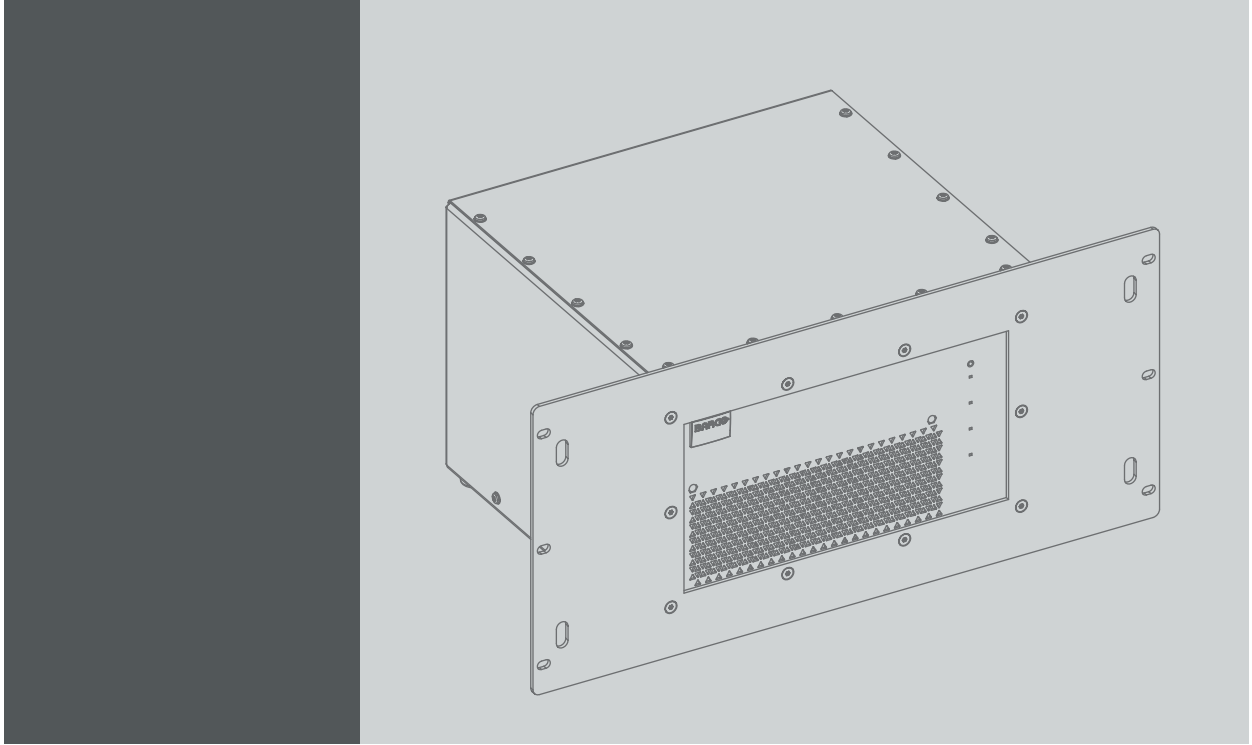


# MCM-50



## User Guide Optimized for F50

**Barco NV**

President Kennedypark 35, 8500 Kortrijk, Belgium

Phone: +32 56.36.82.11

Fax: +32 56.36.883.86

Support: [www.barco.com/en/support](http://www.barco.com/en/support)

Visit us at the web: [www.barco.com](http://www.barco.com)

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# TABLE OF CONTENTS

<b>1. Safety instructions</b>	<b>5</b>
1.1 Notice on safety	5
1.2 Installation instructions	5
1.3 Owner's record	5
1.4 Warnings	6
1.5 Plug types	6
1.6 Heat and fire hazard	7
1.7 Installation	7
1.8 Prevent personal injury	7
1.9 Device damage	7
1.10 Environment condition check	8
1.11 Service	8
1.12 Cleaning	9
1.13 Repacking	9
<b>2. Introduction</b>	<b>11</b>
2.1 About this manual	11
2.2 Symbols and fonts	12
2.3 Key features and benefits	12
<b>3. Packaging</b>	<b>13</b>
3.1 Content	13
3.2 Unpacking	14
<b>4. Facility and system requirements</b>	<b>17</b>
4.1 Environmental requirements	17
4.2 Installation requirements	17
<b>5. Physical installation and connections</b>	<b>19</b>
5.1 RCU battery installation	19
5.2 Installing the rack mount plate	20
5.3 DisplayPort connection	21
5.4 Connecting the F50 projector	21
5.5 Power connection	22
5.6 Network connection	23
<b>6. Setup and configuration</b>	<b>25</b>
6.1 Setting the RCU address	25
6.2 Powering the MCM-50	27
6.3 Activating the MCM-50	27
6.4 Setting the MCM-50 address	28
6.5 Network configuration	29
6.5.1 Configuring the MCM-50 for a Private Subnet	30
6.5.2 Configuring the MCM-50 for a DHCP network	31
6.6 Linking MCM-50 devices in a multi-channel system	32
<b>7. Getting started</b>	<b>37</b>
7.1 Starting the MCM-50	37
7.2 Displaying a single source	37
7.3 Displaying multiple sources: Stitched Layouts	37
7.3.1 Details on Stitched Layouts	39
7.3.2 Creating a Window file	39
7.3.3 Viewing Window file information	42
7.3.4 Editing a Window file	43
7.3.4.1 Locking to the sync of another source	43
7.3.4.2 Editing Stitch Layout	43
7.3.4.3 Input Stereo Sync settings	44
7.3.5 Saving a Window file	45
7.3.6 Loading a Window file	45
7.3.7 Renaming a Window file	46
7.3.8 Copying a Window file	47
7.3.9 Deleting a Window file	47
7.4 Basic image adjustment	48
7.4.1 Adjusting the brightness	48
7.4.2 Adjusting the contrast	49
7.4.3 Adjusting the gamma	50
<b>8. OSD Preferences</b>	<b>51</b>
8.1 Displaying the advanced menu items	51
8.2 Navigating through the OSD	52
8.3 Opening a drop down menu	52
8.4 Opening a dialog box	52
8.5 Activating a menu item of a drop down menu	52

