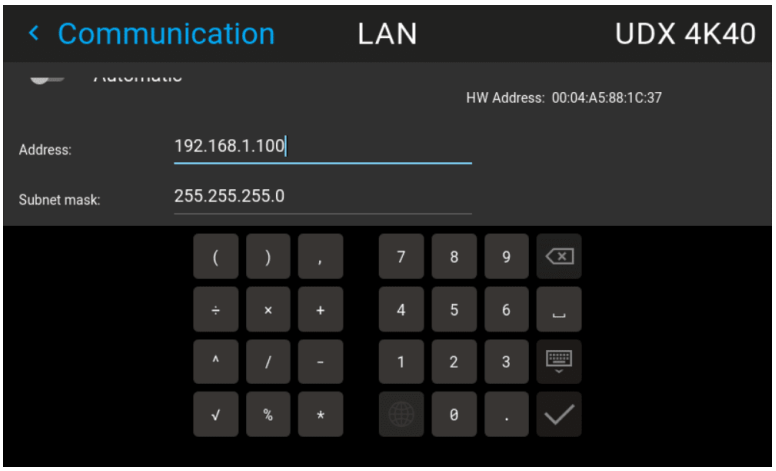


Image 9–13 Example of entering the IP address

4. Enter the desired IP address and confirm using the ✓ symbol .
5. Repeat the previous steps for all other fields in the LAN menu.
6. Select **APPLY** and confirm.

   When the connection is established, it is indicated with the connection symbol and the indication *Connected*.

9.1.3.4 Wi-Fi IP address – Automatic setup

Location and availability

- **Menu**: *Settings* > *Communication* > *WiFi*
- **Access level**: all

- **Models**: all
- **Requirements**: WiFi module or WiFi dongle

How to connect to a wireless network?

1. In the Communication menu, select *WiFi*.

Image 9–14 Communication menu, WiFi

The *WiFi* menu is displayed.

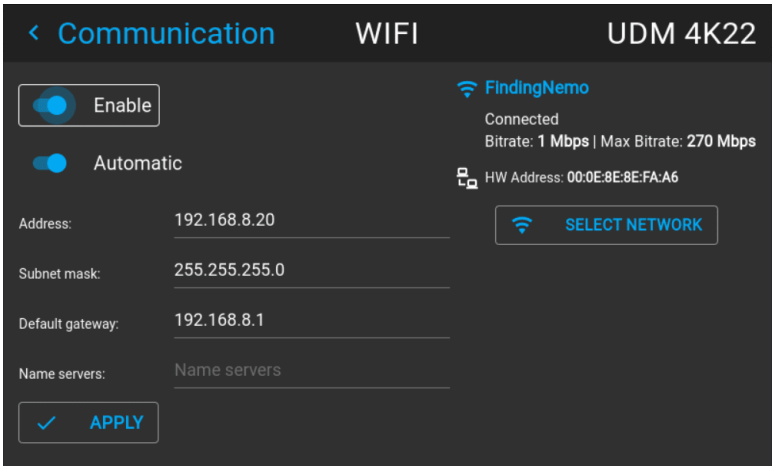


Image 9–15 Example of the WiFi menu

2. Enable the *Enable* and *Automatic* sliders.

Tip: The *Enable* slider enables the Wi-Fi module. The *Automatic* slider enables automatic IP address assignment.

If the projector was previously connected with a wireless network, it will automatically try to reconnect with this network. If the projector can connect to the network using this method, proceed to the last step in this procedure.

3. Select **SELECT NETWORK** and confirm.

The *Select WIFI Network* menu will be displayed.

4. Select the desired network from the available list and confirm.

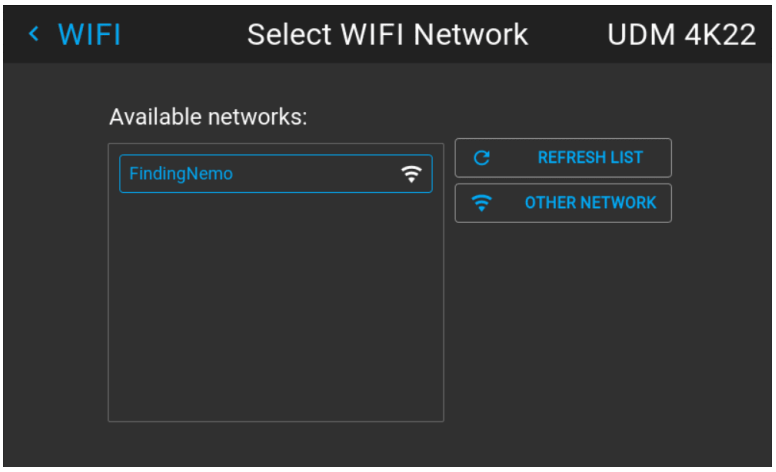


Image 9–16 Example of the available networks list.

Tip: If the desired wireless network is not in the list of available networks, or if the desired network is hidden by default, select **OTHER NETWORK** and confirm. An on-screen keyboard will be prompted. Fill in the details of the network using the on-screen keyboard.

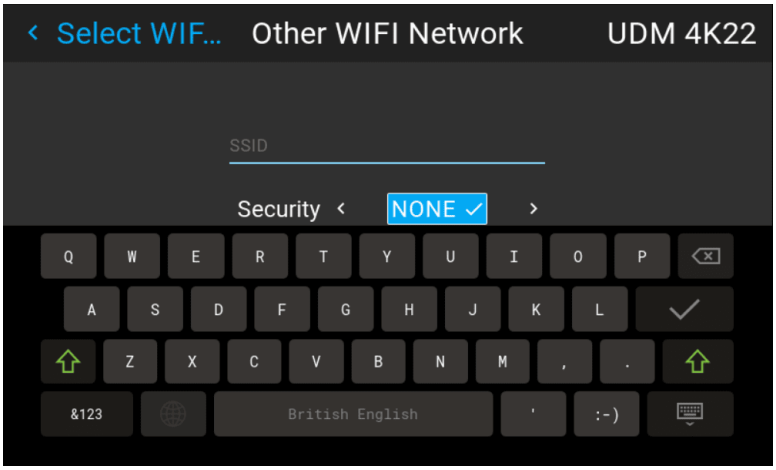


Image 9–17 Example of the entry form to search for other wireless networks

5. Select *Connect* and confirm to connect to the selected network.
6. If required by the chosen wireless network, fill in the user name and password, and confirm.

Tip: If the projector has already connected to this network in the past, the software will have remembered the user name and password.

If the filled in credentials are correct, an IP address will be assigned. Also, the term “connected” will be visible in the right side of the menu.

9.1.3.5 Wi-Fi IP address – Manual setup

Location and availability

- **Menu**: *Settings* > *Communication* > *WiFi*
- **Access level**: all
- **Models**: all
- **Requirements**: Wi-Fi module or Wi-Fi dongle

How to manually set up the Wi-Fi IP address

1. In the Communication menu, select *WiFi*.

Image 9–18 Communication menu, WiFi

The *WiFi* menu is displayed.

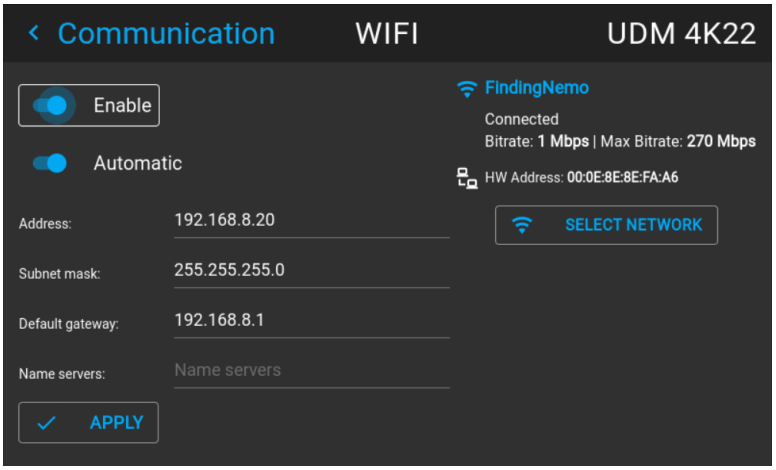


Image 9–19 Example of the WiFi menu

2. Enable the *Enable* slider to enable the Wi-Fi module.
3. Disable the Automatic slider in order to set the IP address manually.

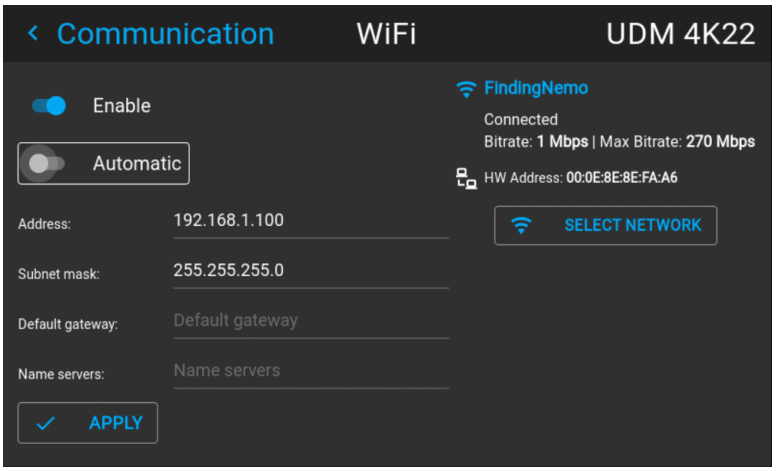


Image 9–20

4. Select the *Address* field and confirm.

   An on-screen keyboard will be prompted.
5. Fill in the IP address using the on-screen keyboard and confirm using the ✓ symbol.
6. Repeat the previous steps for the other fields in this menu.
7. Select **APPLY** and confirm to save the manually entered IP address.
8. Select the *Select Network* button, select the desired wireless network from the list and confirm.

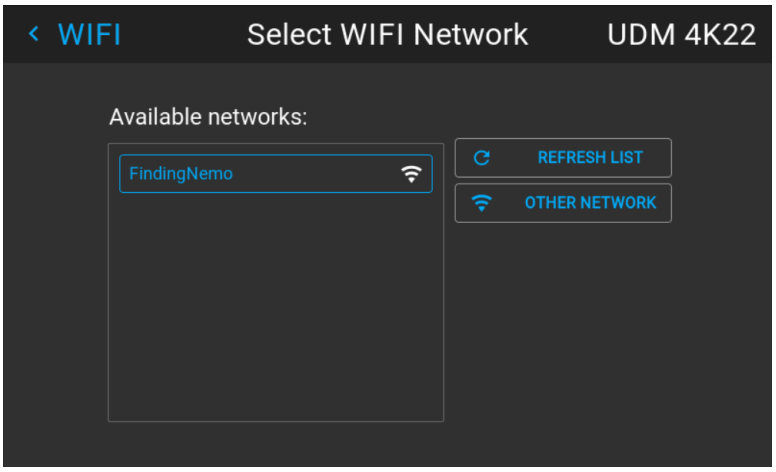


Image 9–21 Example of the available networks list.

9. If required by the chosen wireless network, fill in the username and password and confirm.

   If the filled in credentials are correct, the term “connected” will be visible in the right side of the menu.

9.1.3.6 LAN over HDBaseT™ IP address – Automatic setup

Location and availability

- **Menu**: *Settings* > *Communication* > *HDBaseT™*
- **Access level**: all
- **Models**: all
- **Requirements**: HDBaseT™ input

> Take into account that the HDBaseT™ network is unavailable if the projector is in either Standby mode or Standby ECO mode (whichever is available on the projector). If HDBaseT™ is used as the main network connection, it is thus advised to disable standby mode. For more info, see “Auto standby”, page 176.

How to automatically set up the IP address

1. In the *Communication* menu, select *HDBaseT™*.

Image 9–22 Communication menu, HDBaseT™

The *HDBaseT™* menu is displayed.

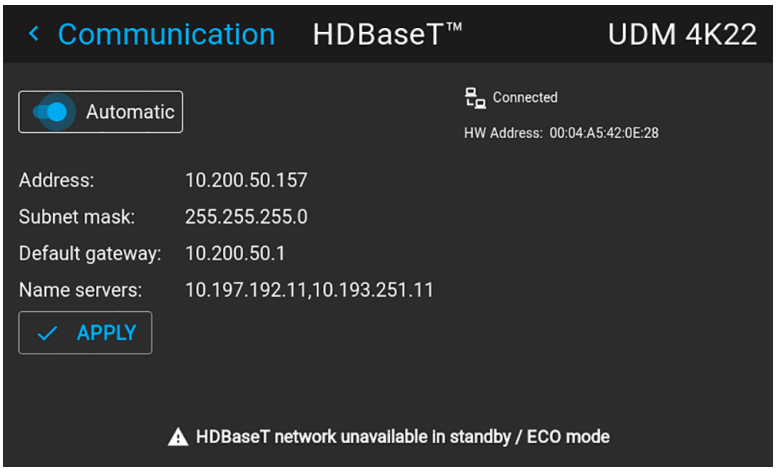


Image 9–23 Example of the HDBaseT™ menu

2. Enable the *Automatic* slider.

   An IP address will be automatically assigned if it can make a connection to the network.

   When connected, it is indicated with the connection symbol and the indication *Connected*.

3. Select **APPLY** and confirm.

9.1.3.7 LAN over HDBaseT™ IP address – Manual setup

Location and availability

- **Menu**: *Settings* > *Communication* > *HDBaseT™*
- **Access level**: all
- **Models**: all
- **Requirements**: HDBaseT™ input

Take into account that the HDBaseT™ network is unavailable if the projector is in either Standby mode or Standby ECO mode (whichever is available on the projector). If HDBaseT™ is used as the main network connection, it is thus advised to disable standby mode. For more info, see “Auto standby”, page 176.

How to manually set up the IP address

1. In the *Communication* menu, select *HDBaseT™*.

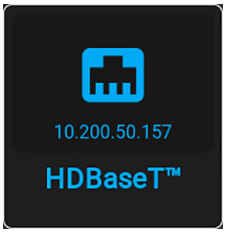


Image 9–24 Communication menu, HDBaseT™

The *HDBaseT™* menu is displayed.

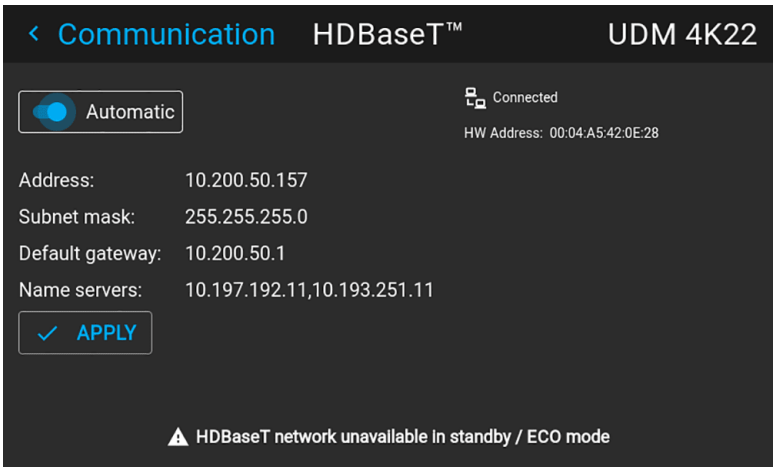


Image 9–25 Example of the HDBaseT™ menu

2. Disable the *Automatic* slider.
3. Select the *Address* input field.

   An on-screen keyboard will be prompted.

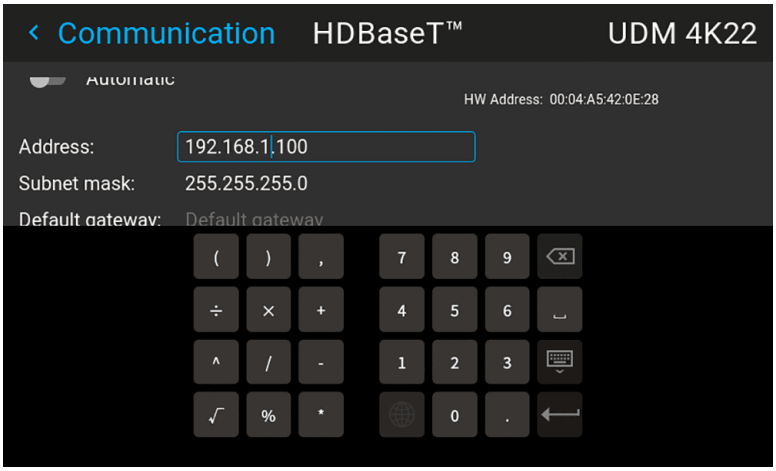


Image 9–26 Example of entering the IP address

4. Fill in the IP address using the on-screen keyboard and confirm.
5. Repeat the previous steps for the other input fields on the screen.
6. Select **APPLY** and confirm.

   When the connection is established, it is indicated with the connection symbol and the indication *Connected*.

9.1.4 DMX

Location and availability

- **Menu**: *Settings* > *Communication* > *DMX*
- **Access level**: all
- **Models**: UDM, UDX, I600, FL40, F70, F80, Bragi, Balder, Medea, Njord, Hodr

Controlling projectors remotely is not allowed on “Stealth” models of projectors (FS40, FS70, FS400). For this reason both DMX and PJLink features have been disabled on these models.

Ways to control the projector via DMX

DMX signals can be connected to the DMX In port on the communicator panel when using a standard DMX cable equipped with XLR connector. The DMX out can be used to create a chain of DMX devices. One DMX universe can control up to 512 channels.

When using a DMX console and other automated lighting products compatible with Art-Net, the Ethernet network can serve as the link for DMX control. All DMX controls can be sent over the Ethernet cable. Multiple universes are possible. This method allows a user to control more than 512 channels in the setup.

For a full list of all DMX channels, values and possible actions, see “DMX chart”, page 219.

About the DMX menu

DMX Feature	What can be done?
Connector type	Choose between DMX 512 (via XLR) and Art-Net (via Ethernet). If Art-Net is selected, Art-Net universe and Art-Net net become available.
DMX Art-Net Universe	If Art-Net is enabled, specify which DMX universe this projector belongs to.
DMX Art-Net net	If Art-net is enabled, specify the net channel.
DMX Mode	Two different modes for DMX are available. • **Basic**: A basic configuration where 2 channels are implemented. • **Extended**: A full configuration, spread over 14 channels. For the full mapping of each used channel, refer to the DMX chart in the appendices. See “DMX chart”, page 219.
Start Channel	Before a projector can execute DMX commands, an address (named DMX address or *Start channel*) should be given to the projector. This address can vary from 1 to 512.
Auto shutdown	The projector can be forced to shut down after a certain time-out period if no DMX signals are available. **Note**: Value is set in minutes.
Channels	If a DMX device is connected, the settings per channel can be displayed by clicking the **Monitor** button ().
Reset for Max intensity	The Shutter and intensity can be changed via DMX Channel 1 (both in Basic and Extended mode). If no DMX signals are available, the intensity value can be reset to its default (maximum) value of 255 using the **Max Intensity** button () .
Wake on DMX activity	When the projector is in Standby mode, the projector will wake up when it detects any activity on the DMX network over XLR. Available on Pule 2.5 or later, when the Pulse Quad Combo MKIII is installed.
Front XLR connector	On Pulse 2.5 or later, this has been moved to a separate menu. For more info, see “Controlling the front XLR connector”, page 178.

How to set up DMX?

1. In the *Communication* menu, select *DMX*.

Image 9–27 Communication menu, DMX

The *DMX* menu is displayed.

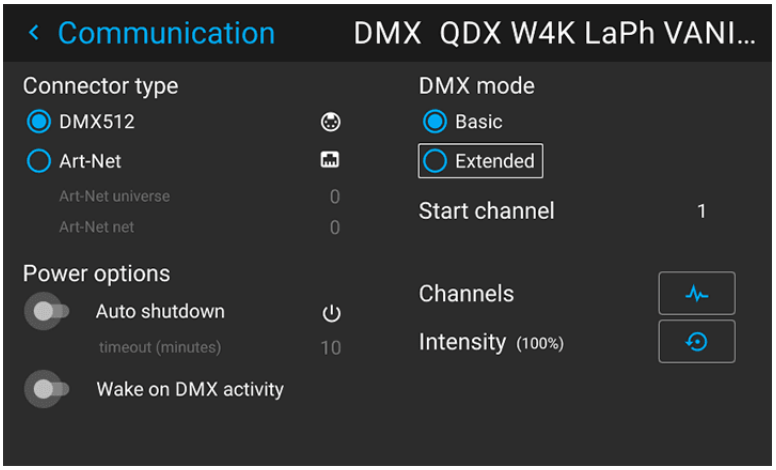


Image 9–28 Example of the DMX menu

2. Choose the used *Connector type*.
3. If Art-Net is chosen, determine the desired *Art-Net Universe* and *Art-Net channel*.
4. Choose the desired *DMX mode*.
5. Choose the desired starting channel.
6. Choose whether or not the Auto power-down feature should be enabled. If enabled, determine the time-out.
7. Enable *Wake on DMX activity* if the feature is visible and the projector is connected to the DMX network using XLR.

9.1.5 PJLink

Location and availability

- **Menu**: *Settings* > *Communication* > *PJLink*
- **Access level**: administrator, service
- **Models**: UDM, UDX, I600
- **Requirements**: Pulse 2.4 or later

About PJLink

JBMIA PJLink is a unified standard for operating and controlling projectors using external “controller” computers.

The supported PJLink commands and how they apply to this projector is described in the appendix: “PJLink commands”, page 227.

When PJLink is enabled on this projector, it will be compliant with the PJLink specification Version 2.00

What can be done

The following items can be configured on the Projector:

Menu item	Function
PJLink Enable / disable slider	Enables or disables the PJLink protocol on the projector. This slider is disabled by default.
Authentication and Password	Authentication adds a layer of password protection between the controller and projector. When authentication is enabled, enter a valid custom password. When the controller then tries to access this projector, this custom password will have to be entered in order to control the projector. Note: The custom password can be: • Up to 32 characters • Only letters and numbers are allowed:: [0-9], [a-z] and [A-Z]. • No special characters are allowed.
Notification	While notifications are enabled and a valid controller address is filled in, all projector notifications will be sent to the IP address of the controller.
Controller address	Location/IP address of the PJLink controller

How to activate PJLink

1. In the *Communication* menu, select *PJLink*.

Image 9–29 Communication menu, PJLink

The *PJLink* menu will be displayed.

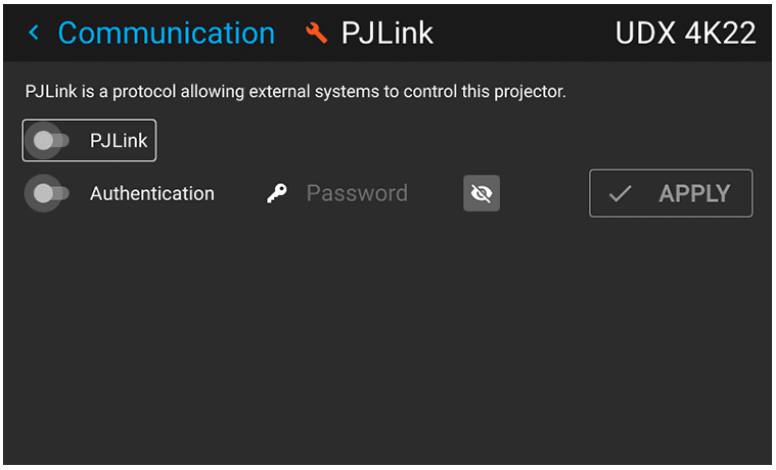


Image 9–30 Example of the PJLink menu

2. Enable the *PJLink* slider.

The *Notification* options will become visible.

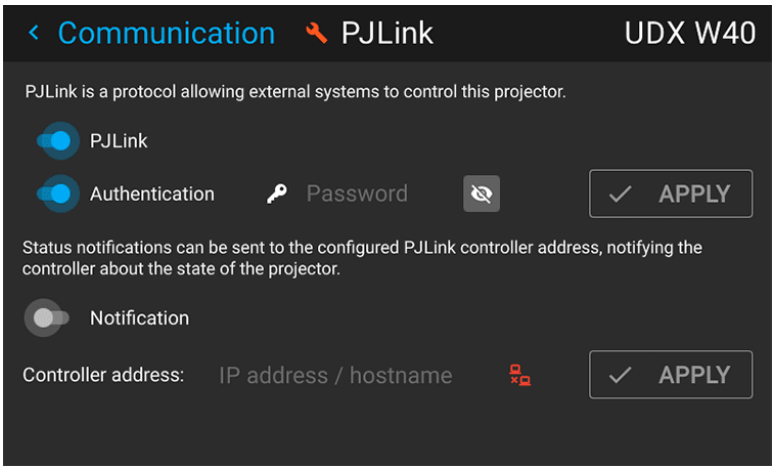


Image 9–31 Example of the PJLink menu with the Notification options visible.

3. To enable authentication, proceed as follows:
   1. Enable the *Authentication* slider.
   2. Fill in a valid password and confirm. Use up to 32 characters in the range [a-z], [A-Z] and [0-9].
   3. Select **APPLY** and confirm.
4. To enable notifications on the controller PC, proceed as follows:
   1. Enable the *Notification* slider.
   2. Fill in the valid *Controller IP address* or host name for the controller PC and confirm.
   3. Select **APPLY** and confirm.

   If a valid *Controller address* was filled in, the connection icon will change from red (disconnected) to white (connected).

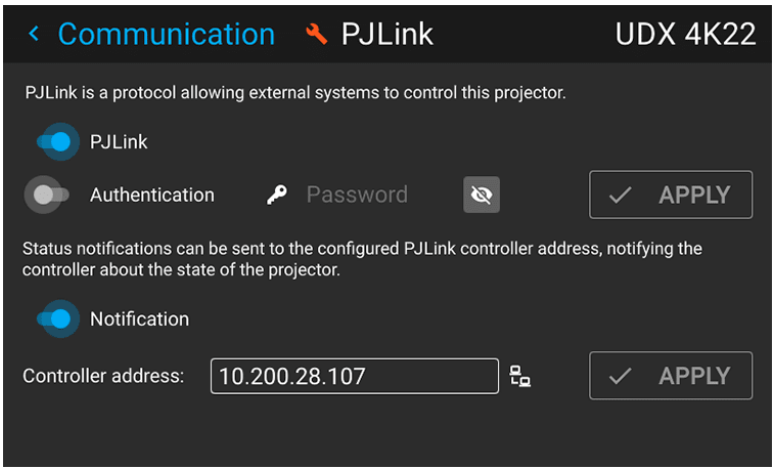


Image 9–32 Example of the PJLink menu while logged in and with a valid controller address filled in.

On Pulse 2.5 or later, the *Login* feature on the main menu of the Pulse OSD software can be used to log in as administrator or service technician. For more info on this, see “User authentication on Pulse 2.5”, page 30.
However, on Pulse 2.4 specifically, the PJLink menu was first made with its own login button to unlock the menu features. When using Pulse 2.4, use the login button to log in with administrator or service technician access.

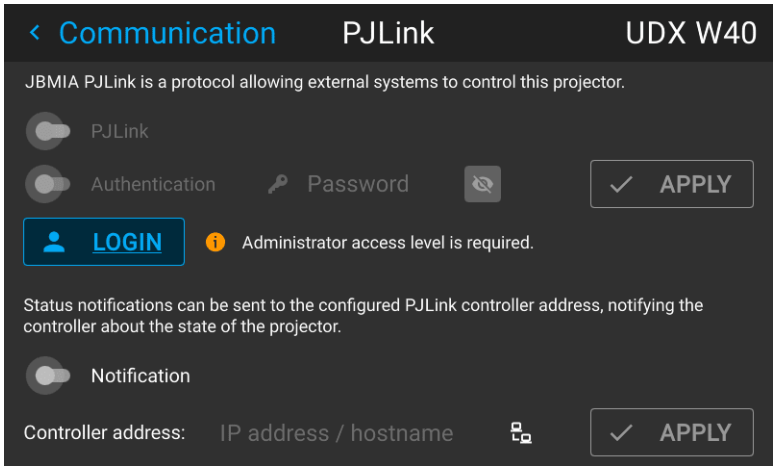


Image 9–33 Example of the PJLink menu in Pulse 2.4

9.1.6 GSM configuration

Location and availability

- **Menu**: *Settings* > *Communication* > *GSM*
- **Access level**: all
- **Models**: all
- **Requirements**: GSM module with SIM card

When to use the GSM menu

The GSM menu by itself does not have any functionality. The main purpose of this menu is to read out the necessary data from the SIM card in the GSM module.

This information may be required when using specific connectivity functions (e. g. configuring the Insights Management Suite in a mobile–only setup).

About the SIM card PIN code

To configure the projector software with the installed SIM card for the first time, a correct PIN code (4 digits) must be entered.

The software cannot verify if the entered PIN code I correct. Make sure to enter the correct PIN code.

When the used SIM card is blocked, remove the SIM card from the GSM module and to insert the SIM card in a mobile phone. Do this so that the PUK code can be entered to unblock the SIM card.

How to activate

1. In the *Communication* menu, select *GSM*.

Image 9–34 Communication menu, GSM

At first use, the GSM pin code input menu is displayed. If a correct PIN code has been entered in the past, it will not be necessary to enter the PIN code again.

2. Enter the 4 digits of the PIN code and confirm.

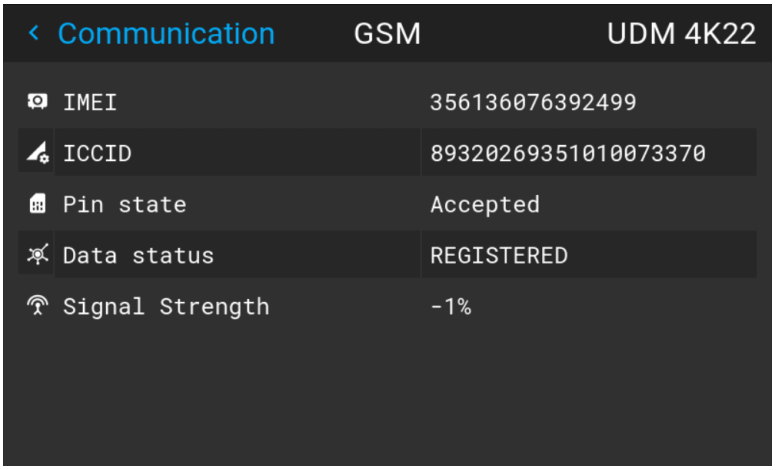


Image 9–35 Example of the GSM menu once the PIN code has been applied

9.1.7 Trigger outputs control

Location and availability

- **Menu**: *Settings* > *Communication* > *Triggers*
- **Access level**: all
- **Models**: I600, F40, F70, F80, F400, Bragi, Balder, Medea

About the trigger outputs

There are a number trigger outputs on the projector (two or three, depending on projector model). The trigger outputs are located on the connection panel of the projector. The triggers can be used for controlling external equipment, like motorized screens, curtains, etc.

The trigger outputs can be individually set to active low or active high.

If the trigger outputs are loaded too heavily, there is a risk that the projector will go in reset mode, and restart. This causes no damage to the projector, but is an undesirable response. This will also happen if the startup current for the external equipment is too high, even though the nominal power consumption is less than 0,5 A.

How to enable or disable

1. In the *Communication* menu, select *Triggers*.

Image 9–36 Communication menu, Triggers

The Triggers menu is displayed.

Image 9–37 Example of a Triggers menu

2. Use the slider for each trigger individually to set them to “active low” or “active high”.

The time of trigger output is defined via API code. Contact Barco support for detailed info.

9.2 User interface

9.2.1 Changing the User Interface language

Location and availability

- **Menu**: *Settings* > *User interface* > *Language*
- **Access level**: all
- **Models**: all

How to change the language of the user interface

1. In the *User interface* menu, select *Language*.

Image 9–38 Interface

The *Language* menu is displayed.

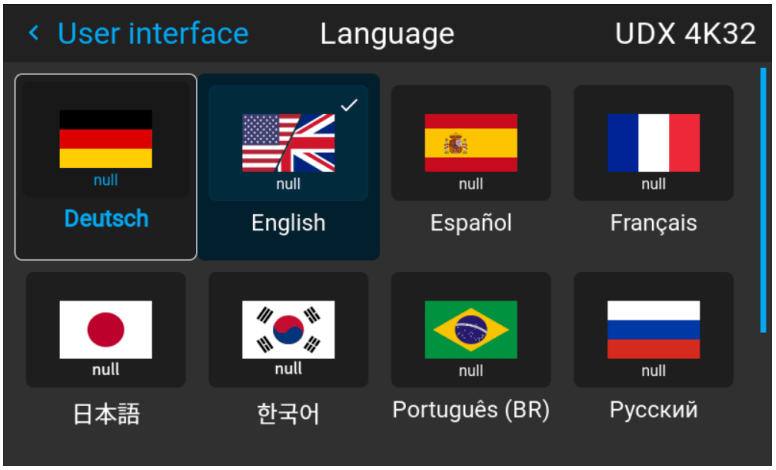


Image 9–39 Example of the Language menu

2. Select the desired language and confirm. Choose one of the following:
   - German (DE)
   - English (EN)
   - Spanish (ES)
   - French (FR)
   - Japanese (JA)
   - Korean (KO)
   - Portuguese (PT-BR)
   - Russian (RU)
   - Chinese (ZH)

9.2.2 Themes

Location and availability

- **Menu**: *Settings* > *User interface* > *Themes*
- **Access level**: all
- **Models**: all

About Themes

Themes are used to apply a predefined functionality to the OSD display. There are two options: light or dark. The default theme is dark.

Changing themes can be helpful in setups with low ambient lighting conditions. Choosing a Light theme in this situation may put less strain on the eyes.

How to select a different interface theme

1. In the *User interface* menu, select *Themes*.

Image 9–40 Settings menu, themes

The Themes menu is displayed.

2. Select the desired theme and confirm.

If a different theme is chosen, the look-and-feel of the user interface will change.

9.2.3 Units (measurement) system setup

Location and availability

- **Menu**: *Settings* > *User interface* > *Units*
- **Access level**: all
- **Models**: all

About the used measurement systems

This menu can be used to change the default measurement. The following can be changed:

- **Temperature**: °C or °F. Default is °C.
- **Distance**: meters (m), centimeter (cm), feet (Ft) or inch (in). Default is meters.

How to set a different metric system

1. In the *User interface* menu, select *Units*.

Image 9–41 Settings menu, units

The *Units* menu is displayed.

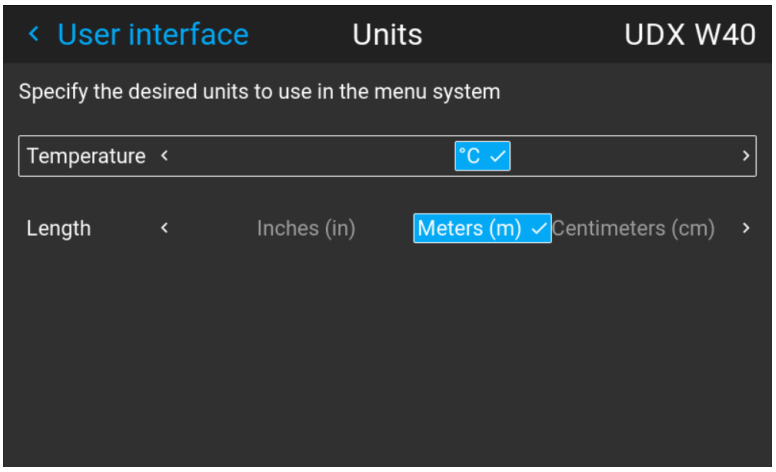


Image 9–42 Example of the Units menu

2. Select the desired *Temperature* unit and confirm.
3. Select the desired *Length* unit and confirm.

9.2.4 Controlling the backlight of the LCD Display

Location and availability

- **Menu**: *Settings* > *User interface* > *Backlight*
- **Access level**: all
- **Models**: all

What lighting can be controlled?

The backlight of the LCD display will turn off after five minutes by default. this feature can be disabled. Alternatively, the time interval can be changed to another preset, or a custom entered value.

Stealth Mode

Alternatively, **Stealth Mode** can be activated instead. By activating this mode, the backlight of the LCD, the backlight of all the buttons of the keypad and the indication LEDs for the LAN and HDbaseT inputs will be disabled.

Stealth Mode can also be enabled or disabled by pressing the OSD button on the remote control for 3 seconds.

How to set the backlight

1. In the *User interface* menu, select *Backlight*.

Image 9–43 Settings menu, backlight

The *Backlight* menu will be displayed.

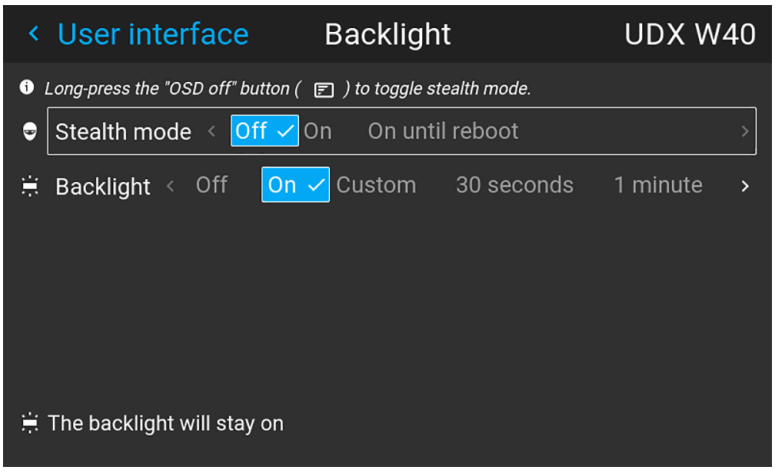


Image 9–44 Example of the backlight menu

2. Choose the desired Stealth mode:
   - *Off*: Stealth mode will be disabled.
   - *On:* Stealth mode will be on.
   - *On until reboot*: Stealth mode will remain on until the next reboot of the projector.
3. Choose how long the backlight will remain on. Choose one of the following:
   - *Off*: The Backlight will turn off and remain off.
   - *On*: The backlight will turn on and will remain on.
   - Any value between 30 seconds and 1 hour: The backlight will turn off and remain off after the chosen timestamp.
   - *Custom*: Remembers the previous chosen custom value (if any).

9.3 Date and time

9.3.1 Date and time setup - automatically

Location and availability

- **Menu**: *Settings* > *Date and time*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.2 or later

About date and time

The date and time setting can be set automatically via an NTP server based on region and city location.

Date is displayed by default as: day / month / year.
Time is displayed by default as: hour : minutes : seconds, in the 24–hour clock.

To set date and time automatically

1. In the *Settings* menu, select *Date and time*.

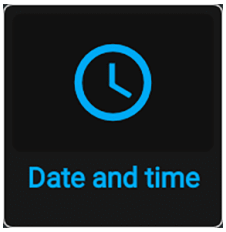


Image 9–45

The *Date and time* menu will be displayed.

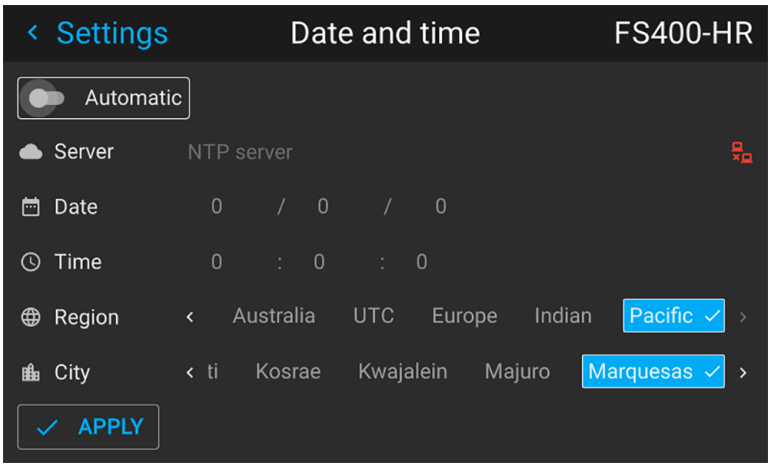


Image 9–46 Example of the Date and time menu

2. Enable the *Automatic* slider.

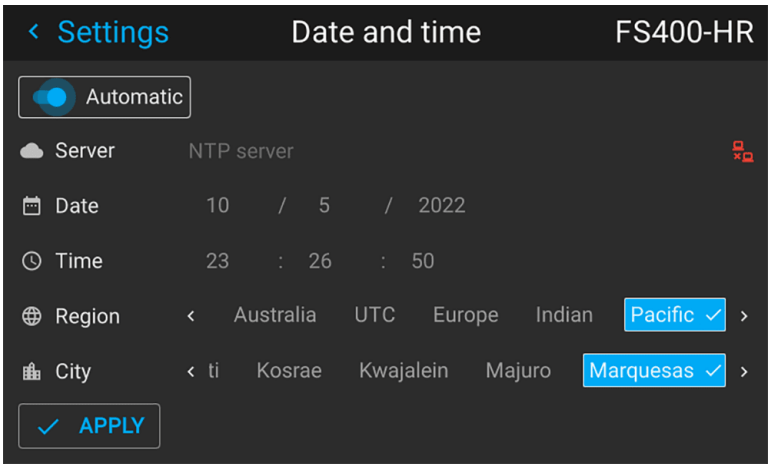


Image 9–47

3. Select *Server* and confirm.

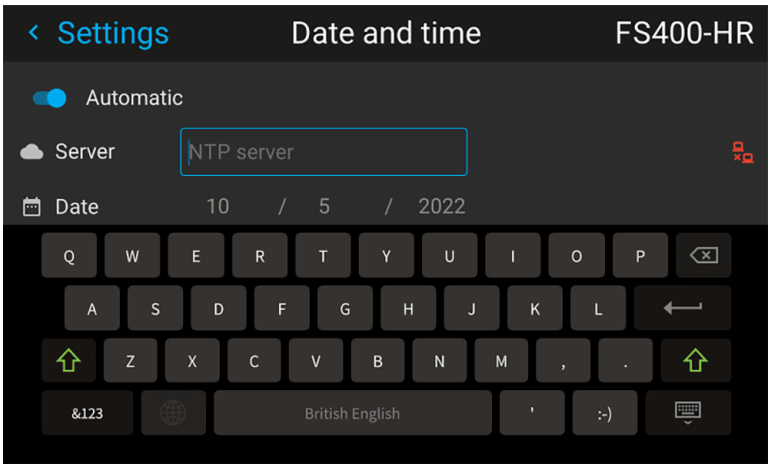


Image 9–48

4. Enter the hostname or the IP address of the NTP server and confirm.

   Tip: In case the projector cannot connect to an external NTP server although the server can be PINGed, the connection is blocked by the local firewall policy. Contact the local IT system administrator.

   In case the connection is successful, a green icon appears at the right side of the server line.

5. Select the desired *Region* from the list and confirm.

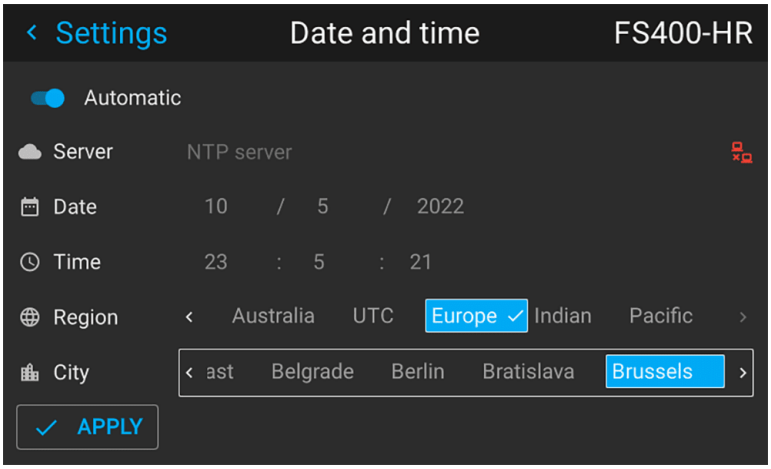


Image 9–49

The list of cities is updated according the selected region.