8.6	Moving a slider in a slider box .....	53
8.7	Entering data in an edit box .....	53
<b>9.</b>	<b>Basic operation .....</b>	<b>55</b>
9.1	General settings .....	55
9.1.1	Identification .....	55
9.1.2	Freeze .....	55
9.1.3	Automatic startup .....	56
9.1.4	Change password .....	56
9.2	Source alignment: timings .....	57
9.2.1	Loading a Custom Image file .....	58
9.2.2	Editing a Custom Image file .....	58
9.2.3	Saving a Custom Image file .....	61
9.2.4	Renaming a Custom Image file .....	61
9.2.5	Copying a Custom Image file .....	62
9.2.6	Deleting a Custom Image file .....	63
9.3	Colors: using Dynacolor .....	63
<b>10.</b>	<b>Advanced operation .....</b>	<b>65</b>
10.1	Geometry adjustment .....	65
10.1.1	Geometry adjustment principle .....	65
10.1.2	Keystone correction workflow .....	68
10.1.3	General geometry adjustment workflow .....	68
10.1.4	The Geometry edit dialog .....	68
10.1.5	Selecting the geometry level .....	70
10.1.6	Selecting an anchor point .....	71
10.1.7	Moving an anchor point in small steps .....	72
10.1.8	Moving an anchor point in large steps .....	73
10.1.9	Geometry reset .....	74
10.2	Using Dynacolor sets .....	76
<b>11.</b>	<b>Expert operation .....</b>	<b>77</b>
11.1	Geometry .....	77
11.1.1	Setting the Axis link to ON or OFF .....	77
11.1.2	Working with Geometry files .....	79
11.1.2.1	Loading a Geometry file .....	80
11.1.2.2	Renaming a Geometry file .....	81
11.1.2.3	Copying a Geometry file .....	81
11.1.2.4	Deleting a Geometry file .....	82
11.1.3	Shifting the image on the projector panel .....	83
11.1.4	Transport delay .....	85
11.2	Soft Edge and Black Level .....	86
11.2.1	Soft Edge and Black Level explained .....	86
11.2.2	Soft Edge area shape .....	88
11.2.3	General Soft Edge workflow .....	91
11.2.4	Alpha planes .....	94
11.2.5	Beta planes .....	95
11.2.6	The Soft Edge selection dialog .....	96
11.2.7	The Soft Edge edit dialog .....	98
11.2.8	Selecting an anchor point .....	100
11.2.9	Moving an anchor point in small steps .....	100
11.2.10	Moving an anchor point in large steps .....	101
11.3	Dynacolor .....	101
11.3.1	Dynacolor concept and expert use .....	102
11.3.2	The Dynacolor dialog .....	106
11.3.3	Enabling Dynacolor .....	107
11.3.4	Color fine tuning .....	108
11.3.5	Color calibration .....	110
11.3.6	Dynacolor for Infitec .....	112
<b>12.</b>	<b>Maintenance .....</b>	<b>115</b>
12.1	Maintenance: general overview .....	115
12.2	Cleaning housing and mechanical structure .....	115
12.3	Firmware upgrade .....	115
12.4	Diagnostics through the OSD .....	116
12.4.1	I2C .....	117
12.4.2	Board identification .....	117
12.5	Diagnostic LEDs .....	118
12.6	Identification .....	119
12.7	Internal and scaled patterns .....	119
12.8	Troubleshooting checklist .....	121
<b>13.</b>	<b>MCM-50 Tools .....</b>	<b>123</b>
13.1	High Bandwidth Digital Protection .....	123
13.2	EDID .....	124
13.2.1	Selecting an EDID file .....	124
13.2.2	Creating Custom EDID files .....	125

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13.2.3	Deleting Custom EDID files.....	127
13.3	Patterns .....	127
13.4	Textboxes .....	127
13.5	Menu bar position .....	128
13.6	Status bar position.....	128
13.7	Positioning the slider box.....	129
13.8	Sync Variance Limit .....	129
13.9	Full-screen synchronous representation.....	131
<b>14.</b>	<b>Specifications.....</b>	<b>133</b>
14.1	General specifications.....	133
14.2	Dimensions .....	134
14.3	Technical Regulations .....	134
<b>15.</b>	<b>RCU Control.....</b>	<b>135</b>
15.1	Range of RCU and IR receivers .....	135
15.2	OSD navigation and selection.....	136
15.3	Data input .....	137
15.4	MCM-50 control.....	138
<b>16.</b>	<b>Environmental information.....</b>	<b>141</b>
16.1	Disposal information.....	141
16.2	Rohs compliance .....	141
16.3	Production address.....	143
16.4	Importers contact information .....	143





# 1. SAFETY INSTRUCTIONS

## About this chapter

It is necessary to read this chapter prior to starting any activity on the device. It contains valuable and critical information to ensure safety of the operator, other people in the neighborhood of the device.

### Overview

- Notice on safety
- Installation instructions
- Owner's record
- Warnings
- Plug types
- Heat and fire hazard
- Installation
- Prevent personal injury
- Device damage
- Environment condition check
- Service
- Cleaning
- Repacking

## 1.1 Notice on safety

### Notice on Safety

This equipment is built in accordance with the requirements of the international safety standards IEC60950-1, EN60950-1, UL60950-1 and CAN/CSA - C22.2 No.60950-1, which are the safety standards of information technology equipment including electrical business equipment. These safety standards impose important requirements on the use of safety critical components, materials and isolation, in order to protect the user or operator against risk of electric shock and energy hazard, and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

## 1.2 Installation instructions

### Installation Instructions

- Before operating this equipment please read this manual thoroughly, and retain it for future reference.
- Installation and preliminary adjustments can be performed after reading the documentation manuals in detail.
- All warnings on the device and in the documentation manuals should be adhered to.
- All instructions for operating and use of this equipment must be followed precisely.

## 1.3 Owner's record

### Owner's Record

The part number and serial number can be found on the label at the back side of the device. Record these numbers in the table below. Refer to them whenever you call your Barco dealer regarding this product.

Part Number:	
Serial Number:	
Dealer:	

## 1.4 Warnings

---

### Safety warnings

- To prevent fire or electrical shock hazard, do not expose this equipment to rain or moisture!
- This product should be operated from an AC source with the supplied AC mains power adapter. The power input of the AC mains power adapter is auto ranging from 100V to 240V.
- All equipment in the system is equipped with a 3-wire grounding plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- If an extension cord is used with this product, make sure that the total of the Ampere ratings on the products plugged into the extension cord does not exceed the extension cord Ampere rating.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Never spill liquid of any kind on the product. Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Lightning - For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

## 1.5 Plug types

---



**WARNING: The AC mains power adapter must be grounded (earthed) via the supplied 3 conductor AC power cable. If the supplied power cable is not the correct one, consult your dealer.**

---

### Plug types

#### a. Mains lead (AC Power cord) with CEE 7 plug up to 16 A

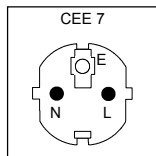


Image 1-1

The colors of the mains lead are colored in accordance with the following code:

Green + yellow: Earth (Ground)

Blue: Neutral

Brown: Line (Live)

#### b. Power cord with NEMA 5/15 plug up to 15 A

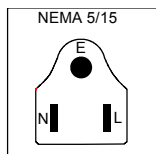


Image 1-2

The wires of the power cord are colored in accordance with the following code.

Green or yellow + green: Earth (Ground)

Blue or white: Neutral

Brown or black: Line (Live)

## 1.6 Heat and fire hazard

---

### Heat and Fire Hazard

Warning – risk of fire: do not place flammable or combustible materials near the device!

Barco products are designed and manufactured to meet the most stringent safety regulations.

This device radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this device could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an "exclusion zone" around all external surfaces of the device where no flammable or combustible materials are present. The exclusion zone must be not less than 40 cm (16") for all Barco devices. Do not cover the device or the lens with any material while the it is in operation.

Keep flammable and combustible materials away from the device at all times.

Mount the device in a well ventilated area away from sources of ignition and out of direct sun light.

Never expose the device to rain or moisture.

In the event of fire, use sand, CO<sub>2</sub>, or dry powder fire extinguishers; never use water on an electrical fire.

Always have service performed on this device by authorized Barco service personnel.

Always insist on original Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this device.

Slots and openings in the cabinet and the sides are provided for ventilation; to ensure reliable operation of the device and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface.

This device should never be placed near or over a radiator or heat register, nor should it be placed in a built-in installation or enclosure unless proper ventilation is provided.

Rooms must be well ventilated or cooled in order to avoid build up of heat.

## 1.7 Installation

---

### Safety On Installation

- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it.
- Do not use this equipment near water.
- Only use the power cord supplied with your device. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the device. For a replacement power cord, contact your dealer.
- Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, nor should it be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Do not block the device's cooling fans or free air movement around the device. Loose papers or other objects may not be nearer to the device than 10 cm (or 4") on any side.
- Always ensure the working load limit of the structure supporting the device.

## 1.8 Prevent personal injury

---

### To prevent personal injury

To prevent injuries and physical damage, always read this manual and all labels on the system before connecting to the wall outlet.

To prevent injuries, take note of the weight of the device.

Before attempting to remove any of the device's covers, you must turn off the device and disconnect from the wall outlet.

## 1.9 Device damage

---

### To prevent device damage

In order to ensure that correct airflow is maintained, and that the device complies with Electro-Magnetic Compatibility requirements, it should always be operated with all of it's covers in place.

Ensure that nothing can be spilled on, or dropped inside the device. If this does happen, switch off and unplug the mains supply immediately. Do not operate the device again until it has been checked by qualified service personnel.

## 1. Safety instructions

---

The device must always be mounted in a manner which ensures free flow of air into its air inlets and unimpeded evacuation of the hot air exhausted from its cooling system. Heat sensitive materials should not be placed in the path of the exhausted air.

### 1.10 Environment condition check

---

#### Environment condition check

A device must always be mounted in a manner which ensures the free flow of clean air into the device's ventilation inlets. For installations in environments where the device is subject to excessive dust, then it is highly advisable and desirable to have this dust removed prior to it reaching the device clean air supply. Devices or structures to extract or shield excessive dust well away from the device are a prerequisite; if this is not a feasible solution then measures to relocate the device to a clean air environment should be considered.

It is the clients responsibility to ensure at all times that the device is protected from the harmful effects of hostile airborne particles in the environment of the device. The manufacturer reserves the right to refuse repair if a device has been subject to negligence, abandon or improper use.

#### Ambient temperature conditions

Max. ambient temperature : +40°C or 104°F

Min. ambient temperature : 10°C or 51°F

Storage temperature: -35°C to +65°C (-31°F to 149°F)

#### Humidity Conditions

Storage: 0 to 98% relative humidity, non-condensing

Operation: 0 to 95% relative humidity, non-condensing

#### Environment

Do not install the device in a site near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust or humidity. Be aware that room heat rises to the ceiling; check that temperature near the installation site is not excessive.

#### Environment condition check

The device must always be mounted in a manner which ensures the free flow of clean air into the air intake and out of the air outlet.

### 1.11 Service

---

#### Safety On Servicing

Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock!

Refer all servicing to qualified service personnel.

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

- When the power cord or plug is damaged or frayed.
- If liquid has been spilled into the equipment.
- If the product has been exposed to rain or water.
- If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
- If the product has been dropped or the cabinet has been damaged.
- If the product exhibits a distinct change in performance, indicating a need for service.
- Replacement parts: When replacement parts are required, be sure the service technician has used original BARCO replacement parts or authorized replacement parts which have the same characteristics as the BARCO original part. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this device, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

## 1.12 Cleaning

---

### **Safety On Cleaning**

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

To keep the cabinet looking brand-new, periodically clean it with a soft cloth. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet.

## 1.13 Repacking

---

### **On Repacking**

Save the original shipping carton and packing material; they will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.



## 2. INTRODUCTION

### About this chapter

This chapter is an overview of the manual's layout, symbols and fonts used in this manual. It also introduces you to the Barco MCM-50 external warp box and describes its features and controls.

### Overview

- About this manual
- Symbols and fonts
- Key features and benefits

### Model certification name

Model certification name: MCM-400

## 2.1 About this manual



**CAUTION:** For the latest version of the product manuals, see <http://www.barco.com>.



**CAUTION:** Always check for the latest firmware version the Barco website (<http://www.barco.com>) and select myBarco on top of the page. Login to the secured website and browse to your product.

### Description

This manual contains all essential information for the operator to make full use of the MCM-50 external warp box. It includes the description of the warp box functionalities and capabilities, its operation, and step-by-step procedures for accessing controls.

This manual includes the following chapters:

1. *Safety*: safety instructions to be followed when operating the device.
2. *Introduction*: general information about the manual and about the device.
3. *Packaging*: overview of the deliverables and unpacking instructions.
4. *Facility and system requirements*: lists requirements and guidelines.
5. *Physical installation*: instructions to install the device and to make all connections.
6. *Setup and configuration*: setup of resolution, external communication and linking configuration.
7. *Getting started*: starting the device and displaying a source.
8. *OSD preferences*: Customizing the On Screen Display (OSD) or menu.
9. *Basic operation*: first level (= operator) features and image alignment
10. *Advanced operation*: second level (= specialist) features and alignment, such as mid-level geometry and color alignment.
11. *Expert operation*: third level (= expert) features and alignment, such as high end geometry, color and blending alignment.
12. *Maintenance and troubleshooting*: lists maintenance activities and troubleshooting tips.
13. *MCM-50 tools*: tools to perform a wide range of actions and to customize the device for your application.