6. Select the desired *City* from the list and confirm.
7. Select **Apply** and confirm.

9.3.2 Date and time setup - manually

Location and availability

- **Menu**: *Settings* > *Date and time*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.2 or later

About date and time

The date and time setting can be set manually or automatically via an NTP server based on region and city location.

Date is displayed by default as: day / month / year.
Time is displayed by default as: hour : minutes : seconds, in the 24–hour clock.

How to set time manually

1. In the *Settings* menu, select *Date and time*.

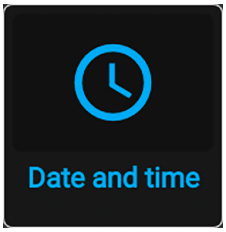


Image 9–50 Settings menu, Date and time

The *Date and time* menu will be displayed.

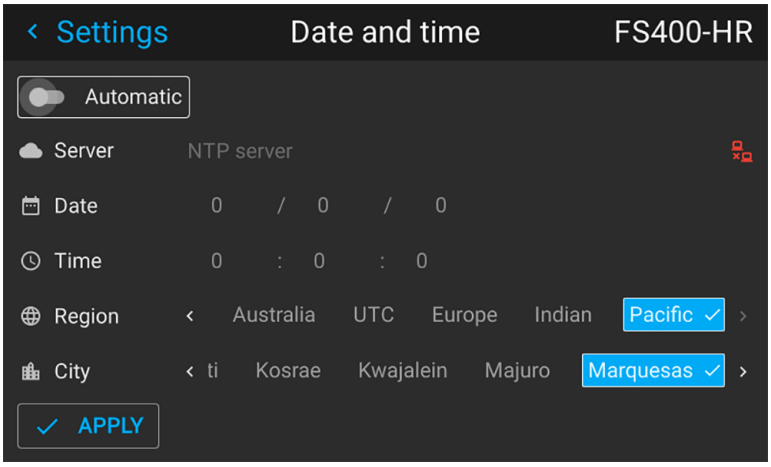


Image 9–51 Example of the Date and time menu

2. Disable the *Automatic* slider.
3. Select *Date*

   The Date dialog is prompted. The active day is selected by default.
4. Slide the *Day*, *Month* and *Year* slider up or down until the desired date is obtained.

   or

   Alternatively, use the up, down and OK buttons on the RCU or control panel until the desired date is obtained.

5. Select *Time*.

   The Time dialog is prompted. The active time is selected by default.

6. Slide the Hour, Minute and second slider up or down until the desired time is obtained.

   or

   Alternatively, use the up, down and OK buttons on the RCU or control panel until the desired time is obtained.

7. Select **Apply** and confirm.

9.4 Scheduler

9.4.1 About the projector scheduler

Location and availability

- **Menu**: *Settings* > *Scheduler*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

From Pulse 2.5 onward the Scheduler can be found in the Settings menu. In older versions, the Scheduler menu can be found directly in the main menu.

About the scheduler

The projector scheduler allows the user to automate the weekly schedule of the projector. This includes:

- Powering up the projector
- Selecting and activating a predefined projector profile.
- Powering down the projector

How to open the scheduler

1. In the *Settings* menu, select *Scheduler*.

Image 9–52 Main menu, Scheduler menu icon

2. The current scheduler will be displayed.

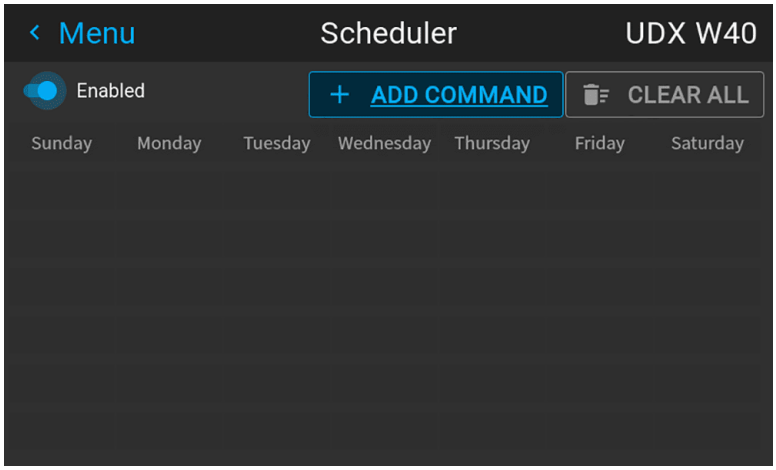


Image 9–53 Example of a cleared Scheduler menu

Make sure the *Enabled* slider is toggled on. If not, none of the items in the scheduler will trigger.

9.4.2 Adding a new command in the scheduler

How to add a new command

1. In the *Scheduler* menu, select *Add Command*.

   The *Add Command* page is displayed.

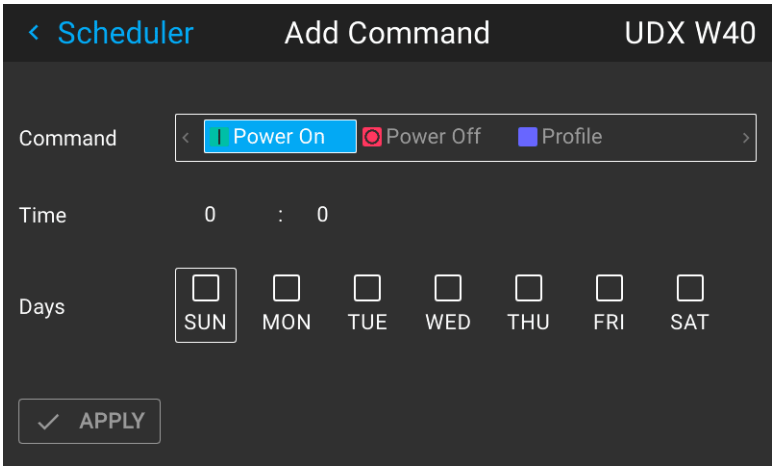


Image 9–54 Example of the Add Command window

2. Select the type of command to be added. The following options are available:
   a) Power On (ON mode).
   b) Power Off (Ready and or Standby mode).
   c) Activate a projector profile.

   Tip: In order to activate a projector profile in the scheduler, a minimum of one projector profile will need to be configured beforehand. If no profile is available, the “Profile” option will not be available in the “Add Command” window.

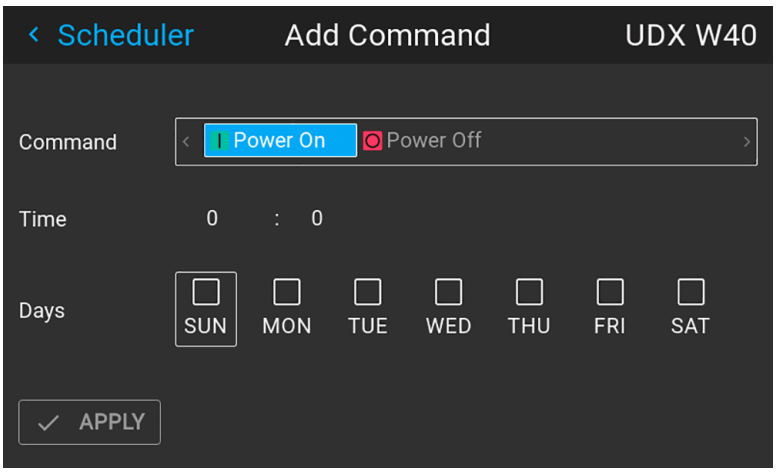


Image 9–55 Example of the Add Command window without any Projector Profiles configured

   For more info on creating Projector Profiles, see “Projector profiles”, page 131.

If *Profile* is selected, the currently available projector Profiles will be listed in the menu.

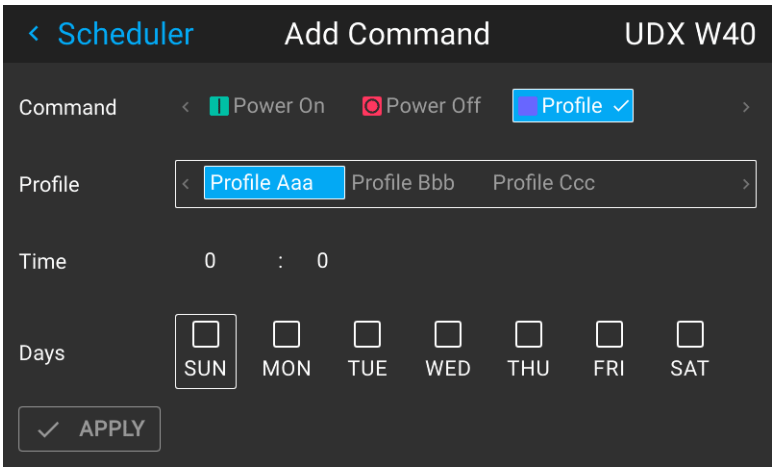


Image 9–56 Example of the Add Command window with the available profiles listed

3. If *Profile* is selected, choose the desired profile to activate.
4. Select the desired *Time* the command will need to activate (in hours and minutes of the day).

   Note: Make sure the projector time is correctly configured. For more info, see "Date and time setup - automatically", page 166 and "Date and time setup - manually", page 168.

   Tip: If the hour and minute marker is selected, a time slider will pop up. Use the hours and minutes sliders to select the desired timeframe and confirm.

5. Select the desired days of the week when this command will need to activate. Use the arrow keys to select the desired days and confirm.

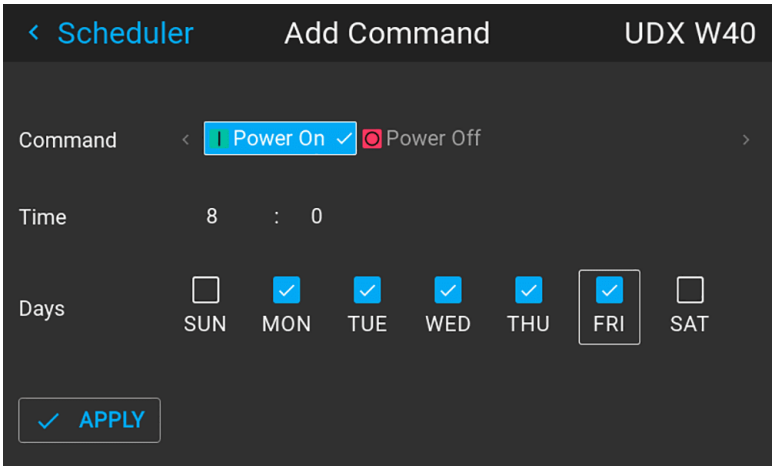


Image 9–57 Example of the Add Command menu with command, time and days of the week selected.

6. Click **Apply** to add the new command to the scheduler.

   The new command is added to the Scheduler.

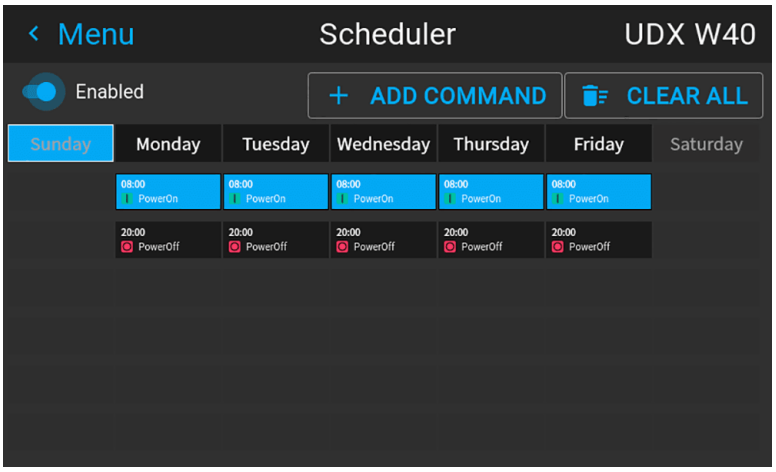


Image 9–58 Example of the Scheduler menu, with Power On being added.

9.4.3 Edit or Delete a command

How to edit or delete a command

1. In the *Scheduler* menu, select and confirm an existing command.

   The *Edit Command* window will be prompted.

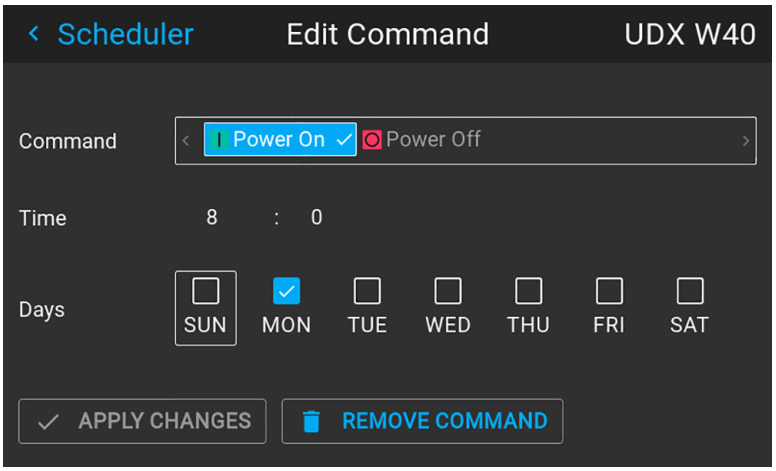


Image 9–59 Example of the Edit Command window

2. Edit the desired settings of the Command.
3. Once all changes have been made, select the **Apply Changes** button and confirm.
4. If the command should be deleted instead, select **Remove Command** button and confirm.

9.4.4 Clearing the scheduler

How to clear up the entire scheduler

1. In the *Scheduler* menu, click **Clear All**.

   A warning dialog will be prompted, asking to confirm the clearing of the entire schedule.

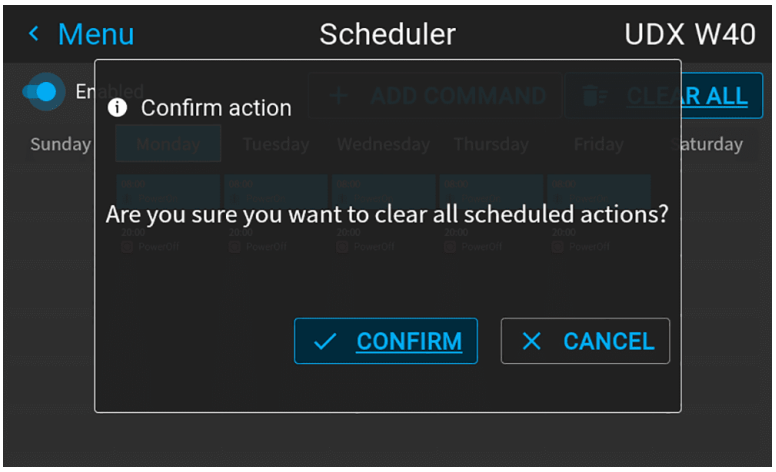


Image 9–60 Example of the warning dialog

2. Confirm the action by selecting **Confirm** and confirm.

   Note: If the **Clear All** button is clicked by accident, click **Cancel** instead to cancel and return to the Scheduler menu.

   All actions in the Scheduler will be deleted.

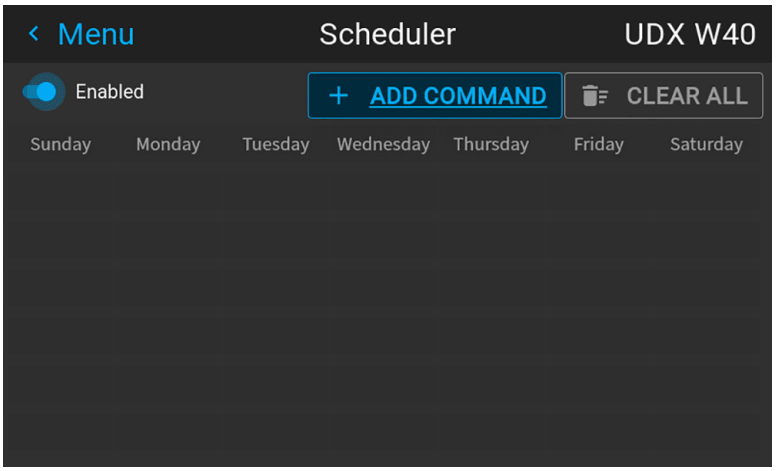


Image 9–61 Example of a cleared Scheduler menu

9.5 Power settings

About the power saving features

In the aspect of continuous improvement, Barco has added several power saving features to the projector, which will extend the lifetime of the projector and light source in particular.

9.5.1 Auto dimming

Location and availability

- **Menu**: *Settings* > *Power* > *Auto dim*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

When first updating to Pulse 2.3 or newer from an older version, this feature will be enabled by default.

About Auto dimming

When enabled the light source will be dimmed to 50% when:

- no source with active signal is connected to the projector,
- the OSD is not being projected, and
- no test pattern is currently active.

How to set Auto dimming?

1. In the *Power* menu, select *Auto dim*.

Image 9–62 Power menu, Auto dimming

The *Auto dim* menu is displayed.

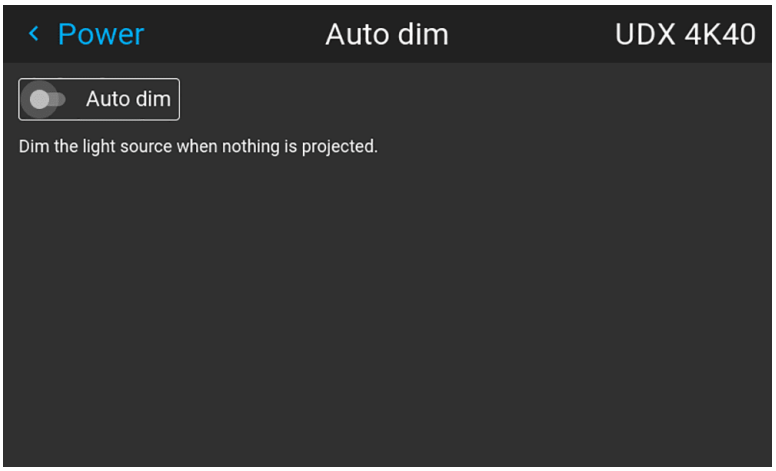


Image 9–63 Example of the Auto dim menu

2. Enable or disable the *Auto dim* slider to respectively enable or disable the Auto dimming feature.

9.5.2 Auto light source off

Location and availability

- **Menu**: *Settings* > *Power* > *Auto light source off*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

When first updating to Pulse 2.3 or newer from an older version, this feature will be enabled by default.

About Auto light source off

When enabled, the projector will transition to Ready mode after a configurable time-out period when:

- no source with active signal is connected to the projector,
- the OSD is not being projected, and
- no test pattern is currently active.

Most of the projector features will remain available while in Ready mode.

How to configure Auto dimming?

1. In the *Power* menu, select *Auto light source off*.

Image 9–64 Power menu, Auto light source off

The *Auto light source off* is displayed.

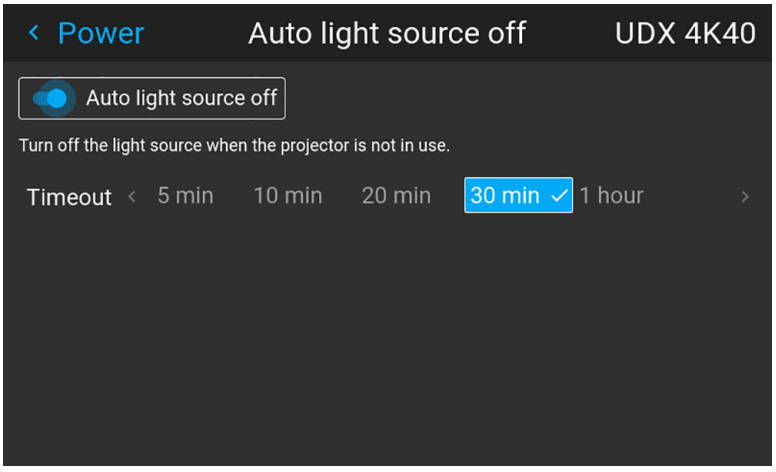


Image 9–65 Example of the Auto light source off menu

2. Enable or disable the *Auto light source off* slider to respectively enable or disable this power saving feature.
3. When enabled, select the time-out period after which the light source will be turned off.

9.5.3 Auto standby

Location and availability

- **Menu**: *Settings* > *Power* > *Auto standby*

- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.3 or later

When first updating to Pulse 2.3 or newer from an older version, this feature will be disabled by default.

About Auto standby

When the projector is in Ready mode and is not actively being used (e.g. browsing through the projector OSD software), the projector will transition to either Standby mode or ECO standby mode after a configurable time-out period.

The difference between the Standby and Standby ECO mode is the following:

- **Standby mode**: After a set time-out, the projector disables most functionality to save power, safe the communication options. This allows the projector to be awoken either using the local keypad, the RCU or remotely using Pulse Prospector or automation controllers (e.g. using DMX).
- **Standby ECO mode**: After a set time-out, the projector disables almost all functionality to save power, safe a single small wake-up controller. This allows the projector to be awoken **only** using the local keypad or the RCU, or by sending a “Wake on LAN” package to the MAC address of the projector. The projector can not be awoken using other methods.

Availability standby modes

Depending on the projector model, Standby mode, ECO Standby mode or both modes will be available. The availability is as follows:

- **Standby mode** only: UDX
- **Standby ECO mode** only: F40, F70, F80, Bragi, Balder, Medea
- **Both modes**: UDM, I600, F400, Njord, Hodr

How to configure standby mode?

1. In the *Power* menu, select *Auto standby*.

Image 9–66 Power menu, Auto standby

The *Auto standby* menu off is displayed.