The appendix includes Specifications, detailed information about the Remote Control Unit (RCU) and On Screen Display (OSD or menu) and environmental information.

## 2.2 Symbols and fonts

---

### Symbol overview

The following icons are used in the manual :

	Caution: provides information on potential hazards.
	Warning: provides information on potential hazard that can lead to personal injuries.
	Info: general information (about a term).
	Note: additional information about the subject.
	Tip: useful advice about the subject.

### Font overview

- Buttons and keys are indicated in **bold**.
- Menu items are indicated in *italic*.
- Step related notes, tips, warnings and cautions are printed in *italic*.
- Procedure related notes, tips, warnings and cautions are printed in **bold** between 2 lines preceded by an icon.

## 2.3 Key features and benefits

---

### Key features and benefits

The MCM-50 external warp box is intended to be used together with the F50 projector projector.

The MCM-50 external warp box offers following key features and benefits:

- Real time warping with minimal latency;
- Using proprietary advanced scaling algorithms to retain maximal detail;
- Advanced color matching using linked Dynacolor algorithms;
- Electronic blend generation;
- Pixel based alpha/beta plane correction for black/highlight levels;
- Native and scaled pattern generation;
- Supports active and passive stereo formats;



## 3. PACKAGING

### About this chapter

This chapter provides an overview of what is in the box and how to unpack.

### Overview

- Content
- Unpacking




### 3.1 Content



**No DisplayPort cable is delivered with the kit. A good shielded DisplayPort cable is necessary for good EMI performance. Bad DisplayPort cables cause loss of the image and the image only recovers by reconnecting the DisplayPort cable.**

### What's in the box

The items listed in the table below are delivered along with the device. Ensure that everything is present and intact. Contact your local dealer or **Barco** if anything is missing or damaged. Never use a damaged unit (e.g. MCM-50, power cord, power adaptor, RCU).

Description	Article number	Image	Quantity
MCM-50	R9898503		1
Remote Control Unit (RCU) + 2 batteries	R764277K		1
12 VDC power adaptor	B557282		1

### 3. Packaging

Description	Article number	Image	Quantity
Power cord (connectors C13 and NEMA 5-15)	V326111		1
Power cord (connectors C13 and CEE7)	R326103		1
Rack mount	R874169		1
Screws to tighten the rack mount	B364484		10
User Guide	R5909057		1
Safety Guide	R5905189WW		1

## 3.2 Unpacking

### Packaging

Cardboard boxes and foam are used for maximum protection during shipment.



Save the original packaging for future shipment. For maximum protection while shipping the unit, always pack it as it was packed during first delivery.

### Unpacking the MCM-50

1. Carefully cut the tape on the top lid of the box  
**Warning:** Follow the relevant safety precautions while using a knife.
2. Open the box and lift out the content.

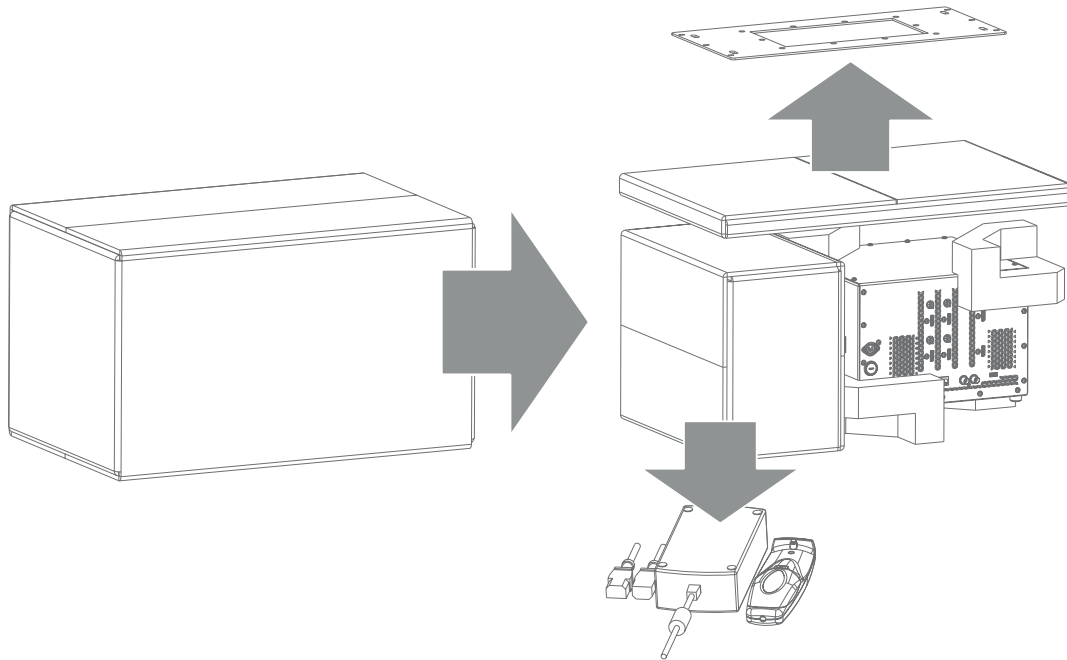


Image 3-1



## 4. FACILITY AND SYSTEM REQUIREMENTS

### About this chapter

This chapter provides information about the installation requirements such as temperature, humidity, power net, safety area around the device. Also the air intake and air outlet area guidelines are listed.

### Overview

- Environmental requirements
- Installation requirements

### 4.1 Environmental requirements

---

#### Ambient temperature conditions

Max. ambient temperature : +40°C or 104°F

Min. ambient temperature : +10°C or 50°F

Storage temperature: -35°C to +65°C (-31°F to 149°F)

#### Humidity Conditions

Storage: 0 to 98% relative humidity, non-condensing

Operation: 0 to 95% relative humidity, non-condensing

#### Environment

Do not install the device in a site near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust or humidity. Be aware that room heat rises to the ceiling; check that temperature near the installation site is not excessive.

#### Environment condition check

The device must always be mounted in a manner which ensures the free flow of clean air into the air intake and out of the air outlet.

### 4.2 Installation requirements

---

#### Rack mount

The device is 19" rack mount, 5U.

In this case the rack mount plate, which delivered with the device, must be installed.

#### Air flow guidelines

The air intake is at the front side of the device and the air exhaust is at the back side. It is necessary to keep these areas unblocked. A free area of at least 40 cm should be available at the front side of the device. A free area of at least 5 cm should be available at the back of the device.

#### 4. Facility and system requirements

---

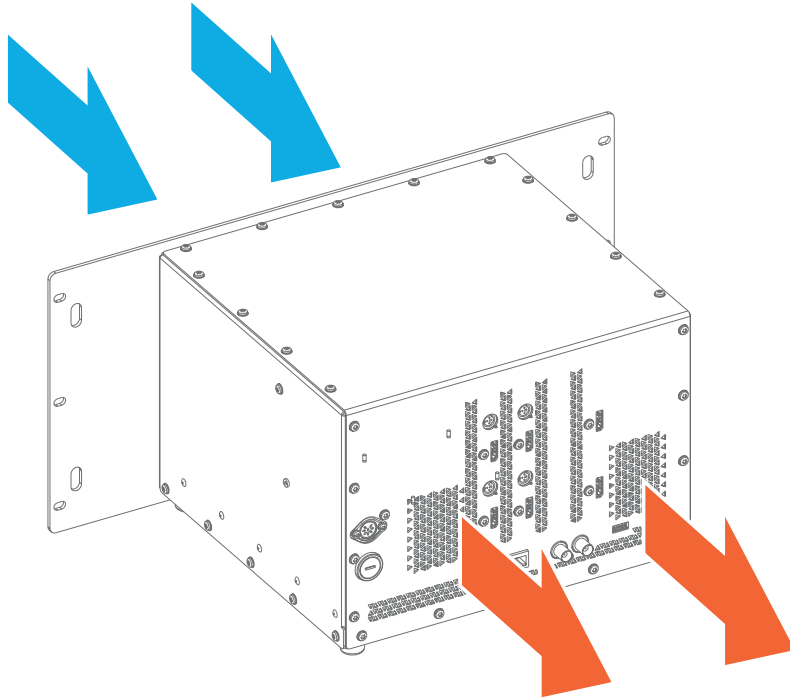


Image 4-1

## 5. PHYSICAL INSTALLATION AND CONNECTIONS

### Overview

- RCU battery installation
- Installing the rack mount plate
- DisplayPort connection
- Connecting the F50 projector
- Power connection
- Network connection

### 5.1 RCU battery installation

#### Finding the batteries for the Remote Control Unit

The batteries are not placed in the remote control unit to avoid control operation in its package, resulting in a shorter battery life time. At delivery the batteries can be found in a separated bag attached to the remote control unit. Before using your remote control, install the batteries first.

#### Installing the batteries in the Remote Control Unit

1. Push the battery cover tab a little backwards (1) while pulling the cover upwards (2).

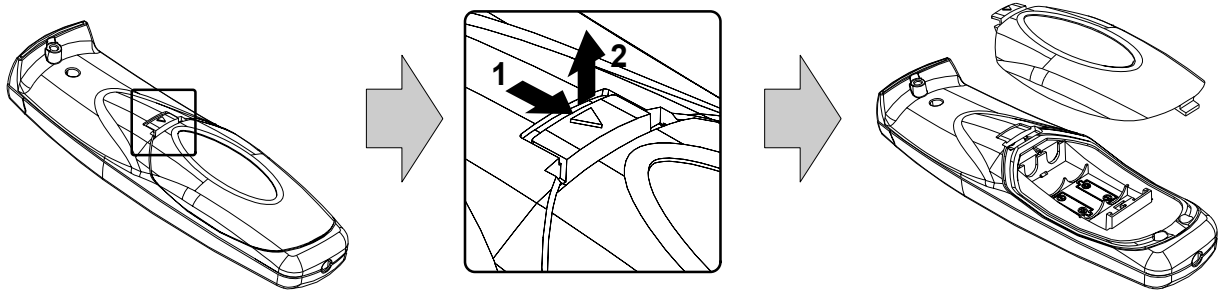


Image 5-1

2. Insert the two AA size batteries, making sure the polarities match the + and - marks inside the battery compartment.

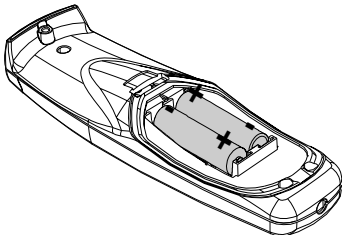


Image 5-2

3. Insert (1) the lower tab of the battery cover in the gap at the bottom of the remote control, and press (2) the cover until it clicks in place.

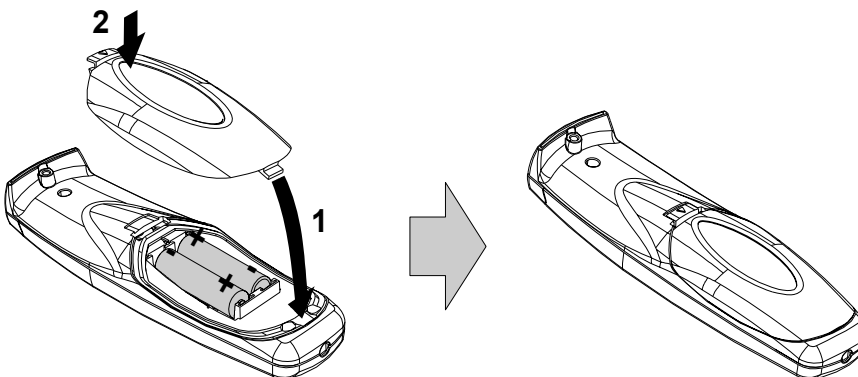


Image 5-3

### To prevent battery explosion

- Danger of explosion if battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Always replace both batteries at the same time.
- Never use an old and a new battery together in the device.
- Disposal of used batteries must be done according to the manufacturer's instruction.

## 5.2 Installing the rack mount plate

---

### Introduction

The rack mount plate which is delivered with the MCM-50 can be mounted to enable installation in a 19" rack. Device height is 5U.