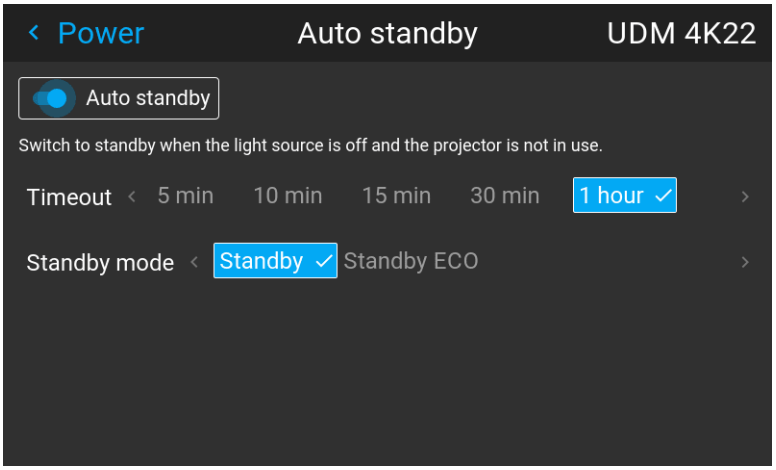


Image 9–67 Example of the Auto standby menu, with both modes available

2. Enable or disable the *Auto standby* slider to respectively enable or disable this power saving feature.
3. Select the *time-out* period after which the projector will go into standby or standby ECO mode.
4. If available on theprojector model, choose the desired version of the *Standby mode*: regular *Standby* mode, or *Standby ECO* mode.

9.5.4 Controlling the front XLR connector

Location and availability

- **Menu**: *Settings* > *Power* > *Front XLR*
- **Access level**: all
- **Models**: UDM, UDX, Njord and Hod
- **Requirements**: Pulse 2.5 or later

In older software versions, the front XLR feature can be found in the DMX menu, under *Settings* > *Communication* > *DMX*.

About the front XLR connector

There is a 4-pin XLR connector located on the front side of the projector, underneath the lens holder.

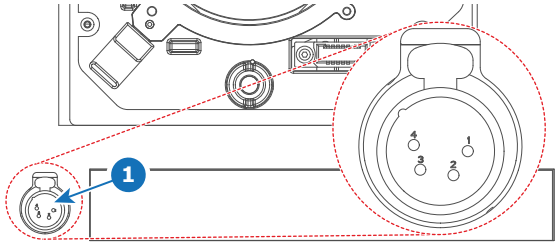


Image 9–68 Location of the XLR connector

The front XLR connector can be used to connect with peripheral devices. These can range from the motorized rigging frame, an external mechanical shutter or other XLR-powered devices.

CAUTION: multiple peripheral devices can be connected if an XLR splitter is available. However, take into account that the maximum allowed load on the front XLR connector is 2 A.

Pinout of the front XLR connector

4-pin XLR connector

Pin	Description
1	Earth
2	Data-
3	Data+
4	VCC

Powering the front XLR connector

The front XLR connector is disabled by default and can be enabled using the DMX menu. When enabled, the output voltage level can be set to 0 V, 12 V or 24 V.

The output voltage will depend on the application or peripheral used. For example, the optional external mechanical shutter requires 12 V. The motorized rigging frame on the other end requires 24 V.

How to enable or disable?

1. In the Power menu, select *Front XLR*.

Image 9–69 Power menu, DMX

The *Front XLR* menu is displayed.

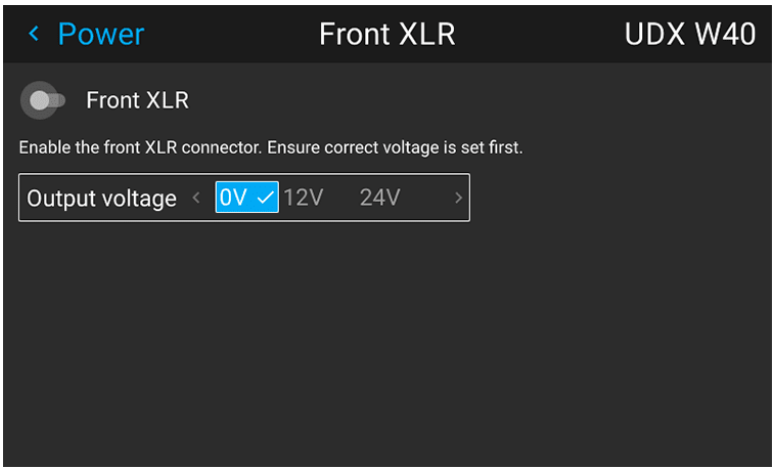


Image 9–70 Example of the Front XLR menu

2. **Enable** the *Front XLR* slider.
3. Select the desired *Output Voltage* and confirm.

Note: Due to technical reasons, if the motorized rigging frame is connected to the XLR connector, it is mandatory to put the voltage to 24V.

9.6 System

9.6.1 Setting up the external cooler

Location and availability

- **Menu**: *Settings* > *System* > *Cooling*
- **Access level**: all
- **Models**: UDM, UDX
- **Requirements**: External cooler

Using the external cooler

Using the Cooling menu, choose between the following cooling methods:

- **Internal**: Use only the internal cooling system of the projector (default).
- **External**: Use only the external cooling system of the projector. This method is preferred when the cooler is in a different location than the projector and the projector should operate in “silent mode”.
- **Mixed**: Use both the external and internal cooling. Can be used to extend the lifetime of the internal cooler of the projector.

How to set up the external cooler

1. In the *System* menu, select *Cooling*.

Image 9–71 Installation menu, Cooling

The *Cooling* menu is displayed.

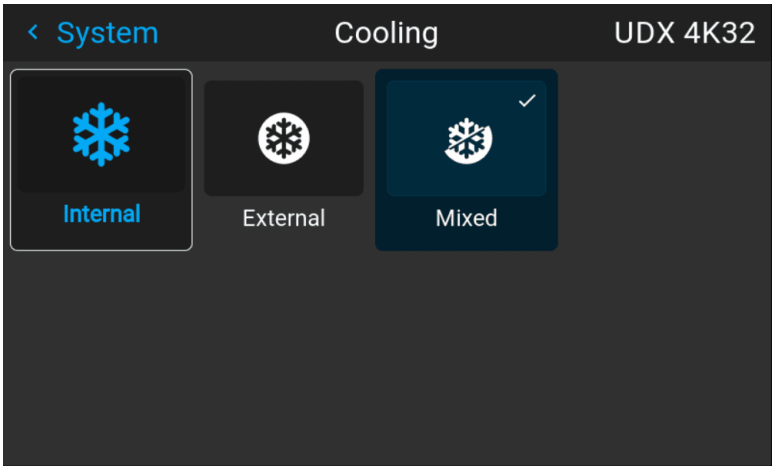


Image 9–72 Example of the cooling menu

2. In the *Cooling* menu, select the desired cooling option and confirm.

Note: After changing the settings, it can take up to 1 minute for the changed settings to take effect.

9.6.2 Operational mode

Location and availability

- **Menu**: *Settings* > *System* > *Operational mode*

- **Access level**: all
- **Models**: UDM, I600, F80, UDX 4K40, UDX W40, UDX U40, UDX U45LC

About operational mode and the trade-off triangle

Using **any** projector comes with a trade-off triangle between brightness (light source power), cooling (fan speed and noise) and ageing (lifetime of the projector components). When going for the maximum in one of these three points in the triangle, the other two will inevitably be sacrificed. This means the following:

- Going for **maximum brightness** on the projector comes at the cost of fan noise (running at maximum speed), and an increased ageing of the projector components (e.g. the light source).
- Going for the "**silent**" option, makes fans run at lower speeds (thus less noise), but comes at the cost of the light source not being able to run in its brightest mode, and may cost in lifetime (due to insufficient cooling).
- Going for a "**long lifetime**" mode will come at a cost of not being able to run at maximum brightness and will have a certain level of fan noise.

Each projector manufacturer predetermines what the optimal location is in the trade-off triangle for the average usage of the projector so that brightness, lifetime and noise can be on an optimal level, and doesn't allow much wiggle room from this optimal location.

However, on certain models Barco allows the user to take a certain level of control in this trade-off triangle. This level of control can be found in the Operational mode menu feature.

Depending on the use-case of the projector, an Operational mode can be selected which more fits the installation's needs, while a smart monitoring algorithm in the background keeps on balancing and optimizing between illumination output power, minimal noise level and optimized temperature household.

Take into account that the implementation of this feature differs in each projector model.

Take note that the fan speed will never be lower than 30%, regardless of chosen mode or light source power.

Implementation on UDX

In more recent years, Barco has added 40k and 45k lumens variants to the UDX family lineup. The increased brightness brings this family of projectors on the edge of the trade-off triangle. For this reason, the Operational mode was introduced on these specific models. On these models, it works as follows:

1. "*Normal mode*": This is the standard mode will force the fans to work at a speed corresponding to the light source power.
2. "*Silent mode*": This mode will automatically adapt the fans to work at a lower speed, while still in accordance to the light source power.

For example, at 80% light source power, "Silent mode" can result in an audible difference of 4 dBA when compared to "Normal mode".

Implementation on UDM

The following presets are available:

1. "*Normal mode*": This is the standard mode delivering highest possible brightness while ensuring a life time of 20 000 hours and keeping the noise level around 48 dBA.
2. "*Silent mode*": controlling maximal fan speed staying 47 dBA.

Implementation on F80

The following presets are available:

1. "*Normal mode*": This is the standard mode delivering highest possible brightness while ensuring a life time of 20.000 hours and keeping the noise level below 40 dBA.
2. "*Silent mode*": controlling maximal fan speed staying < 35 dBA.
3. "*Long Life mode*": Bringing the lifetime to 40.000 hours by carefully balancing between cooling and output power.
4. "*High brightness mode*": Offer maximum brightness under all ambient conditions.

Implementation on I600

The following presets are available:

1. “*Normal mode*”: This is the standard mode delivering highest possible brightness while ensuring a life time of 20.000 hours and keeping the noise level below 40 dBA.
2. “*Long Life mode*”: Bringing the lifetime to 40.000 hours by carefully balancing between cooling and output power.
3. “*High brightness mode*”: Offer maximum brightness under all ambient conditions.

How to change the operational mode of the projector

1. In the *System* menu, navigate to *Operational mode*.

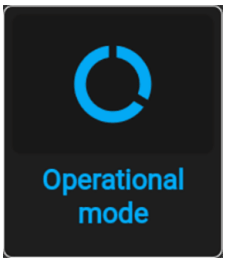


Image 9–73 Maintenance menu, operational mode

The *Operational Mode* menu is displayed.

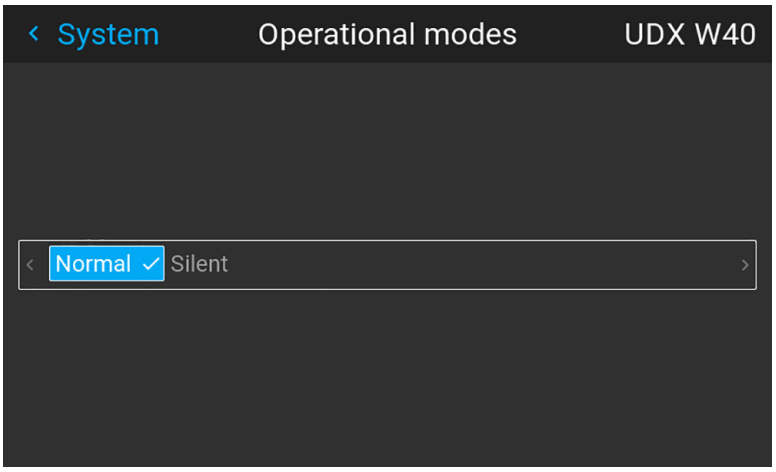


Image 9–74 Example of the Operational modes menu

2. Choose the desired operational mode.
3. Navigate to the Illumination menu and update the desired light output, depending on the chosen operational mode.

Note: If the light source cannot sustain the desired power, it will automatically be reduced to a power level that’s sustainable for the light source and the chosen cooling power.

9.6.3 Capture mode

Location and availability

- **Menu**: *Settings* > *System* > *Capture mode*
- **Access level**: all
- **Models**: UDM, UDX

Why use capture mode?

Various technical features are used inside the projector to display the best possible image on the projected surface. However, in expositions and setups where visitors are expected to film or take pictures of the

projected surface, some of these technical features may have side-effects on the captured footage, such as solarization.

Enabling *Capture mode* feature disables some of the technical features of the projector that are known to cause solarization and gives the visiting audience an experience they can “capture” and post on social media without worries.

How to enable Capture mode

1. In the System menu, click *Capture mode* to toggle between *On* and *Off*.

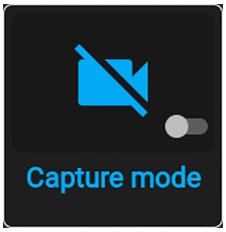


Image 9–75 System menu, Capture mode disabled

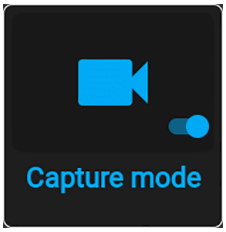


Image 9–76 System menu, Capture mode enabled

9.7 Lens features

Location and availability

- **Menu**: *Settings* > *Lens features*
- **Access level**: all
- **Models**: all

What can be done?

In order to prevent unintentional lens adjustments, especially after e.g. a completed setup and adjustment, there is a possibility to disable certain lens adjustment functions. These functions are directly accessible via the remote control, and can by that easily be adjusted by accident.

Depending on projector model and lens type, not all features may be available (e.g. no zoom on non-motorized lenses). The maximum list of lens features is the following:

- Horizontal lens shift
- Vertical lens shift
- Focus
- Zoom
- Iris illumination
- Iris lens

How to enable/disable

1. In the *Settings* menu, select *Lens Features*.

Image 9–77 Settings menu, Lens features

The *Lens features* menu is displayed.

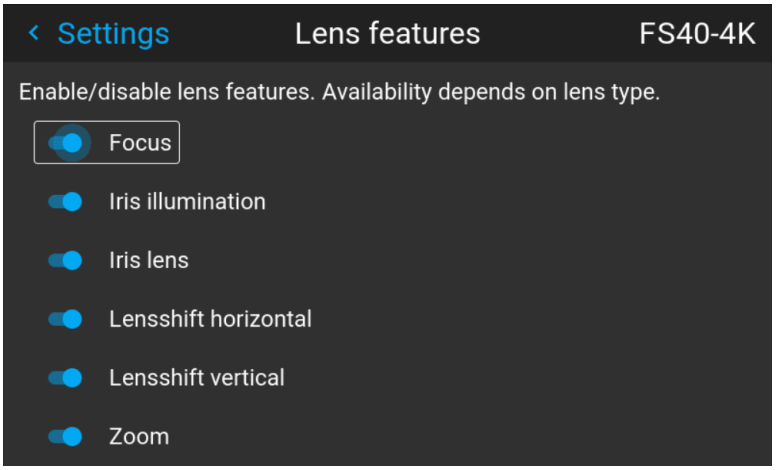


Image 9–78 Example of the lens features menu, here with all options available

2. Enable or disable the desired lens features.

9.8 Maintenance

9.8.1 Factory reset

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Factory reset*
- **Access level**: all
- **Models**: all

What can be done?

All settings and values on the projector can be reset to its default values. This can be done for one or more setting domains separately, or all settings together (factory reset).

What are the factory settings?

The following settings are the default factory settings:

All factory settings are listed, regardless of the projector model, or user level access rights. If an option in this list is not present on the current projector, the feature is not available on the current model or not enabled for the current user.

Option / Domain	Setting	Factory setting
GPIO	Triggers	All triggers set to “active low”
DMX	DMX Mode	Basic
	Start Channel	1
	Auto power down Art-net XLR Connector	Disabled
GSM	PIN State	Unconfirmed
Illumination	Power	100%[10]
	IR power	100%[10]
	Constant light output (CLO)	Disabled
ImageActuator	4K Actuator enabled / disabled	Enabled
Blend	Blend / Mask size Black Level	Disabled, all value to zero
	Black Level Files Blend Files	Disabled. **Note**: All uploaded blend and black level files will be deleted
(Image) Capture	Camera	Camera disabled
	Laser range finder	stored measurements erased. Tolerance set to 0 m. Reference distance cleared to “not set”
Connectors	Signal range	Auto
	Color space	Auto
	EDID	Default EDID for projector type **Note**: All uploaded custom EDID files will be deleted.

10. or maximum if 100% is not technically possible due to ageing

Option / Domain	Setting	Factory setting
	Image adjustments override	Disabled Overrides reset to mid values and auto gamma.
Convergence	Electronic Convergence	All values to zero
Display	Display mode	AutoStereo
(Image) Features	Contrast	mid value
	Brightness	mid value
	Saturation	mid value
	Sharpness	mid value
	Gamma	mid value, auto
	Digital Shift and Zoom	Disabled, set to mid values
	Cropping	Off
	Aspect Ratio	16:9
	Scaling	Fill Aspect ratio
Orientation	Orientation	Table, Front
RealColor™	P7 Realcolor™	all set to native
Resolution	Output Resolution	4K UHD (4K devices) WQXGA (W devices) WUXGA (U devices)
Source	Source files	Standard
3D (Stereo)	Sync delay	0 µs
	Swap eye	Off
	Dark time	lowest value available
Test patterns	Test Patterns	Off, none selected
	Custom Test Patterns	Upload disabled **Note:** All uploaded custom test patterns will be deleted
	“No signal” image	Black image selected. **Note**: Uploaded custom “no signal” images will be deleted.
Tilted brightness	Tilted brightness uniformity correction	Disabled, all values reset to 0
Uniformity	DynaBlack	Off
Warp	Screen size	5120x3200 / 2560x1600
	4 corner Bow	Warp disabled, no warp
	Warp files	Disabled **Note**: all uploaded warp files will be deleted
Linked services	Linked CLO	Disabled
Network	LAN	Automatic settings, stored manual settings removed

Option / Domain	Setting	Factory setting
	HDBaseT	Automatic settings, stored manual setting removed
	Hostname	Projector family – model – serial number (e.g. “UDX-4K40-0123456789”)
	Remote control	Generic IR (0), projector address 0 All IR sensors enabled
Optics	High Contrast	Off
	Shutter mode	Fast Transitions
PJLink	PJ-Link	Disabled
	PJ-Link authentication	Disabled, custom password removed.
	Notification	Disabled, controller IP address or host name removed.
Peripheral	Settings for External Cooler	Cooling mode set to internal.
	Settings for Motorized Frame	All values to mid value
Profiles	Settings for projector profiles	All profiles will be deleted, presets will be cleared
Scheduler	Weekly schedule	Disabled, Schedule is fully cleared.
Screen	Screen luminance unit	nits
	Screen Luminance	400
	HDR Boost	1.0
System	Auto dim	Enabled
	Auto light source off	Disabled, timer set to 10 minutes.
	Auto standby Mode / ECO standby Mode (depending on availability)	Disabled, default mode depends on projector type.
	Operational Mode	Normal
	Source preview	Disabled
Time	Time server	Automatic disabled, NTP server removed
	Date	0 / 0 / 0
	Time	0 : 0 : 0
	Region / City	UTC
User	User profiles	Only default users remain
	Capture mode	Disabled
User interface	Theme	Dark
	Units – Temperature	°C
	Units – Length	Meters (m)
	Language	English
	Backlight – Stealth Mode Backlight – Time-out	Off 5 minutes

Option / Domain	Setting	Factory setting
	Custom LCD Splash image	Images uploaded by external tools (e.g. Pulse Prospector) are removed. Images uploaded using the OEM partner tool provided by Barco are not removed.

How to reset all projector settings

1. In the *Maintenance* menu, select *Factory reset*.

Image 9–79 Settings menu, factory reset

The *Factory reset* menu is displayed.

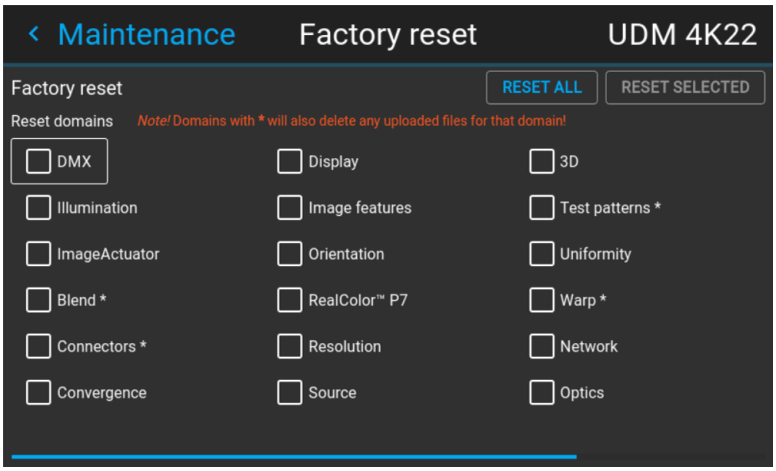


Image 9–80 Example of the Factory reset menu

2. Select *RESET ALL* and confirm when prompted.

How to reset one or more projector settings

1. In the *Maintenance* menu, select *Factory reset*.

Image 9–81 Settings menu, factory reset

The *Factory reset* menu is displayed.

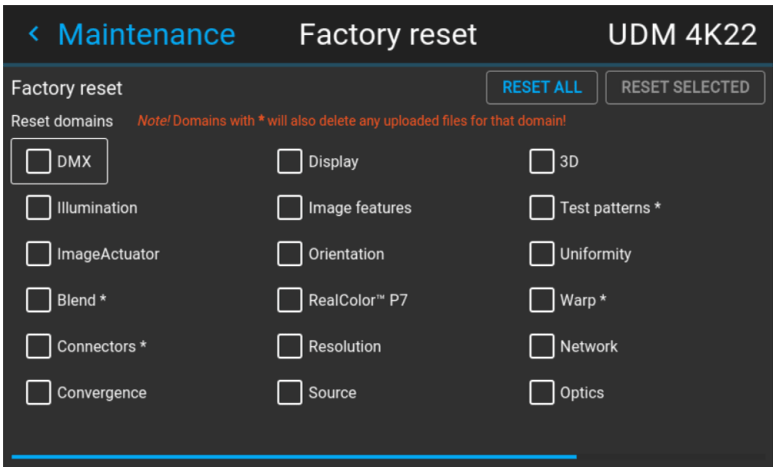


Image 9–82 Example of the reset menu

2. Select the checkbox next to the domains that need to be reset and confirm.

   Tip: Multiple selections are possible.

3. Select **RESET SELECTED** and confirm.

   The selected domains will be reset to their factory settings.