### Installing the rack mount plate

1. Remove the screws from the device.
2. Fix the rack mount plate to the device using 10 screws (reference 1 image 5-4).

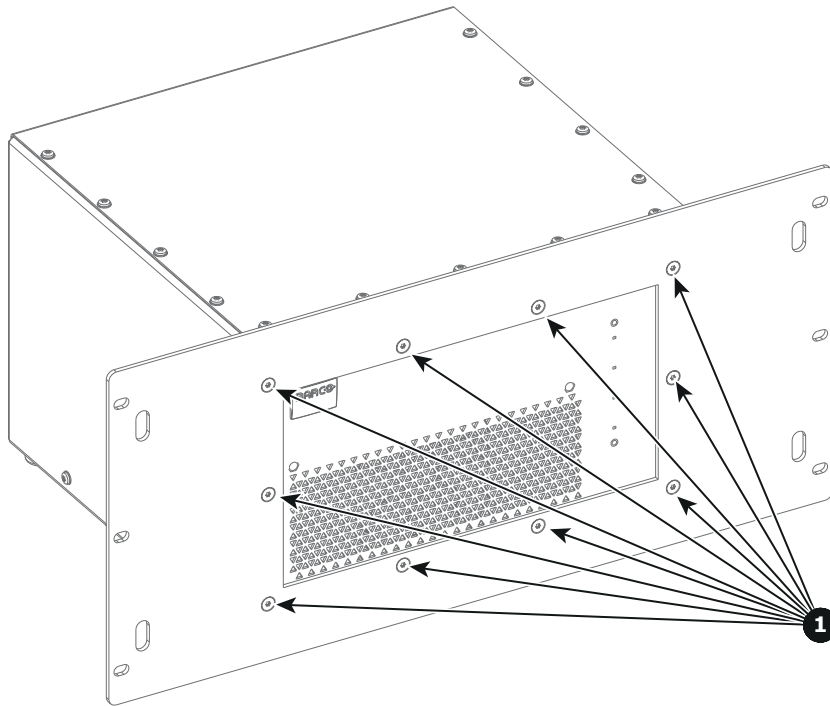


Image 5-4

3. Use the included strip of Velcro to fix the power supply to the cabinet (optional).

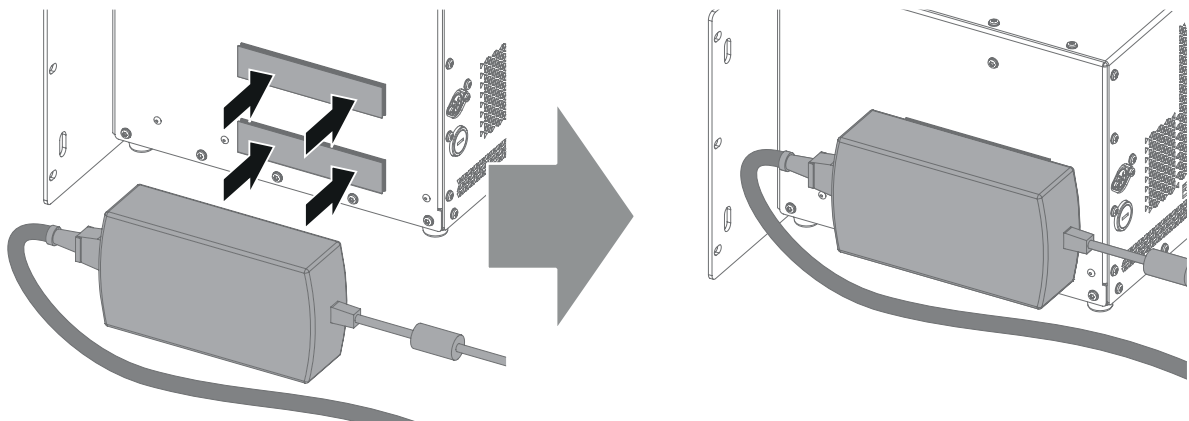


Image 5-5



## 5.3 DisplayPort connection

### How to connect

1. Connect the DisplayPort cable to one of the device's DisplayPort inputs.

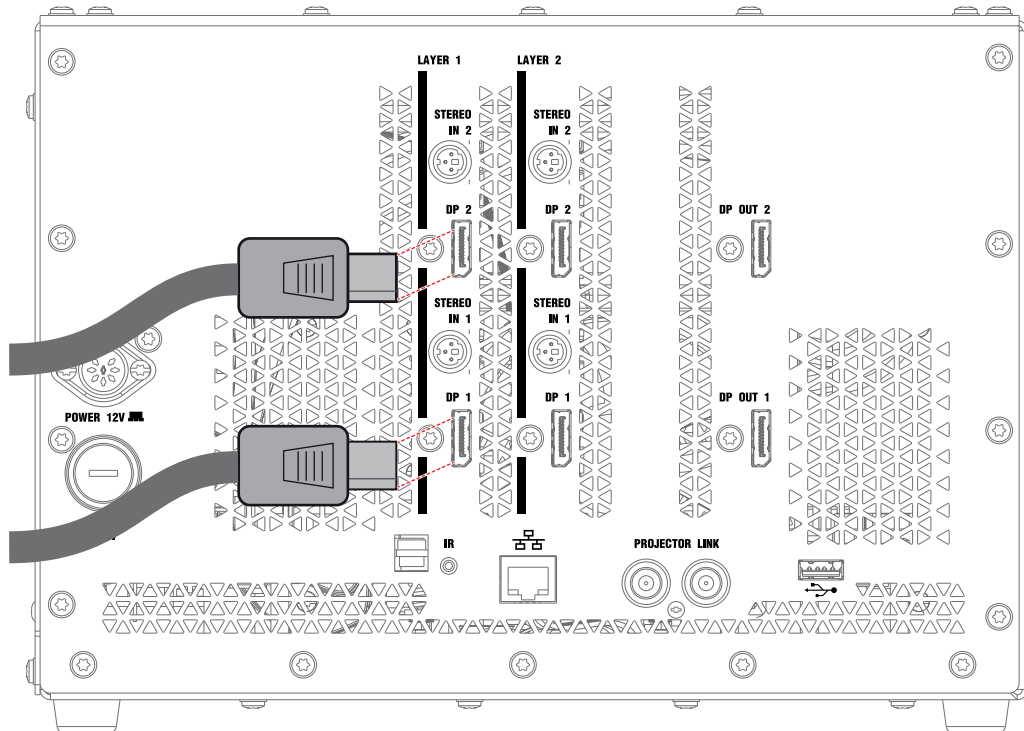


Image 5-6

## 5.4 Connecting the F50 projector

### Description

The signal from the MCM-50 to the external F50 projector is digital only. It is transmitted using DisplayPort cables. For specifications, see the concerning appendix.



The MCM-50 should always be connected to the F50 projector.

### Connecting the F50 projector

1. Connect one end of the DisplayPort cables to the DP output connector on the rear side of the MCM-50.
2. Connect the other end of the DisplayPort cables to the DP input connector of the F50 projector
  - resolution: 2560 x 1600
  - vertical refresh rate in all modes (mono, active stereo):
    - Mono:
      - **Synchronous** : 48 ... 120Hz
      - **Asynchronous** : 60Hz
    - Stereo:
      - **Synchronous** : 48 ... 120Hz
      - **Asynchronous** : 120Hz
  - signal type: DisplayPort.