9.8.2 Lens calibration

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Lens calibration*
- **Access level**: all
- **Models**: all

How to calibrate

1. In the *Maintenance* menu, *Lens calibration*.

Image 9–83 Maintenance menu, lens calibration

The *Lens calibration* menu is displayed, alongside the status of each

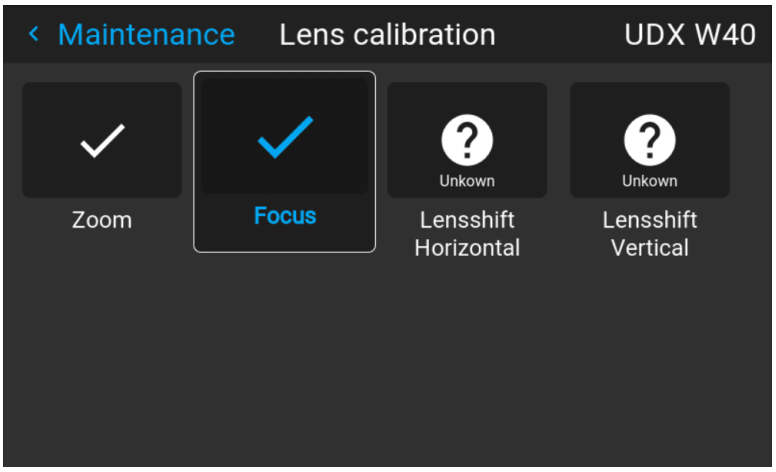


Image 9–84 Example of the lens calibration menu

2. Select the desired calibration action and confirm.

   Select one of the following calibration functions, depending on the type of mounted lens and projector model:

   - Lens shift horizontal
   - Lens shift vertical
   - Focus
   - Zoom
   - Illumination Iris

   The text **Calibrating** will be displayed in the icon of the selected function until the calibration is completed.

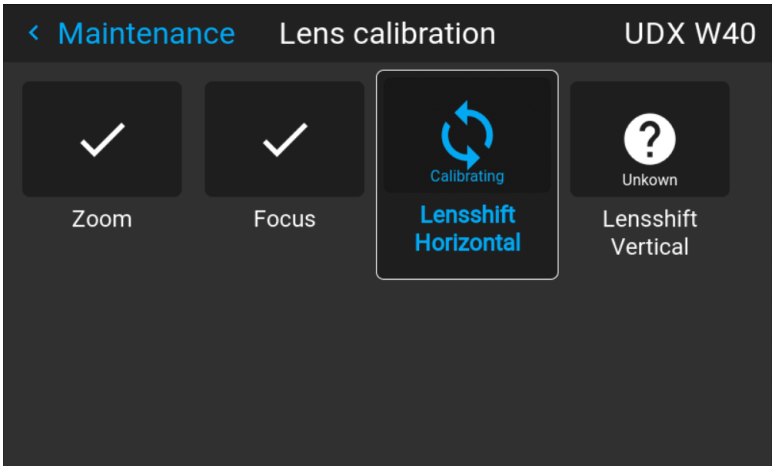


Image 9–85 example of calibration in progress

When an error is detected, the message *Calibration Error* is displayed next to function.

9.8.3 Flex brightness

Location and availability

- **Menu**: *Settings* > *Maintenance* > *FLEX* > *Brightness*
- **Access level**: all
- **Models**: UDX, UDM
- **Requirements**: Flex brightness license

> The Flex submenu will only be visible if the projector carries more than one Flex license. If only this Flex license is available, choosing the Flex submenu will automatically redirect the user to the *Flex Brightness* menu.

About Flex Brightness

With the FLEX technology the projector owners can lock the light output to different levels. The locking can be done using one of the following methods:

- Via Projector Toolset when connected to the projector. For more info on how to set up and use the Flex licenses, see the Projector Toolset's user guide, chapter *""Configuration, License / registration""*.
- Via Pulse Prospector, when connected to the projector. For more info on how to set up and use the Flex licenses, see the Pulse Prospector user guide.
- Via Barco Insights Management Suite when the GSM module is installed. For more information on how to set up and use the Flex license, see Insights Management Suite user guide, chapter “Projector Configuration tab” – “Flex brightness”
- Via the OSD menu of the projector itself

To lock to a specific value a 4 digit code is necessary. These codes can be created by the projector owner using Pulse Prospector, Projector Toolset or the Insights Management Suite.

Activating Flex brightness

The Flex brightness function is license protected. A Flex license file is linked with the projector type and projector serial number.

For UDX 4K40, UDX W40, UDM 4K22 and UDM W22, this license is pre-installed on the projector and requires activation once a Flex code has been obtained. Contact Barco to obtain the flex code for free.

For other models, the Flex brightness license may be available for purchase. Contact Barco to see if a Flex brightness license is available to purchase for the current projector model.

Once the Flex code or Flex license has been obtained, upload and activate the license file using Pulse Prospector, Projector Toolset or the Insights Management Suite. For more information about uploading and activating Flex licenses, see the respective user guides.

Flex codes

Once the Flex license is correctly uploaded and activated, the projector creates a number of flex codes, one for each possible maximum light output. These codes are used for rental activities when adapting the light output of the projector.

The created flex codes are only visible in Pulse Prospector, Projector Toolset and the Insights Management Suite by the projector owner. To make these visible he will need his license for this typical projector.

Setting the Flex brightness

1. In the Maintenance menu, select *Flex* > *Brightness*.

Image 9–86 Flex menu, Flex Brightness

The *Flex brightness* menu is displayed.

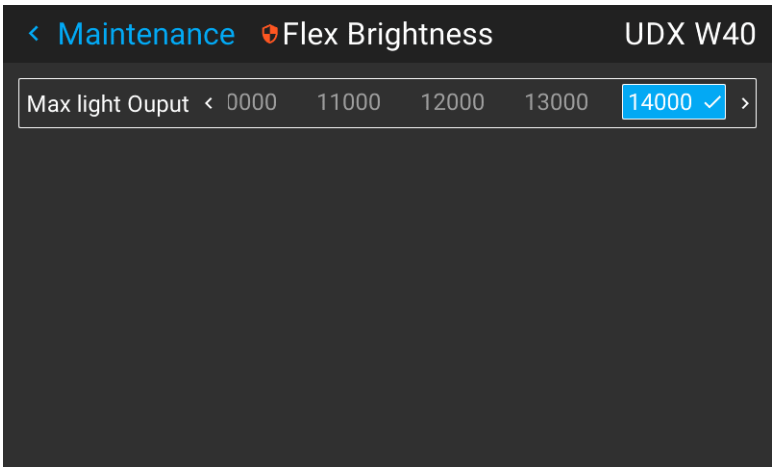


Image 9–87 Example of the Flex brightness menu

2. Choose the desired light output for which a code is available.

   Tip: All values are listed in lumens.

   The pin code entry field will become visible. Once the field is selected, an on-screen keyboard will be prompted.

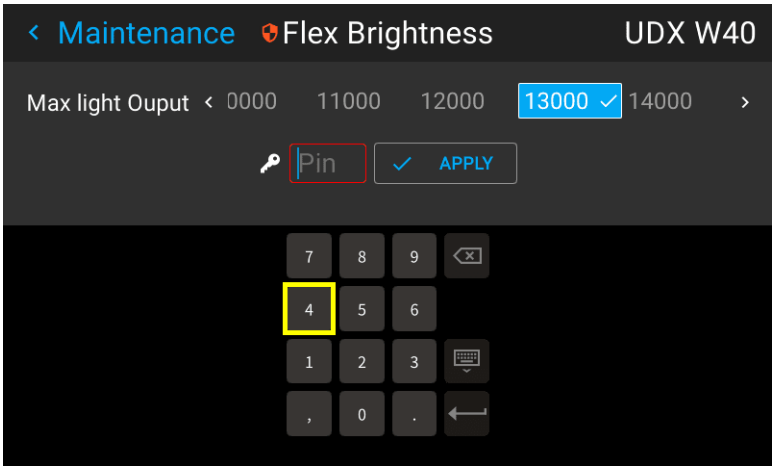


Image 9–88 Example of entering the code in the Flex license menu

3. Enter the code and confirm.
4. select **Apply** and confirm

9.8.4 Flex resolution

Location and availability

- **Menu**: *Settings* > *Maintenance* > *FLEX* > *Resolution*
- **Access level**: all
- **Models**: UDX 4K, UDM 4K
- **Requirements**: Pulse 2.3 or later, Flex resolution license

The Flex submenu will only be visible if the projector carries more than one Flex license. If only this Flex license is available, choosing the Flex submenu will automatically redirect the user to the *Flex resolution* menu.

About Flex resolution

A Flex resolution license file can be purchased for certain projector models. This license file is linked with the projector model and projector serial number. Once received, upload this license file via an external tool like

Pulse Prospector or Projector Toolset to the projector. Once the file is uploaded, the same file has to be used to upload the Flex code.

Overview

With the FLEX technology the projector owners can lock the resolution to different levels. The locking can be done using one of the following methods:

- Via Projector Toolset when connected to the projector. For more info on how to set up and use the Flex license, see the Projector Toolset's user guide, chapter *""Configuration, License / registration""*.
- Via Pulse Prospector, when connected to the projector. For more info on how to set up and use the Flex licenses, see the Pulse Prospector user guide.
- Via Barco Insights Management Suite when the GSM module is installed. For more information on how to set up and use the Flex license, see Insights Management Suite user guide, chapter “Projector Configuration tab” – “Flex resolution”
- Via the OSD menu of the projector itself

To lock to a specific value a 4 digit code is necessary. These codes can be created by the projector owner using Pulse Prospector, Projector Toolset or the Insights Management Suite.

Flex codes

Once the flex code is correctly uploaded, the projector creates a number of flex codes, one for each possible resolution type. These codes are used for rental activities when adapting the resolution of the projector. The available resolutions are the following:

- **4K-UHD**: 3840 x 2400 (default resolution)
- **WQXGA**: 2560 x 1600 (16:10)
- **WUXGA**: 1920 x 1200 (16:10)

The created flex codes are only visible in Pulse Prospector, Projector Toolset and the Insights Management Suite by the projector owner. To make these visible he will need his license for this typical projector.

Flex resolution versus EDID list

The EDID list will **not** be restricted through the flex resolution license. All available resolution for the 4K models will remain available through the Flex resolution license.

This means that when a Flex resolution lower then 4K is chosen (e. g. WUXGA), 4K content can still be displayed. However, this content will be displayed alongside a persistent notification dialog proposing to limit the source resolution or update the resolution license.

This way, the user can still see enough content to go through the necessary menus (either to change resolution or update the Flex license), while enough of the screen is blocked for it to be a hindrance for the end purpose.

Setting the resolution via OSD menu

1. In the *Maintenance* menu, select *Flex* > *Resolution*.

Image 9–89 Flex menu - Resolution

The *Flex resolution* menu is displayed.

Image 9–90 Example of the Flex resolution menu

2. Choose the desired Resolution for which a code is available and confirm.

   The pin code entry field will become visible. If the field is selected, an on-screen keyboard will prompt.

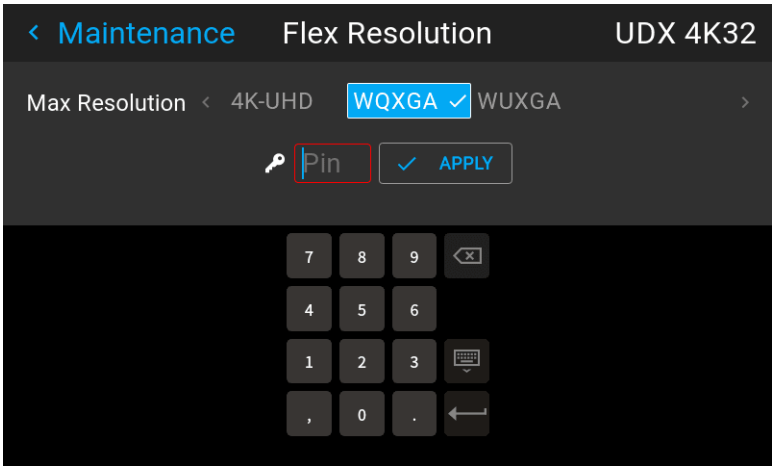


Image 9–91 Eample of the Flex Resolution menu with digital keyboard

3. Enter the code and confirm.
4. Select **Apply** and confirm.

9.8.5 Rigging frame Calibration

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Frame calibration*
- **Access level**: all
- **Models**: UDM, UDX, F70, F80
- **Requirements**: Barco supported motorized rigging frame

How to calibrate the motorized rigging frame

1. In the *Maintenance* menu, select *Frame calibration*.

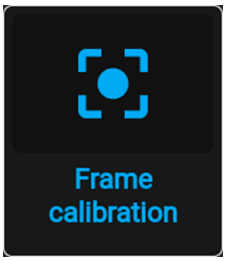


Image 9–92 Maintenance menu, Frame calibration

The *Frame calibration* menu is displayed.

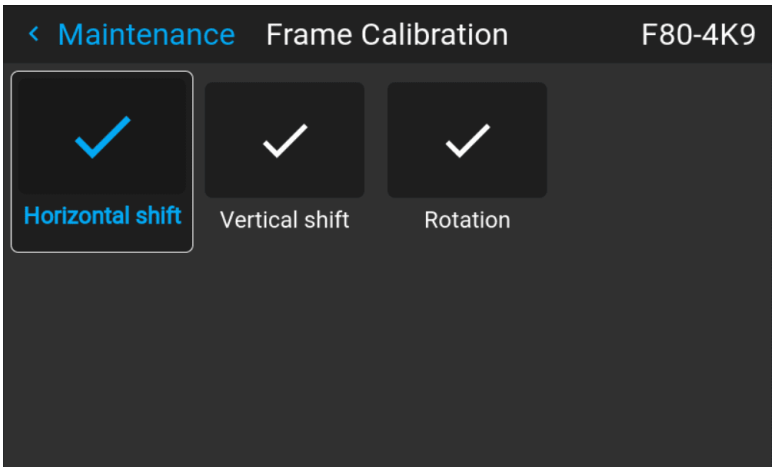


Image 9–93 Example of the Frame calibration menu

2. Select the desired calibration action and confirm.

   One of the following calibration functions can be chosen:

   - Horizontal shift
   - Vertical shift
   - Rotation

   The text **Calibrating** will be displayed until the calibration is completed.

Image 9–94 Example of a calibration in progress

When an error is detected, the message *Calibration Error* is displayed next to function.

9.8.6 Electronic convergence

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Electronic convergence*
- **Access level**: all
- **Models**: all

About convergence

Convergence alignment of the red, green and blue can drift due to multiple reasons. There are two ways to compensate for this drift:

- **Mechanical convergence**, must be done by a certified technician.

- **Electronic convergence**, for quick and minor adjustments by taking pixels out of the total resolution.

Electronic convergence can only be used if the misalignment is more than 1 pixel. However, a mechanical convergence is always preferred when possible.

How to adjust convergence electronically

1. Project the Convergence test pattern.

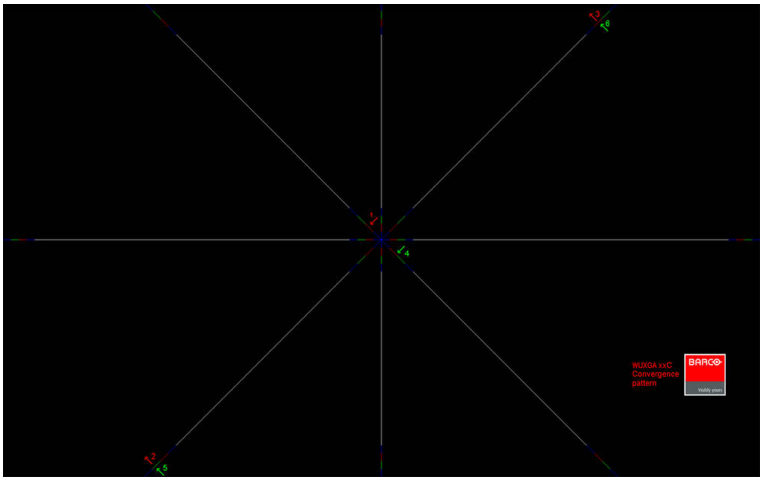


Image 9–95 Example of a convergence test pattern

2. In the *Maintenance* menu, select *Electronic convergence*.

Image 9–96 Maintenance menu, electronic convergence

The *Electronic Convergence* menu is displayed.

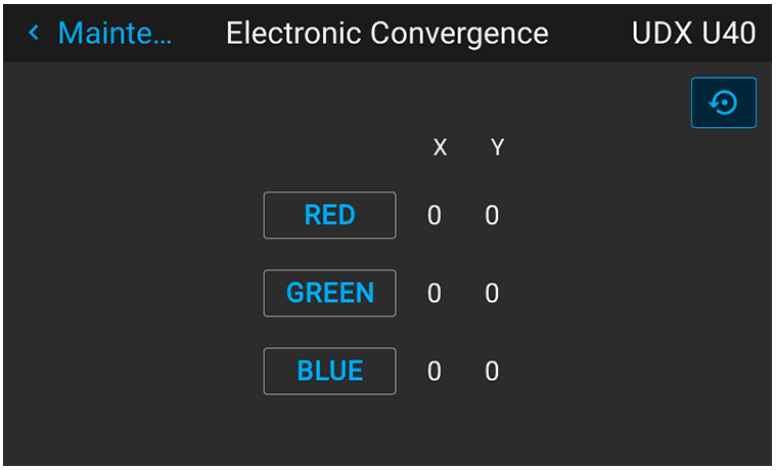


Image 9–97 Example of the electronic convergence menu

3. Select the desired X or Y value for one of the three colors and confirm.
4. Use the arrow keys to raise or lower the value and confirm.
5. Repeat all steps until the desired alignment is achieved.

Press the **Reset** icon to return all values to the factory settings.

9.9 Advanced settings

About the hidden menu features

The *Security* menu, *Advanced* Settings menu, and *Diagnostics* menu are hidden by default for the user. These menus only become visible after logging in as power user, administrator or service technician. For more info on how to log in on each version of software, see “User rights and logging in”, page 27.

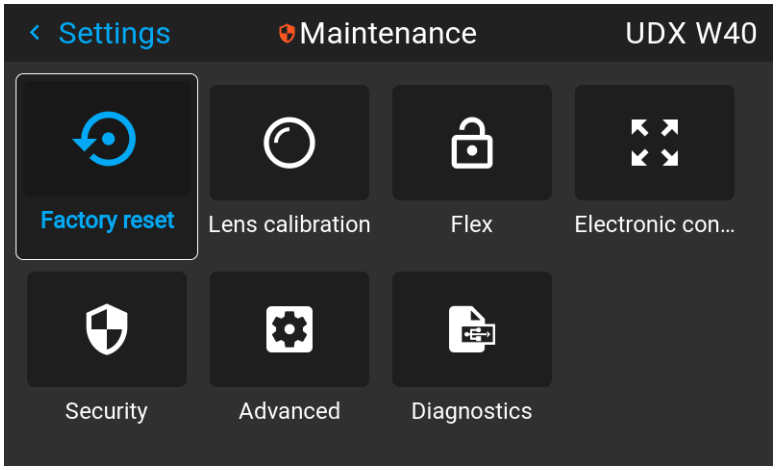


Image 9–98 Example of the Maintenance menu, with the Security, Advanced and Diagnostics menus unlocked

9.9.1 Security

On Pulse 2.4 and later, the *Remote access* menu has been renamed to the *Security* menu. On older versions, please refer to the *Remote access* menu instead.

9.9.1.1 Security – Enable source preview

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Security*
- **Access level**: power user, administrator, service
- **Models**: UDM, UDX
- **Requirements**: Pulse 2.1 or later, distance meter and camera kit

About source preview

Up until Pulse 2.0, a preview of the connected source could be seen when accessing the projector remotely.

However, on Pulse 2.1 and later, this feature is disabled by default for security reasons and can now be enabled in both the OSD software and external tools like Pulse Prospector or Projector Toolset.

Updating the projector from Pulse 2.0 to 2.1 or later will disable *Source preview* by default. After the update, the feature has to be enabled manually.

How to enable source preview

1. In the *Maintenance* menu, select *Security*.

Image 9–99 Maintenance menu, Security

The *Security* menu is displayed.

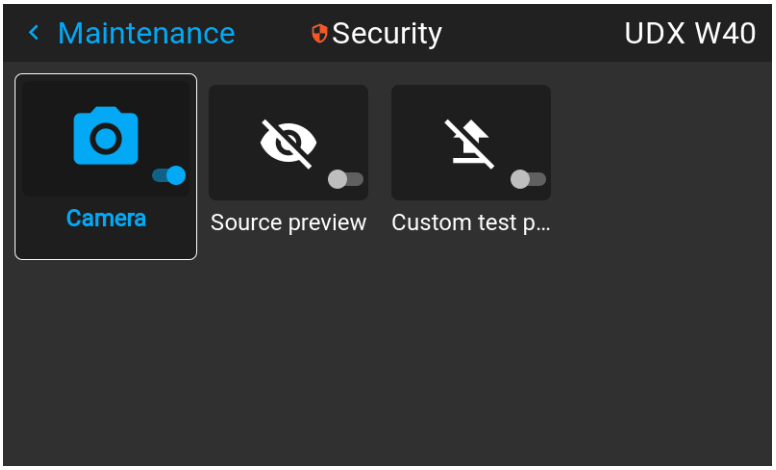


Image 9–100 Example of the Security menu

2. Enable the Source preview slider.

Image 9–101 Remote access menu, Source preview is disabled

Image 9–102 Remote access menu, Source preview is enabled

9.9.1.2 Security – Enable camera preview

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Security*
- **Access level**: power user, administrator, service
- **Models**: UDM, UDX
- **Requirements**: Pulse 2.1 or later, distance meter and camera kit

Camera preview

Up until Pulse software 2.0, the footage of the camera kit could be seen when the user remotely accessed the projector. The feature was enabled by default and considered opt-out.

On Pulse 2.1 and later, this feature is disabled by default for security reasons and is now considered opt-in.

Updating the projector from Pulse version 2.0 to 2.1 or later will disable *Camera preview* by default. After the update, the feature has to be enabled manually.

How to enable Camera preview

1. In the *Maintenance* menu, select *Security*.

Image 9–103 Maintenance menu, Security

The *Security* menu is displayed.

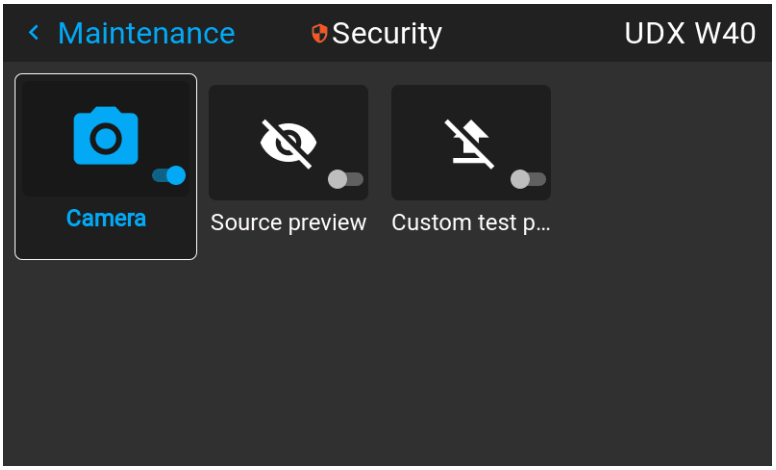


Image 9–104 Example of the Security menu

2. Enable the *Camera* slider.

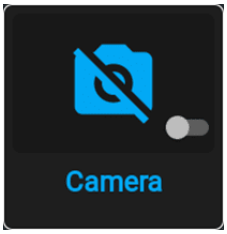


Image 9–105 Security menu, Camera preview is disabled

Image 9–106 Security menu, Camera preview is enabled

9.9.1.3 Security – Enable custom test pattern upload

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Security*
- **Access level**: power user, administrator, service
- **Models**: all
- **Requirements**: Pulse 2.4 or later

About custom test patterns

Until now it has always been possible for any user to upload custom test patterns to the projector using external tools like Pulse Prospector or Projector Toolset.

On Pulse 2.4 or later, the ability to upload custom test patterns is disabled by default for security reasons and has to be enabled in the Pulse OSD software.

Updating the projector from Pulse version 2.3 or older to 2.4 or later will disable *Custom test pattern* by default. After the update, the feature has to be enabled manually.

How to enable Custom test pattern upload

1. In the *Maintenance* menu, select *Security*.

Image 9–107 Maintenance menu, Security

The *Security* menu is displayed.

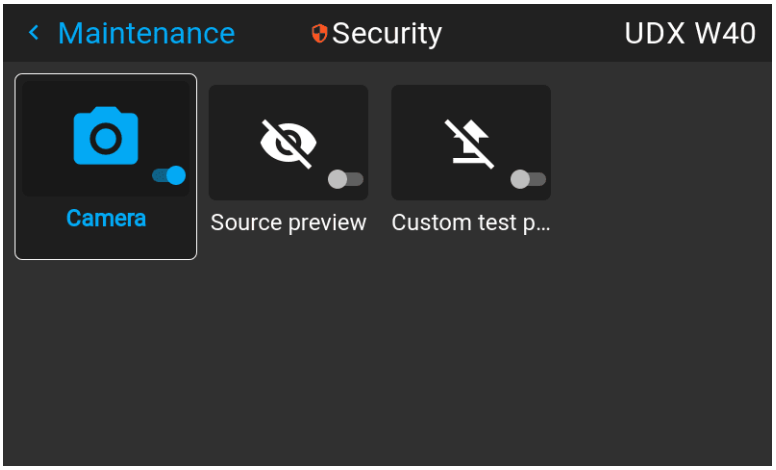


Image 9–108 Example of the Security menu

2. Enable the *Custom test pattern* icon.

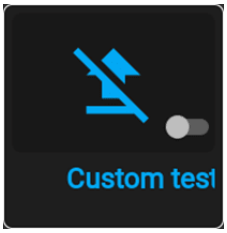


Image 9–109 Security menu, Custom test pattern disabled

Image 9–110 Security menu, Custom test pattern enabled

9.9.2 Advanced settings – RealColor calibration

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Native RealColor*
- **Access level**: power user, administrator, service
- **Models**: all

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Factory native RealColor*
- **Access level**: service
- **Models**: all

CAUTION: The native colors have been measured and set during factory production. Do not change them, unless parts of the optical path have been replaced due to servicing.
If the native colors on the device must be changed, make sure to also perform a **P7 calibration**, using Pulse Prospector or the Projector Toolset and a chroma meter. For more info on P7 calibration, refer to the Pulse Prospector or Projector Toolset user guide.

How to adjust the P7 native settings

1. In the *Advanced Settings* menu, select *Native RealColor*.

Image 9–111 Advanced Settings, Native Realcolor

The RealColor calibration menu will be displayed.

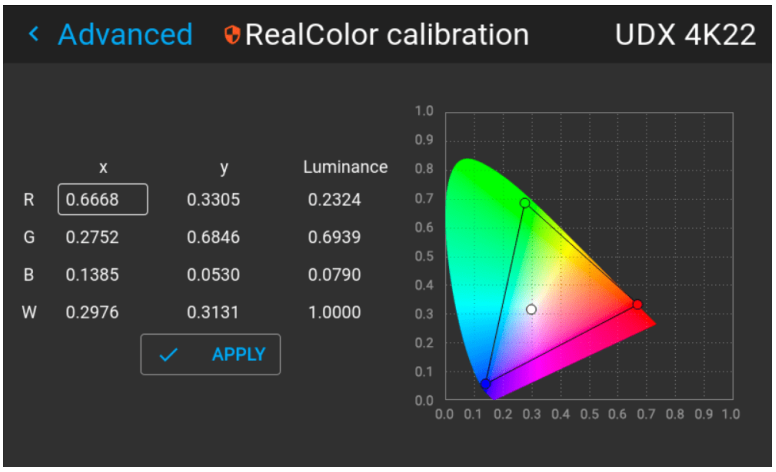


Image 9–112 Example of a RealColor calibration menu

2. Select the desired value to change and confirm.
3. Change the values to the desired position, taking into account the color gamut values.
4. Select **APPLY** and confirm.

9.9.3 Service – Color wheel

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Color wheel*
- **Access level**: power user, administrator, service
- **Models**: I600, F40, F70, F80, Bragi, Balder, Medea

About the Color wheel

Each projector is equipped with one color wheel, which is controlled by the software. The type of used color wheel is determined by the specific projector model purchased. Using the advanced settings menu, a Slider makes it possible to fine-tune the color wheel for variations.

For F70, other color wheels are available upon request. Consult Barco sales office or a service partner in order to find the most suitable color wheel for the specific application.

How to fine-tune the color wheel

1. In the Advanced settings menu, select *Color wheel*.

Image 9–113 Advanced Settings, Color wheel

The color wheel menu will be displayed.

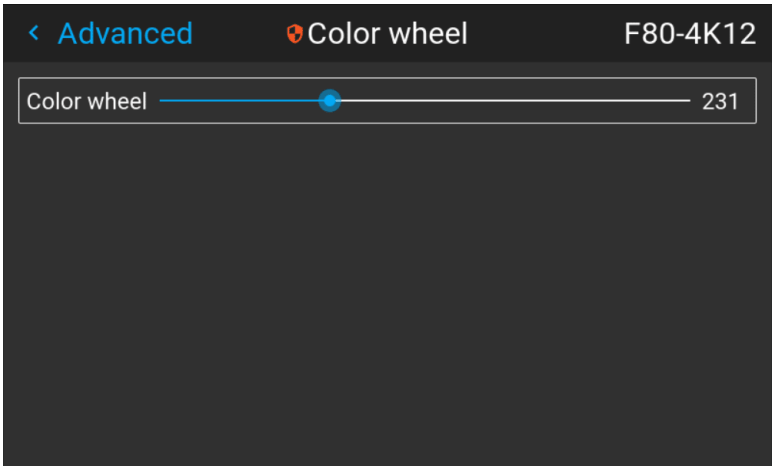


Image 9–114 Example of the Color wheel menu

2. Change the slider to the desired position.

9.9.4 Advanced Settings – Statistics

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Statistics*
- **Access level**: power user, administrator, service
- **Models**: all

What can be seen?

The statistics screen shows general statistical information about the projector and its light source, spread over two tab pages.

The information displayed will vary between projector models.

How to display the statistics

1. In the *Advanced Settings* menu, select *Statistics*.

Image 9–115 Advanced settings, Statistics

The Statistics menu will be displayed.

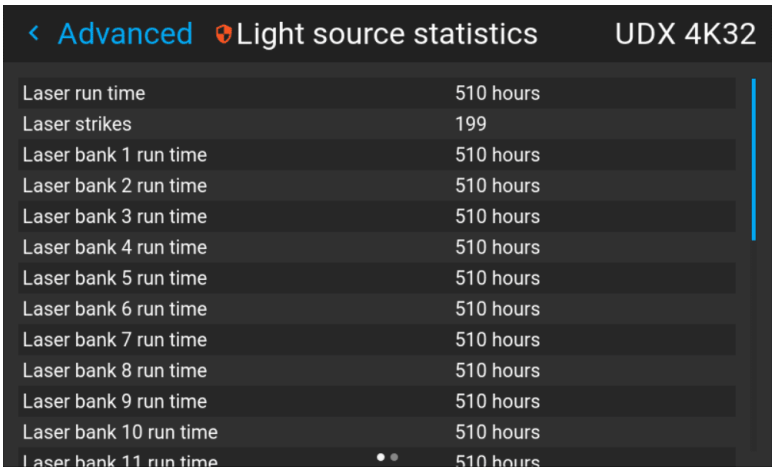


Image 9–116 Example of the Statistics menu

9.9.5 Advanced settings – Laser pulsing calibration

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Laser pulsing*
- **Access level**: service
- **Models**: F70, Balder

What is laser pulsing

Laser pulsing is a feature that enables the projector to obtain a specific white y coordinate while keeping the brightness loss to a minimum. As the brightness loss happens in both white and black, this will also keep the contrast at the same level. Using RealColor to do the same will result in additional brightness loss and lower contrast.

The projector is tuned to a white y-coordinate of 0.329 for optimal performance but any desired white y-coordinate can be used.

When adjusting the laser pulse value to obtain the desired white y coordinate, the white x coordinate will change accordingly.

Perform a Color calbration once the Laser pulse calibration has been completed.

When to perform laser pulsing calibration

All projectors are calibrated and tested before leaving the factory to ensure build quality and performance of the product. However, when parts of the optical path have been replaced, it is advised to perform a laser pulsing calibration.

Barco recommends to always calibrate the projector within the environment it is to be used. This to compensate for screen type, coating, lens and other environmental factors in a multi-channel set-up. Barco also recommends calibrating both laser pulsing and calibrating native colors at the same time.

Prerequisites

Prepare the projector for laser pulsing as follows:

- Set up the chromameter in front of the projection screen.
- Run the projector and project a white test pattern. Ensure the light source is on for at least 15 minutes to ensure a stable output.
- Select the Native *RealColor* preset mode. For more info, see “RealColor P7 - Presets”, page 68.
- Select the desired *BrilliantColor™* mode. For more info, see “BrilliantColor™”, page 73
- Select the desired Smear reduction mode. For more info, see “Smear reduction”, page 73.

Required tools

Chromameter

How to calibrate

1. In the *Advanced settings* menu, select *Laser pulsing*.

   The Laser pulsing menu is displayed.

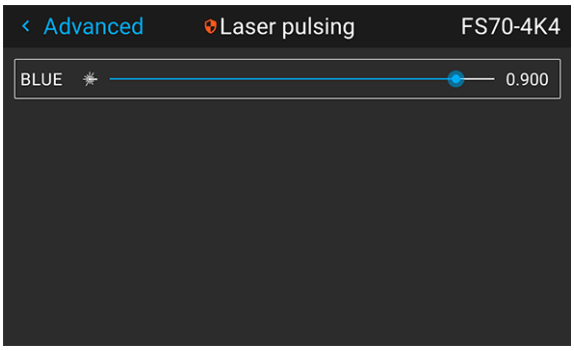


Image 9–117 Example of the Laser pulsing menu

2. Change the value of the Laser pulsing slider until the desired y coordinate is achieved
3. Navigate to the Native Realcolor menu and input the resulting white x and y coordinates and confirm.

9.9.6 Advanced Settings – Pixel shift

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Pixel shift*
- **Access level**: service
- **Models**: FL40 4K, FS40 4K, F70 4K, F80 4K, Bragi, Balder, Medea

About pixel shift

4K projector models use an actuator to achieve a 4K resolution. If a new actuator or lens holder (containing an actuator) is installed on the projector, it is advised to update this menu with the new

This actuator can be calibrated by using the XPR test pattern and subsequently adjusting parameters in the **Pixel shift** menu until the desired result is achieved. These settings are the following:

- **Gain**: The amplitude of the waveform, sent to the actuator. Default value: 0.65
- **Resonance**: The frequency of the actuator. When this value is 0, the actuator is off. High frequencies mean much noise. Default value: 227 Hz

How to fine-tune the actuator

1. Make sure the projector orientation is set to *Desktop front*. For more info, refer to “Orientation”, page 80.

   Tip: For the best possible result, it is advised to only use the *desktop front* orientation while performing pixel shift, no matter how the projector is actually mounted.

2. In the *Advanced Settings* menu, select *Pixel Shift*.

Image 9–118 Advanced settings, Pixel shift

The Pixel Shift menu will be displayed. Also, the the XPR test pattern (Cross hatch) will be projected.

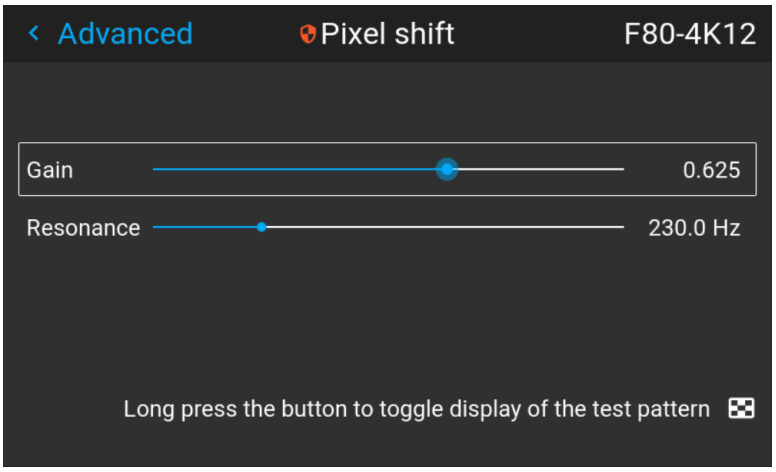


Image 9–119 Example of the pixel shift menu

3. Use the *Gain* and *Resonance* sliders to fine tune the actuator until the center marker hits the **bull's-eye**. Use Align both following images with the sliders available in this menu.

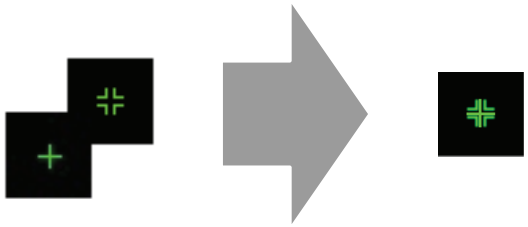


Image 9–120 The alternating XPR test pattern

9.9.7 Advanced settings – Optical filter

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Optical filter*
- **Access level**: Power user, administrator, service
- **Models**: F70, F80, Balder, Medea

How to

1. In the Advanced settings menu, select *Optical Filter*.

Image 9–121 Advanced menu, Optical filter

The Optical filter menu will be displayed.

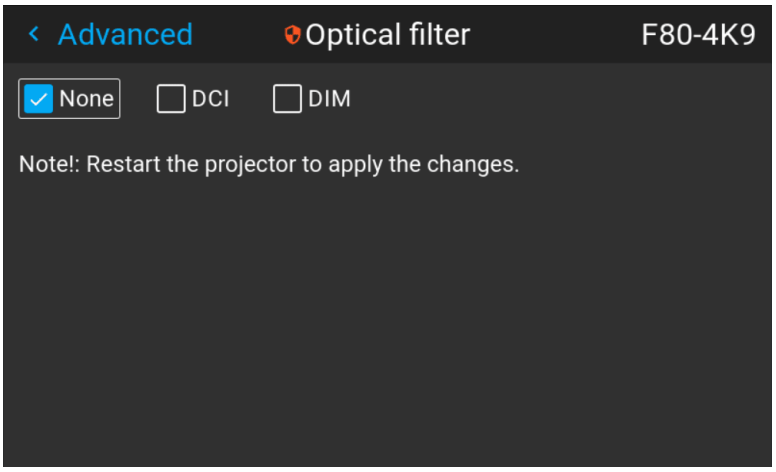


Image 9–122 Example of the Optical filter menu

2. Select the desired Optical filter setting(s).
3. Restart the projector to apply the changes

9.9.8 Checking the status of the laser banks

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Laser banks*
- **Access level**: Power user, administrator, service
- **Models**: UDM, UDX, F80, Njord, Hodr, Medea

About failing laser banks

The projector is powered by a laser light source, which has multiple laser banks. The light output and color performance is dependant on the number of active laser banks.

If one or more laser banks have failed of a certain type, a decreased light input and decrease in color performance might be visible. But the projector will keep on playing, unless too many banks of a certain color will have failed.

In order to disable a certain laser bank, or calibrate the projector after disabling one or more laser banks, please refer to the Pulse Prospector or Projector Toolset user guide.

How to check the status of the Laser Banks

1. In the *Advanced settings* menu, select *Laser Banks*.

Image 9–123 Advanced menu, Laser banks

The *Laser group statistics* menu is displayed.

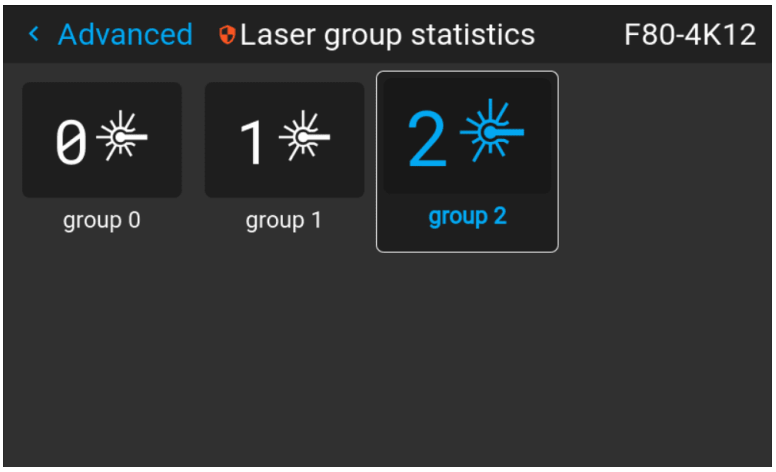


Image 9–124 Example of the Laser group statistics menu

2. Select the desired laser group.

   The laser banks group page will be displayed, showing which banks are operational and which have failed.

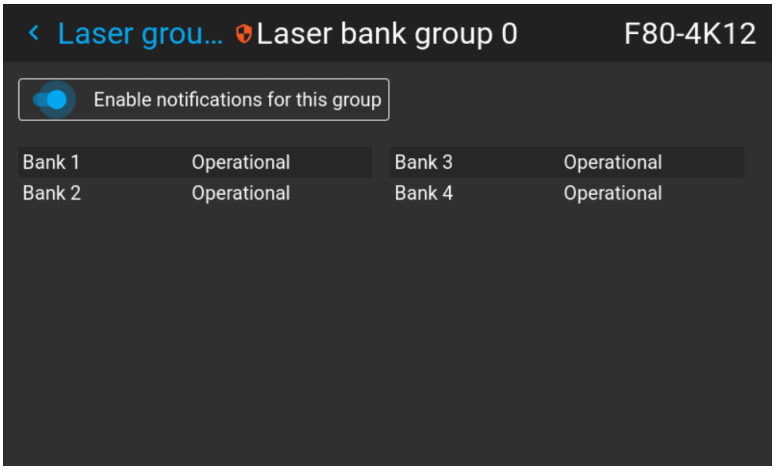


Image 9–125 Example of the laser bank group menu

3. Enable or disable the *Enable notifications for this group* slider.

9.9.9 Advanced settings – Tilt sensor calibration

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *Tilt sensor calibration*
- **Access level**: Power user, administrator, service
- **Models**: all

About the tilt sensor calibration

If the tilt sensor isn't working correctly, the tilt sensor calibration feature can be used to calibrate the tilt sensor.

CAUTION: The calibration procedure resets the values of the tilt sensor to 0 in the current position of the projector. For the optimal working of the tilt sensor it is important to make sure the projector is perfectly level when performing this procedure. If not, the tilt sensor will not function as desired once the calibration has been completed.

Required tools

Level

How to calibrate the tilt sensor?

1. Place the projector on a flat surface and make sure it is positioned level in all directions. Use a level tool to help ensure this.
2. In the *Advanced settings* menu, select *Tilt sensor calibration*.

Image 9–126 Advanced menu, Tilt sensor calibration

3. Confirm the action.

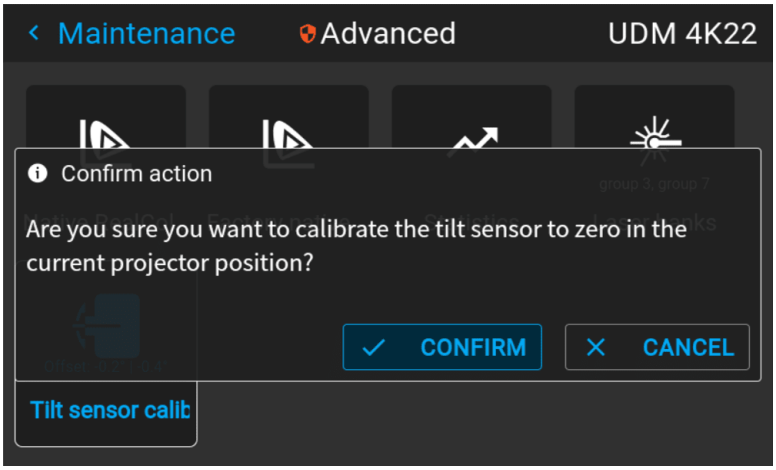


Image 9–127 Example of the Advanced menu with the Tilt sensor menu

The tilt sensor will be set to zero in the current position of the projector.