## 5. Physical installation and connections

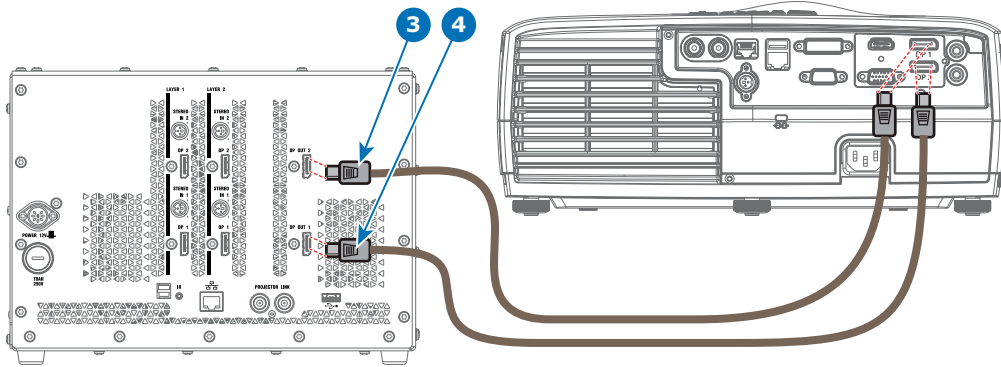


Image 5-7

- 3 DisplayPort cable for channel A between MCM-50 (DP A) and F50 projector (DP 1)
- 4 DisplayPort cable for channel B between MCM-50 (DP B) and F50 projector (DP 2)

## 5.5 Power connection



**CAUTION:** Only use the original power supply and power cables.



**CAUTION:** Do not use power supplies or power cables that are damaged. Replace it by a new original one.

### Connecting power

1. Connect the 8-pin DIN of the supplied power adaptor to the power socket (reference 1 image 5-8) on the rear side of the MCM-50.
2. Connect the other end of the power adaptor to your AC power source (100–240 VAC).

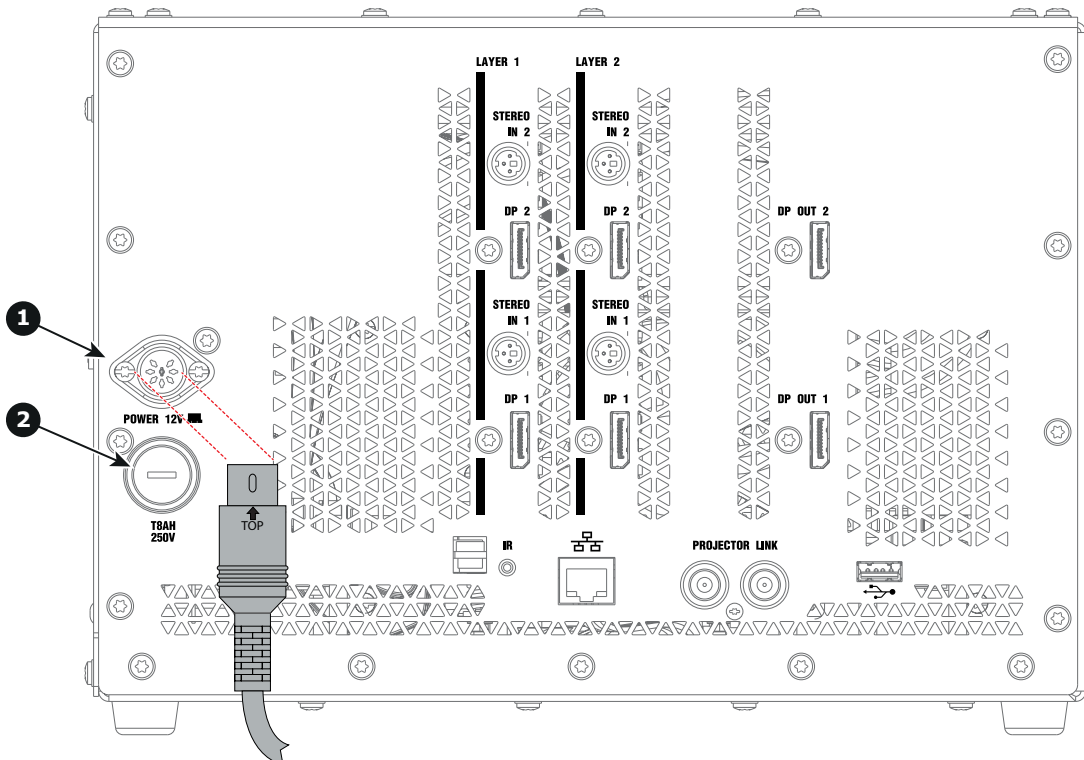


Image 5-8

Power connection

- 1 Power socket
- 2 Fuse



**CAUTION:** For continued protection against risk of fire, replace only with same type and rating fuse: T 8 AH / 250V. (reference 2 image 5-8).

## 5.6 Network connection

### What can be done ?

The device can be connected to a network allowing it to be accessed from any connected network device. The Ethernet connection can be used to upload/download device software and/or to set up communication (TCP-packets) with the device. This network can be a local area network or a small dedicated network.

Following operations are made possible :

- file transfer for firmware upgrade
- storage of multiple device configurations and set ups
- wide range of control possibilities
- linking the devices to allow uniform color (Linked Dynacolor).
- ...

The connection to the device can be done via a crossed cable or via a switch on the local network (LAN).