9.9.10 Advanced settings – TIM curing

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Advanced* > *TIM curing*
- **Access level**: service
- **Models**: UDM, F40, F400, Bragi, Njord, Hodr

For F40 and Bragi, the TIM curing will only be available from Pulse 2.5 and later.

About TIM curing

The TIM curing process is only used during service action on the DMDs or laser plates. For more information on when to us TIM curing or laser curing, see the service manual.

How to activate a TIM curing process

1. In the Advanced Settings menu, select *TIM curing*.

Image 9–128 Advanced menu, TIM Curing

The *TIM curing* menu is displayed.

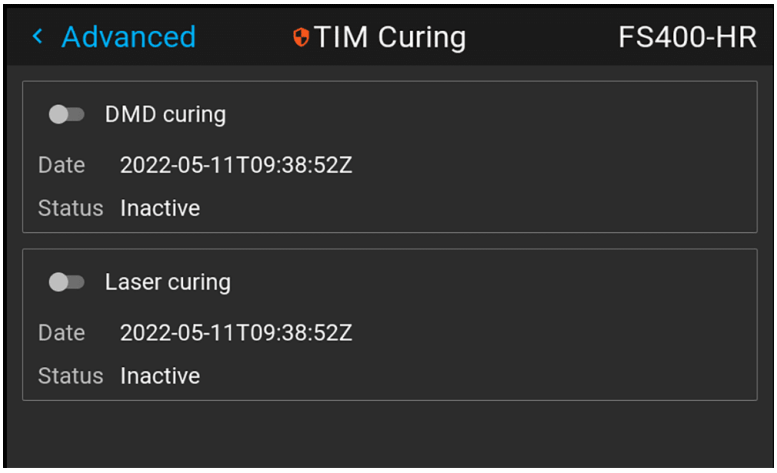


Image 9–129

2. To activate *DMD curing*, enable the DMD curing slider confirm.
3. To activate *Laser curing*, enable the Laser curing slider and confirm.

9.9.11 Creating a diagnostics package

Location and availability

- **Menu**: *Settings* > *Maintenance* > *Diagnostics*
- **Access level**: Power user, administrator, service
- **Models**: all
- **Requirements**: Pulse 2.4 or later

What can be done?

Up until Pulse 2.4, in order to obtain the diagnostics package of the projector, an external tool like the Projector Toolset was required, or a custom “log extractor” file that was version specific.

On Pulse 2.4 and later, the diagnostics package can be downloaded directly from the projector itself onto a USB flash drive.

Specifications USB flash drive

The USB flash drive needs to be:

- USB 2.0
- Formatted in FAT32
- Have enough free space for the package

How to download a diagnostics package

1. Enter a valid USB flash drive into the USB 2.0 slot on the communication panel of the projector.
2. In the *Maintenance* menu, select *Diagnostics*.

Image 9–130 Maintenance menu, Diagnostics

The *Diagnostics* menu will be displayed.

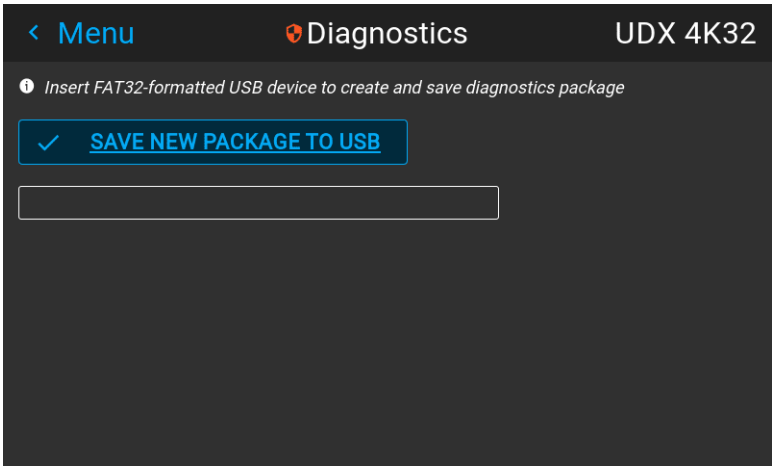


Image 9–131 Example of the Dianostics menu, with a valid USB flash drive inserted.

3. Click the **Save new package to USB** button.

Note: If no (valid) USB flash drive is inserted, the **Save new package to USB** button will be disabled.

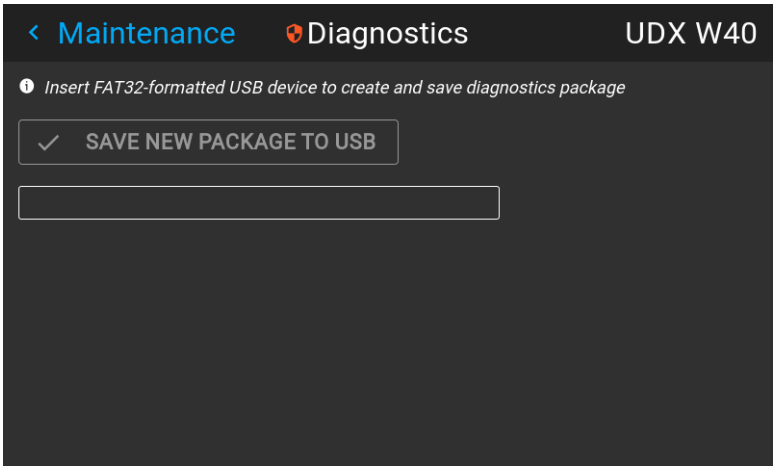


Image 9–132 Example of the Diagnostics menu with no valid USB flash drive inserted.

The Diagnostics package creation process will start. A package will first be prepared, then created and then saved onto the flash drive.

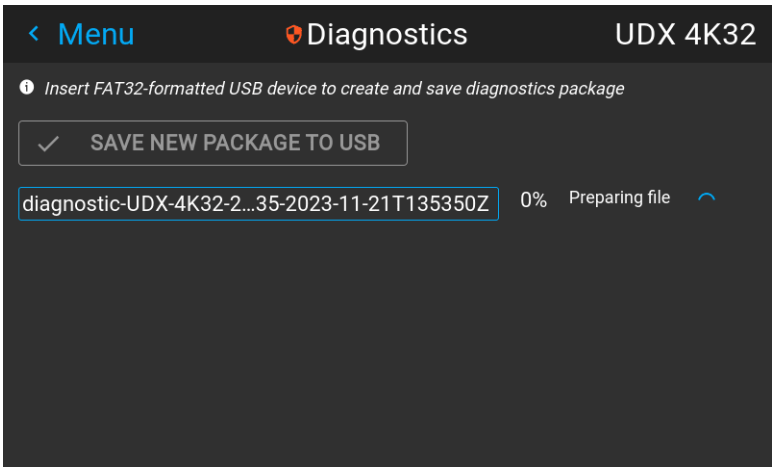


Image 9–133 Example of the creation of a diagnostics package

Note: Take into account that this process will take about 5 to 10 minutes.

4. Once the package creation process completed, a notification will be prompted that it is now safe to remove the USB device.

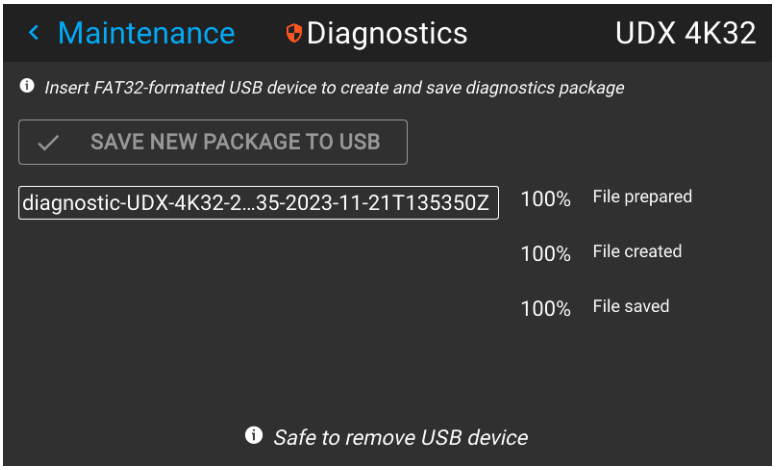


Image 9–134 Example of a completed diagnostics package creation

9.10 General

9.10.1 List of open source licenses

Location and availability

- **Menu**: *Settings* > *General* > *Open source licences*
- **Access level**: all
- **Models**: all

About open source licenses

Open source licenses are licenses that comply with the Open Source Definition. In brief, they allow software to be freely used, modified, and shared.

To be open and transparent about the open source software used on the projector, a list of all open source licenses used is available in the software.

How to find the open source licenses

For the complete and most up-to-date list of the used open source software and the version used, go to the main menu and select *Settings* > *General* >> *Open source licenses*.

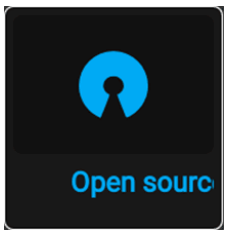


Image 9–135 General menu – Open source licenses

9.10.2 End-user license agreement (EULA)

Location and availability

- **Menu**: *Settings* > *General* > *End User License Agreement*
- **Access level**: all
- **Models**: all
- **Requirements**: Pulse 2.4 or later

About the EULA

Upon first startup of the projector, the user will be asked to accept the end-user license agreement (EULA) before being able to use all functionality of the projector.

On simulation projectors (FL40, FS40, F70, F400), the EULA approval process happens during the purchasing process instead.

After accepting the EULA, the text of the EULA can still be consulted.

There is no option to re-accept or reject the EULA. It is only available for consulting purposes.

How to find the EULA after accepting it

In the General menu, select *End User Licence Agreement*.

Image 9–136 General menu – EULA

10 Dashboard

From Pulse 2.5 onward, the *Status* menu has been renamed into the *Dashboard* menu. While the name has changed, the functionality remains the same.
For older software versions, refer to the *Status* menu instead.

10.1 Dashboard overview

Location and availability

- **Menu**: *Dashboard*
- **Access level**: al
- **Models**: all

In Pulse 2.5 and later, the Status menu has been renamed to Dashboard. On Pulse 2.4 or older, refer to the Status menu instead.

How to access the Dashboard menu

While in the main menu, press *Dashboard*.

Image 10–1 Main menu, Dashboard

The *Dashboard* menu is displayed.

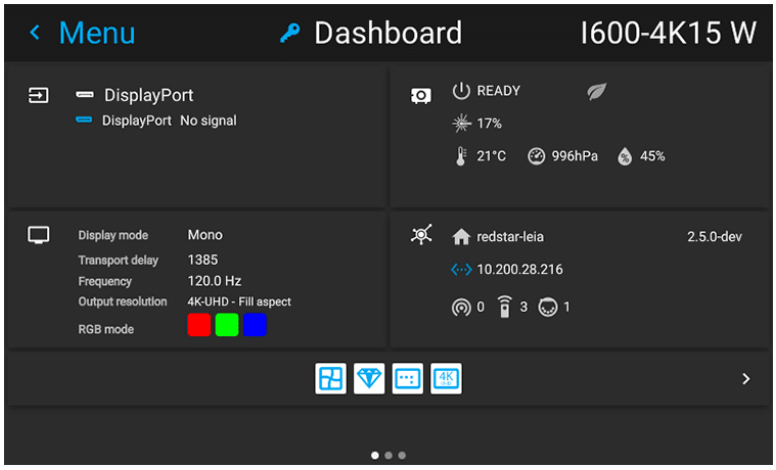


Image 10–2 Example of the Dashboard menu

Swipe the screen left of right to swap between the three different pages.

What can be seen on the Dashboard page?

- Connected source and signal details
- Display settings (e.g. display mode, transport delay, output resolution, etc)
- Projector power and environmental details (e.g. power, temperature, pressure, etc)
- Network status (e.g. host name, IP address, software version)

What can be seen and done on the Functions page?

From Pulse 2.5 and later, the *Functions* page has been added to the dashboard.

The *Functions* page is the list of all available functions as icons. Inactive functions are greyed out, whereas active functions are lit white.

Use the arrow keys to navigate through all functions. Pressing one of the functions will redirect the user to the respective menu (shortcut).

Pressing the return button on the respective menu afterwards will also redirect the user back to the *Functions* page.

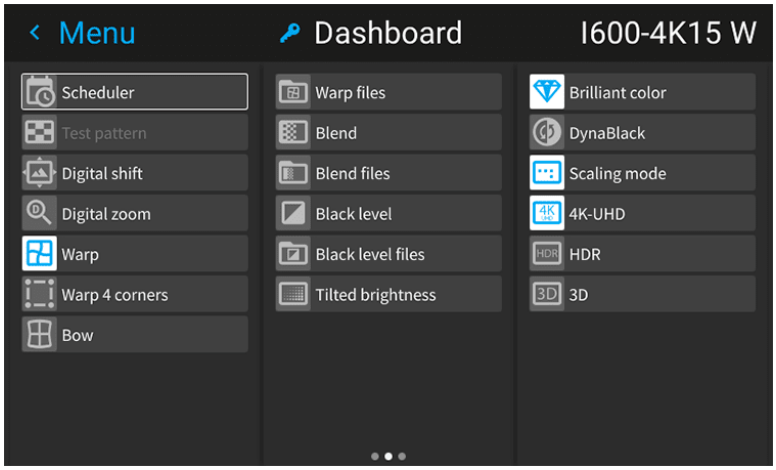


Image 10–3 Example of the Functions page of the Dashboard

What can be seen on the About page?

- **Projector information**, e.g. firmware version, serial number, projector article number and registration status (if applicable)
- **Mounted lens**: lens type and lens description (if available).
- **Installation information**: altitude, pitch angle, roll angle, distance (if applicable)
- **Basic statistics**: light source run time, light source strikes, projector runtime.

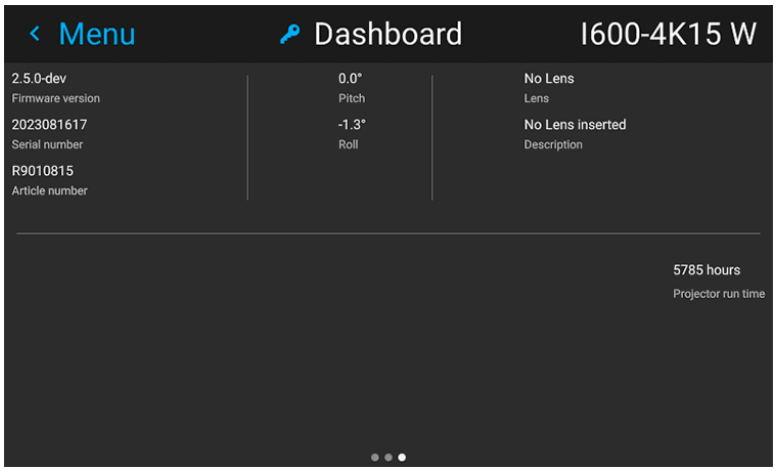


Image 10–4 Example of the About page of the Dashboard

DMX chart

A

A.1 DMX chart input board positioning

About the input boards

6 Input selection ranges are reserved in the DMX chart per input board location (named L1 and L2). With the current version of DMX support, it is important to take into account to keep the input boards in their original slots.

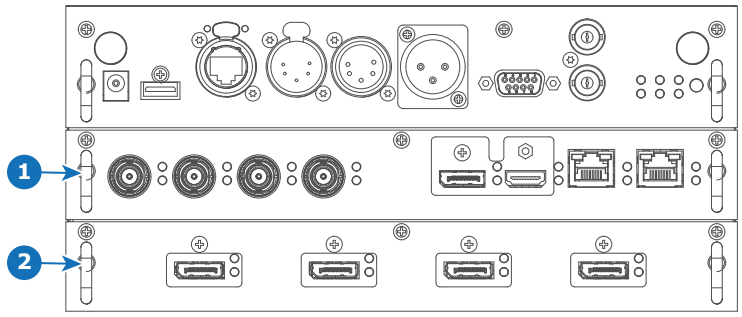


Image A–1

1 Slot L1, here filled with the Quad combo Input board
2 Slot L2, here filled with the Quad DP 1.2 Input board

A.2 DMX chart, Basic

Overview

Ch.	Function	Value	Default	Action
1	Shutter + Intensity	0 - 7	255	Close shutter
		8 - 255		Adjust intensity
2	Function select	0 - 7	0	No function
		8 - 15		Activate first profile preset (If held for 1 second)
		16 - 23		Activate second profile preset (If held for 1 second)
		24 - 31		Activate third profile preset (If held for 1 second)
		32 - 39		Activate fourth profile preset (If held for 1 second)
		40 - 47		Activate fifth profile preset (If held for 1 second)
		48 - 55		Activate sixth profile preset (If held for 1 second)
		56 - 63		Activate seventh profile preset (If held for 1 second)
		64 - 71		Activate eighth profile preset (If held for 1 second)
		72 - 79		Activate ninth profile preset (If held for 1 second)
		80 - 87		Activate tenth profile preset (If held for 1 second)
		88 - 95		Select input 1: HDMI Input (If held for 1 second)[11]
		96 - 103		Select input 2: DisplayPort Input (If held for 1 second)[11]
		104 - 111		Select input 3: SDI Input A (If held for 1 second)[11]
		112 - 119		Select input 4: SDI Input B (If held for 1 second)[11]
		120 - 127		Select input 5: HDBaseT Input 1 (if held for 1 second)[11]
		128 - 135		Select input 6: Quad SDI input (if held for 1 second)[11]
		136 - 143		Select input 7: Quad DP board Input A (if held for 1 second) [12]
		144 - 151		Select input 8: Quad DP board Input B (if held for 1 second)[12]
		152 - 159		Select input 9: Quad DP board Input C (if held for 1 second)[12]
		160 - 167		Select input 10: Quad DP board Input D (if held for 1 second)[12]
		168 - 175		Select input 11: Quad DP board Inputs A-B (if held for 1 second) [12]
		176 - 183		Select input 12: Quad DP board quad column mode (if held for 1 second)[12]
		184 - 207		Reserved for future functionality
		208 - 215		Power on / Light source on (If held for 5 seconds)
		216 - 223		Power down / Light source off (if held for 5 seconds)
		224 - 255		Reserved for future functionality

11. Only when the Quad Combo input board is installed in slot L1
12. Only when the Quad DisplayPort input board is installed in slot L2

A.3 DMX chart, Extended

Overview on F40, F70, F80, Bragi, Balder and Medea

Ch.	Function	Value	Default	Actions
1	Shutter + Intensity	0 - 7	255	Close shutter
		8 - 255		Adjust intensity
2	Brightness	0 - 255	128	Adjusts the brightness between 0 and 100% on input.
3	Contrast	0 - 255	128	Adjusts the contrast between 0 and 100% on input
4	Input selection	0 - 7	0	No function
		8 - 15		Activate first profile preset (If held for 1 second)
		16 - 23		Activate second profile preset (If held for 1 second)
		24 - 31		Activate third profile preset (If held for 1 second)
		32 - 39		Activate fourth profile preset (If held for 1 second)
		40 - 47		Activate fifth profile preset (If held for 1 second)
		48 - 55		Activate sixth profile preset (If held for 1 second)
		56 - 63		Activate seventh profile preset (If held for 1 second)
		64 - 71		Activate eighth profile preset (If held for 1 second)
		72 - 79		Activate ninth profile preset (If held for 1 second)
		80 - 87		Activate tenth profile preset (If held for 1 second)
		88 - 95		Select input 1: HDMI Input (If held for 1 second)[11]
		96 - 103		Select input 2: DisplayPort Input (If held for 1 second)[11]
		104 - 111		Select input 3: SDI Input A (If held for 1 second)[11]
		112 - 119		Select input 4: SDI Input B (If held for 1 second)[11]
		120 - 127		Select input 5: HDBaseT Input 1 (if held for 1 second)[11]
		128 - 135		Select input 6: Quad SDI input (if held for 1 second)[11]
		136 - 143		Select input 7: Quad DP board Input A (if held for 1 second) [12]
		144 - 151		Select input 8: Quad DP board Input B (if held for 1 second)[12]
		152 - 159		Select input 9: Quad DP board Input C (if held for 1 second)[12]
		160 - 167		Select input 10: Quad DP board Input D (if held for 1 second)[12]
		168 - 175		Select input 11: Quad DP board Inputs A-B (if held for 1 second) [12]
		176 - 183		Select input 12: Quad DP board quad column mode (if held for 1 second)[12]
		184 - 255		Reserved for future functionality
5	Focus (MSB)	0 - 255	128	Set coarse lens focus adjustment[13]
6	Focus (LSB)	0 - 255	128	Set fine lens focus adjustment[15]
7	Zoom (MSB)	0 - 255	128	Set coarse lens zoom adjustment[15]
8	Zoom (LSB)	0 - 255	128	Set fine lens zoom adjustment[15]

13. Only when lens has been calibrated

Ch.	Function	Value	Default	Actions
9	Lens shift vertical (MSB)	0 - 255	128	Set coarse lens shift in vertical direction
10	Lens shift vertical (LSB)	0 - 255	128	Set fine lens shift in vertical direction
11	Lens shift horizontal (MSB)	0 - 255	128	Set coarse lens shift in horizontal direction
12	Lens shift horizontal (LSB)	0 - 255	128	Set fine lens shift in horizontal direction
13	Light Source Power[14]	0 - 3	0	Set light source to 100%
		4 - 7		Set light source to 95%
		8 - 11		Set light source to 90%
		12 - 15		Set light source to 85%
		16 - 20		Set light source to 80%
		21 - 23		Set light source to 75%
		24 - 27		Set light source to 70%
		28 - 31		Set light source to 65%
		32 - 35		Set light source to 60%
		36 - 39		Set light source to 55%
		40 - 43		Set light source to 50%
		44 - 47		Set light source to 45%
		48 - 51		Set light source to 40%
		52 - 55		Set light source to 35%
		56 - 59		Set light source to 30%
		60 - 63		Set light source to 25%
		64 - 67		Set light source to 20%
		68 - 71		Set light source to 15%
		72 - 75		Set light source to 10%
		76 - 79		Set light source to 5%
		80 - 87		Power on / Light source on (If held for 5 seconds)
		88- 95		Power down / Light source off (if held for 5 seconds)
		96 - 255		Reserved for future functionality
14	Various	0 - 7	0	Reserved for future functionality
		8 - 15		Calibrate lens zoom & focus (if held for 5 seconds)
		16 - 23		Calibrate lens horizontal and vertical shift (if held for 5 seconds)
		24 - 31		Calibrate lens (zoom, focus and shift) (if held for 5 seconds)
		32 - 255		Reserved for future functionality

14. If the Light Source is forced to an output below its minimum value, it will remain at its minimum output value

Overview on UDX, UDM, Njord and Hodr

Ch.	Function	Value	Default	Actions
1	Shutter + Intensity	0 - 7	255	Close shutter
		8 - 255		Adjust intensity
2	Brightness	0 - 255	128	Adjusts the brightness between 0 and 100% on input.
3	Contrast	0 - 255	128	Adjusts the contrast between 0 and 100% on input
4	Input selection	0 - 7	0	No function
		8 - 15		Activate first profile preset (If held for 1 second)
		16 - 23		Activate second profile preset (If held for 1 second)
		24 - 31		Activate third profile preset (If held for 1 second)
		32 - 39		Activate fourth profile preset (If held for 1 second)
		40 - 47		Activate fifth profile preset (If held for 1 second)
		48 - 55		Activate sixth profile preset (If held for 1 second)
		56 - 63		Activate seventh profile preset (If held for 1 second)
		64 - 71		Activate eighth profile preset (If held for 1 second)
		72 - 79		Activate ninth profile preset (If held for 1 second)
		80 - 87		Activate tenth profile preset (If held for 1 second)
		88 - 95		Select input 1: HDMI Input (If held for 1 second)[11]
		96 - 103		Select input 2: DisplayPort Input (If held for 1 second)[11]
		104 - 111		Select input 3: SDI Input A (If held for 1 second)[11]
		112 - 119		Select input 4: SDI Input B (If held for 1 second)[11]
		120 - 127		Select input 5: HDBaseT Input 1 (if held for 1 second)[11]
		128 - 135		Select input 6: Quad SDI input (if held for 1 second)[11]
		136 - 143		Select input 7: Quad DP board Input A (if held for 1 second) [12]
		144 - 151		Select input 8: Quad DP board Input B (if held for 1 second)[12]
		152 - 159		Select input 9: Quad DP board Input C (if held for 1 second)[12]
		160 - 167		Select input 10: Quad DP board Input D (if held for 1 second)[12]
		168 - 175		Select input 11: Quad DP board Inputs A-B (if held for 1 second) [12]
		176 - 183		Select input 12: Quad DP board quad column mode (if held for 1 second)[12]
		184 - 255		Reserved for future functionality
5	Focus (MSB)	0 - 255	128	Set coarse lens focus adjustment[15]
6	Focus (LSB)	0 - 255	128	Set fine lens focus adjustment[15]
7	Zoom (MSB)	0 - 255	128	Set coarse lens zoom adjustment[15]
8	Zoom (LSB)	0 - 255	128	Set fine lens zoom adjustment[15]
9	Lens shift vertical (MSB)	0 - 255	128	Set coarse lens shift in vertical direction

15. Only when lens has been calibrated

Ch.	Function	Value	Default	Actions
10	Lens shift vertical (LSB)	0 - 255	128	Set fine lens shift in vertical direction
11	Lens shift horizontal (MSB)	0 - 255	128	Set coarse lens shift in horizontal direction
12	Lens shift horizontal (LSB)	0 - 255	128	Set fine lens shift in horizontal direction
13	Light Source Power[16]	0	0	Set light source to 100%
		1 - 61		Set light source to value From 100% to 40% in 1% reductions (e.g. 11 is 90%, 26 is 75%, etc)
		64		Set light source to 35%
		67		Set light source to 30%
		70		Set light source to 25%
		73		Set light source to 20%
		76		Set light source to 15%
		79		Set light source to 10%
		80 - 87		Power on / Light source on (If held for 5 seconds)
		88- 95		Power down / Light source off (if held for 5 seconds)
		96 - 255		Reserved for future functionality
14	Various	0 - 7	0	Reserved for future functionality
		8 - 15		Calibrate lens zoom & focus (if held for 5 seconds)
		16 - 23		Calibrate lens horizontal and vertical shift (if held for 5 seconds)
		24 - 31		Calibrate lens (zoom, focus and shift) (if held for 5 seconds)
		32 - 255		Reserved for future functionality

16. If the Light Source is forced to an output below its minimum value, it will remain at its minimum output value

PJLink commands

B

B.1 PJLink Command list

Supported PJLink Commands

Com-mand	Description	Remarks
POWR	Power control	Parameters: • Power on = Switch projector to ON mode • Power off = - When projector is in ON mode, go to Ready mode. - When projector is in READY mode, go to (Eco) Standby. - When projector is in READY mode and (Eco) Standby mode is disabled, remain in READY mode.
INPT	Switch source	Parameters: • Instruction to switch input to RGB (class 1) is not supported • Instruction to switch input to RGB (class 2) is not supported • Instruction to switch input to Video (class 1) is not supported • Instruction to switch input to Video (class 2) is not supported • Instruction to switch input to Storage (class 2) is not supported • Instruction to switch input to Network (class 2) is not supported • Instruction to switch input to Internal (class 2) is not supported • Instruction to switch input to Digital (Class 1) is only available when the projector is in ON or READY mode. • Instruction to switch input to Storage (Class 1) is only available when the projector is in ON or READY mode. • Instruction to switch input to Network (Class 1) is only available when the projector is in ON or READY mode. • Instruction to switch input to Digital (Class 2) is only available when the projector is in ON or READY mode. **Remark for PJLink Class 1 only**: The PJLink 1.0 specification only defines 9 digital inputs. Barco projectors can have more than 9 digital inputs. For this reason, the storage and network categories are used to host the remaining digital sources. This will result in the following: • Source 01 - 09 = PJLink input 31 - 39 • Source 10 - 18 = PJLink input 41 - 49 • Source 19 - 27 = PJLink input 51 - 59 **Note**: The projector sources are defined by numbers instead of names. This is because the exact source depends on the input cards used and their position in the Input and Communication unit. The first source will correspondend with the first item in the list provided by the command “image.source.list”.
AVMT	Mute audio and/or video	Parameters: • Video mute = ON >> Shutter closes • Video mute = OFF >> Shutter opens • Audio mute is not supported • Audio & video mute is not supported **Note**: Command is only available when projector is in ON or READY mode.
SVOL	Adjust Speaker volume	Command not supported
MVOL	Adjust microphone volume	Command not supported
FREZ	Freeze the screen	Command not supported

Com-mand	Description	Remarks
POWR?	Get power status	Parameters: • Power on = projector is in ON mode • Power off = projector is either in READY, STANDBY or ECO STANDBY mode. • Cooling status = projector is in the deconditioning status • Warmup status = projector is in the conditioning status
INPT ?	Get current source	
AVMT ?	Get the audio/video mute status	Parameters: • Video mute on >> Shutter closes • Video mute off >> Shutter opens • Audio mute is not supported • Audio & video mute is not supported **Note**: Command is only available when projector is in ON or READY mode.
ERST ?	Get error status	Only “other errors” as a parameter is supported.
LAMP ?	Get status of the lamp	Command not supported
INST ?	Get list of input sources	
NAME ?	Get projector name	The result is the projector Hostname
INF1 ?	Get manufacturer of the projector	The result is: “Barco”
INF2 ?	Get product name	Identification property of the DeviceIdentification file
INFO ?	Get other info	Command not supported
CLSS ?	Get PJlink class	The result is “2”
SNUM ?	Get serial number	
SVER ?	Get software version	
INMM ?	Get name of the input sources	
IRES ?	Get input resolution	Only supported with single source selection. Not supported when stitched connections are used.
RRES ?	Get recommended resolution	
FILT ?	Get wear counter of filer	Command not supported
RLMP ?	Get lamp replacement model number	Command not supported
RFIL ?	Get filter replacement model number	Command not supported
FREZ ?	Get status of the freeze control function	Command not supported

Nightvision color component mapping

C

How infrared is displayed

In night vision mode with 2 separate inputs, the projector displays the two inputs alternating every other frame. The output is displayed a double speed of the inputs, i. e. at 120Hz in case of 60Hz input. The DMD is illuminated with visible RGB light every other frame, while the IR “light” is illuminating the DMD all the time.

The display device (DMD) itself does not know whether it is displaying IR or VL. This is causing problems when the actual image content is not carrying all 3 color components (full RGB). As an example, only the red color component is active on the input. The DMD is attempting to display this as an RGB image even if it is illuminated with IR. The result is that the DMD is active only approximately one third of the frame, thereby “wasting” a lot of the IR output power.

From Pulse 2.1 and later, there is an option to create a color component mapping per connector input. This gives the flexibility on individual connector to connect DMD “colors” to input color channel.

C.1 Default setup

Default setup

In the default setup, the RGB components of the DMD fetches the content from the RGB component of the inputs. This mode of operation is best suited for when the VS and IR inputs both carries a full RGB image and specially the IR channel has full black/white content if displayed on a regular monitor. This is not a clone or spitted image even if the content in the example below indicates the same image on both inputs.

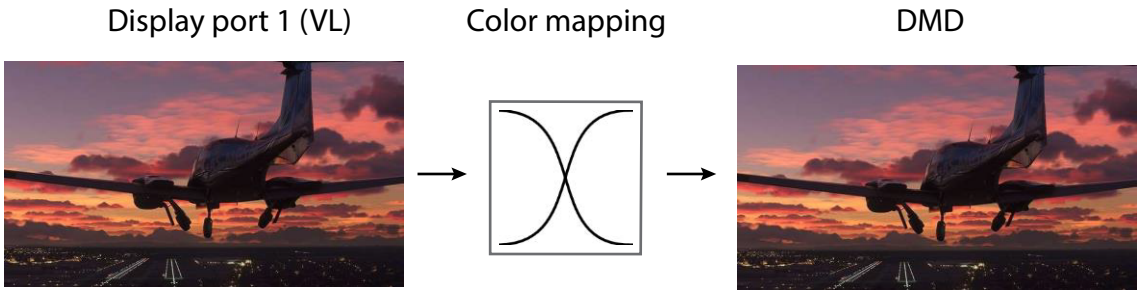


Image C–1

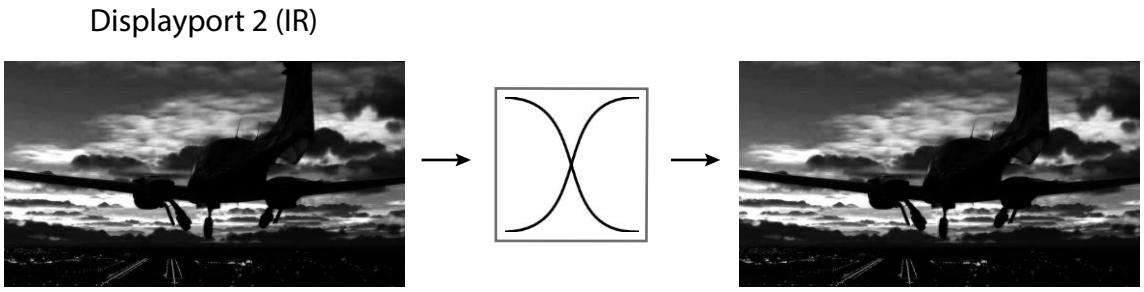


Image C–2

This is the default setup, and the properties of the input is as follows:

Property	Value
image.connector.displayport1.colorcomponent.red	RED_IN
image.connector.displayport1.colorcomponent.green	GREEN_IN
image.connector.displayport1.colorcomponent.blue	BLUE_IN
image.connector.displayport2.colorcomponent.red	RED_IN
image.connector.displayport2.colorcomponent.green	GREEN_IN
image.connector.displayport2.colorcomponent.blue	BLUE_IN

C.2 Cloned image with full RGB input

Cloned image with full RGB input

In this setup the image is rendered for visible light. It has full RGB information. In this setup there is also requested to take the red color component on the input for the IR channel and fully saturate the DMD with this component.

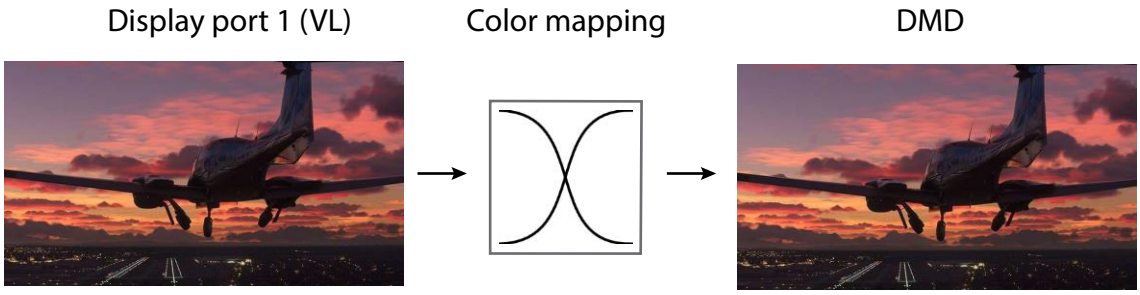


Image C–3

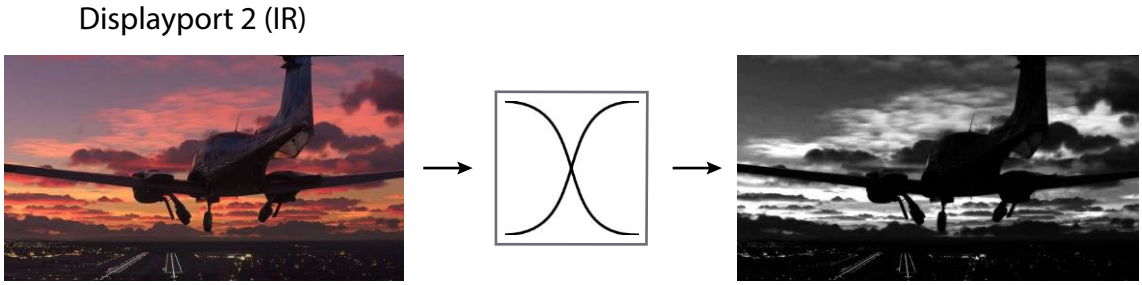


Image C–4

To achieve this result, use the following settings:

Property	Value
image.connector.displayport1.colorcomponent.red	RED_IN
image.connector.displayport1.colorcomponent.green	GREEN_IN
image.connector.displayport1.colorcomponent.blue	BLUE_IN
image.connector.displayport2.colorcomponent.red	RED_IN
image.connector.displayport2.colorcomponent.green	RED_IN
image.connector.displayport2.colorcomponent.blue	RED_IN

C.3 Cloned inputs with only green content for IR

Cloned inputs with only green content for IR

In this setup, the input is a fully saturated green and white image, well suited for the IR channel. In this setup, a portion of the green image is extracted and applied to the red channel for visible light also. Note that the power of the visible light source must be dimmed to achieve the desired effect.

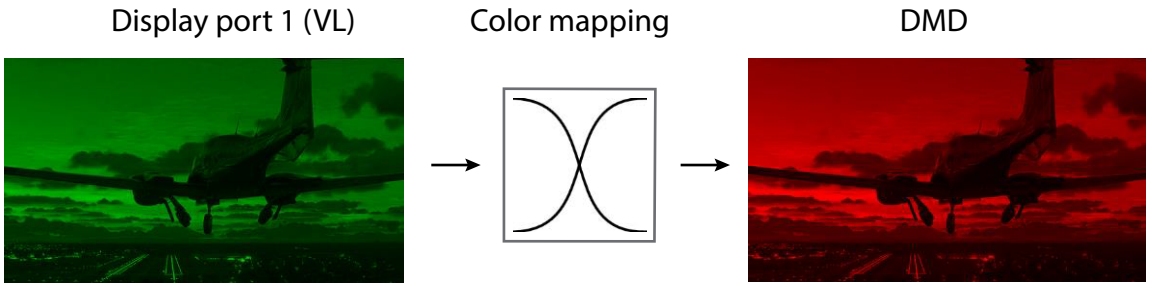


Image C–5

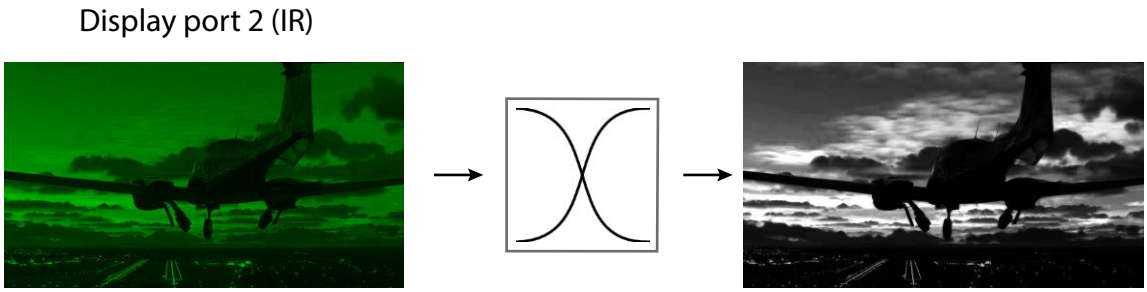


Image C–6

Property	Value
image.connector.displayport1.colorcomponent.red	GREEN_IN
image.connector.displayport1.colorcomponent.green	OFF
image.connector.displayport1.colorcomponent.blue	OFF
image.connector.displayport2.colorcomponent.red	GREEN_IN
image.connector.displayport2.colorcomponent.green	GREEN_IN
image.connector.displayport2.colorcomponent.blue	GREEN_IN

Regulatory

D

D.1 Trademark notice

HDMI™

The terms HDMI, HDMI High-Definition Multimedia Interface, HDMI trade dress and the HDMI Logos are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

DisplayPort™

DisplayPort™, the DisplayPort™ logo and DisplayPortHDR™ logo are trademarks owned by the Video Electronics Standards Association (VESA®) in the United States and other countries.

USB Type-C™

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HDBaseT™

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PJLink™

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DLP™

DLP® and the DLP logo are registered trademarks of Texas Instruments.

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D.2 Product privacy statement

About

Learn more about Barco's Product Privacy Statement: *https://www.barco.com/en/about/trust-center/product-privacy-statement*

Which data is captured and why

User names and IP addresses are captured for general secure operation of the product.

Data retention mechanism

An administrator should modify or delete a user (upon user request, or when the user doesn't work for the company anymore), either via the Users feature, or via a factory reset executed as administrator.

Logs may contain user names and IP addresses and are subject to the retention policy, but can't be deleted by the user. The user can send a request to dataprotection@barco.com.

Glossary

Active Stereo

Field sequential 3D (also known as active 3D or “Active Stereo”) is a technique of displaying stereoscopic 3D images. It works by only presenting the image intended for the left eye while blocking the right eye's view, then presenting the right-eye image while blocking the left eye, and repeating this so rapidly that the interruptions do not interfere with the perceived fusion of the two images into a single 3D image.

This system setup uses liquid crystal shutter glasses (also known as active shutter glasses). Each eye's glass contains a liquid crystal layer which has the property of becoming opaque when voltage is applied, being otherwise transparent. The glasses are controlled by a timing signal that allows the glasses to alternately block one eye, and then the other, in synchronization with the refresh rate of the screen. The timing synchronization to the video equipment may be achieved via a wired signal or via wireless communication, this by using either an infrared or radio frequency (e.g. Bluetooth, DLP link) transmitter.

Default Gateway

A router that serves as an entry point into and exit point out of a network. For example, a local network (LAN) may need a gateway to connect it to a wide area network (WAN) or to the Internet.

DHCP

Dynamic host configuration protocol. DHCP is a communications protocol that lets network administrators manage centrally and automate the assignment of IP addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

IG PixelShift

Image Generator Pixel Shift, hereafter referred to as IG pixel shift, is a method for achieving 4K resolution using the 4K actuator, where the phase offset between 2 subframes is generated by the source (the Image Generator, or IG). When the IG renders the subframes, the exact position of the rendered objects in the 3D model is known and the correct viewpoint for all objects is exact. This instead of the projector applying static filtering on the resulting 4K images to guess the subframes.

Image Generator (IG)

An image generator (IG) creates visual scenes of a simulated environment from the perspective of a participant. The visual scenes can be displayed on multiple simulation projectors in a dome setup. The scenes

can be rendered in the visible spectrum for an "out-the-window" experience, or in other wavelengths to simulate optical sensors. An image generator generates scenes very quickly to maintain a realistic sense of motion for the participant.

IP

Internet Protocol. The network layer of TCP/IP. Required for communication with the internet.

Latency

The total time from the first pixel is coming in on an input source, until the first light representing that pixel is visible on the screen. This includes the transport delay. The value is normally given in milliseconds.

MAC address

Media Access Control address. Unique hardware number, used in combination with the IP-address to connect to the network (LAN or WAN).

Passive Stereo

Passive Stereoscopic 3D (also known as “Passive Stereo”) is the standard method of creating the illusion of depth in an image, by means of stereopsis for binocular vision.

To present stereoscopic pictures, two images are projected superimposed onto the same screen through polarizing filters or presented on a display with polarized filters. For Digital Cinema, a silver screen is used so that polarization is preserved. On most passive displays every other row of pixels are polarized for one eye or the other. This method is also known as interlacing.

The viewer wears glasses which contain a pair of opposite polarizing filters. As each filter only passes light which is similarly polarized and blocks the opposite polarized light, each eye only sees one of the images, and the effect is achieved.

PQ

Perceptual Quantizer (PQ) is a non–linear electro-optical transfer function (EOTF) that allows for the display of High Dynamic Range (HDR) content with a luminance level of up to 10 000 cd/m² and can be used with the Rec. 2020 color space.

Subnet mask

A number that is used to identify a subnetwork so that IP addresses can be shared on a local area network.

Transport delay

The added delay in the image processing chain. The value is the number of lines relative to the output resolution.

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