### Connecting the device to a network

1. Connect the RJ 45 male plug to the device's RJ 45 female connector.

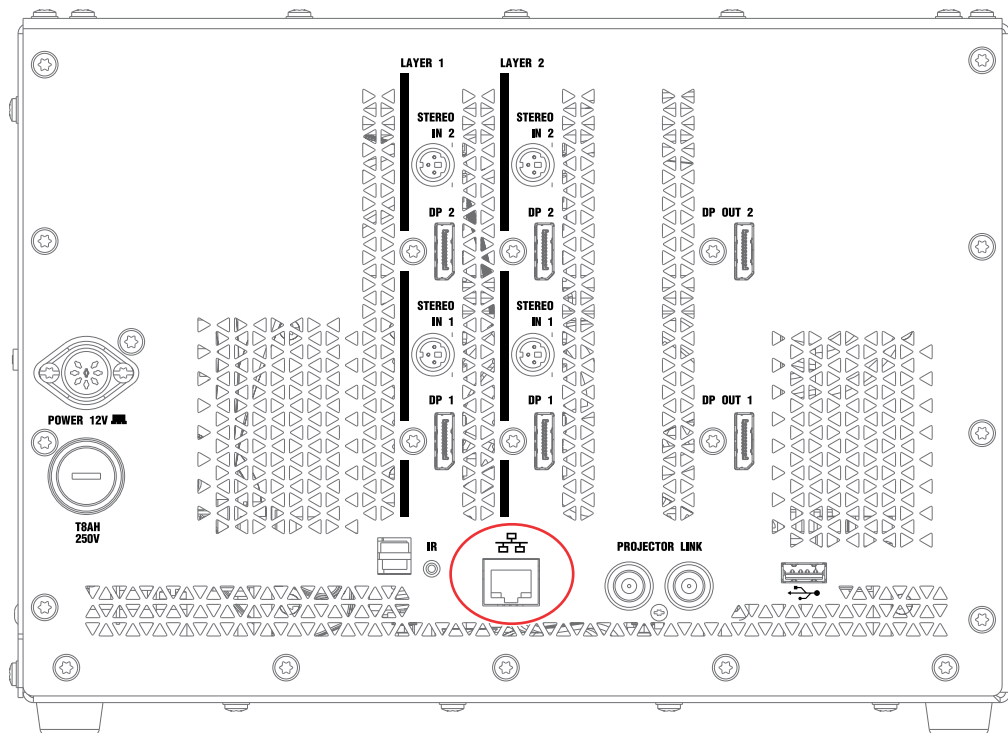


Image 5-9  
Ethernet connection



See *Network settings* to set the communication port.



The linking of devices is treated in the section “Setup of the linked devices in a multichannel system”.



## 6. SETUP AND CONFIGURATION

### About this chapter

This chapter explains the setup and configuration of the MCM-50.

### Overview

- Setting the RCU address
- Powering the MCM-50
- Activating the MCM-50
- Setting the MCM-50 address
- Network configuration
- Linking MCM-50 devices in a multi-channel system

### Basic setup (example)

The drawing below is a representation of a random basic setup of a F50 projector using the MCM-50 external warp box.

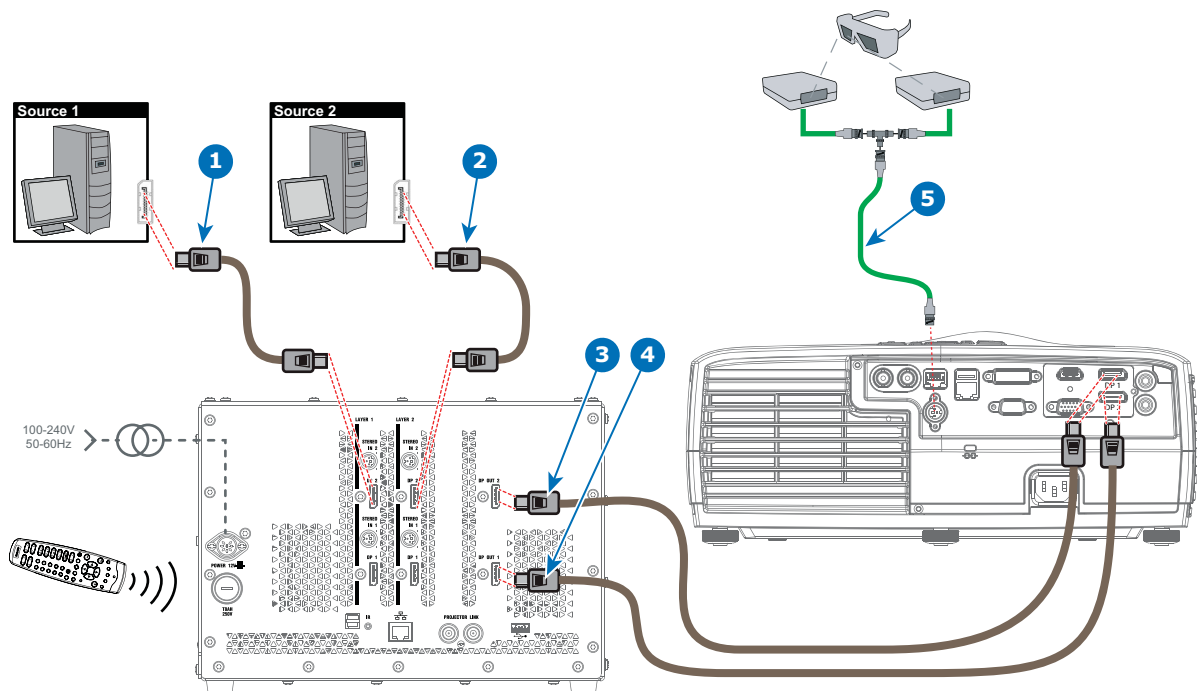


Image 6-1

- 1 DisplayPort connection with input channel 1.
- 2 DisplayPort connection with input channel 2.
- 3 DisplayPort connection for channel A between MCM-50 and DP 1 on F50 series projector.
- 4 DisplayPort connection for channel B between MCM-50 and DP 2 on F50 series projector.
- 5 Dedicated stereo emitter cable.

## 6.1 Setting the RCU address

### RCU address

To establish communication, the RCU (Remote Control Unit) address must be set to the same value as the MCM-50 IR (or RC5) address. The user can change the IR address of the MCM-50 at any time. If you do so, the RCU address must be reprogrammed accordingly.

Two addresses can be set in the MCM-50: a common address and an MCM-50 address. The common address can be used to address multiple devices at once, while the MCM-50 address is used to address one single device at a time.



The default address for the RCU is 0.



The RCU address can be set in the range 0..9.

---



See "Setting the MCM-50 address", page 28 to learn how to check/set the MCM-50 address.

---

### Setting the RCU address

1. Use a pencil to press the sunk-down **Address** button on the RCU.

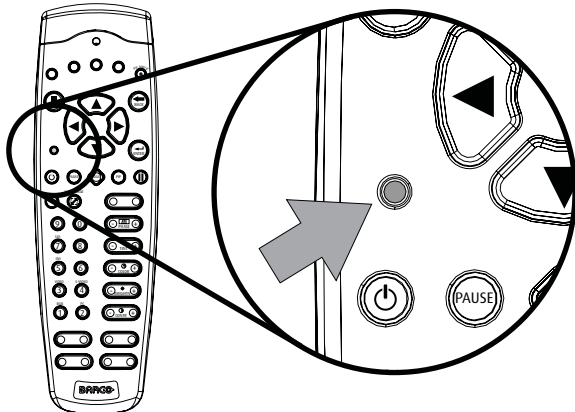


Image 6-2  
RCU: Address button

2. Within 5 seconds after pressing the **Address** button, press one of the digit buttons to enter its value as RCU serial address.

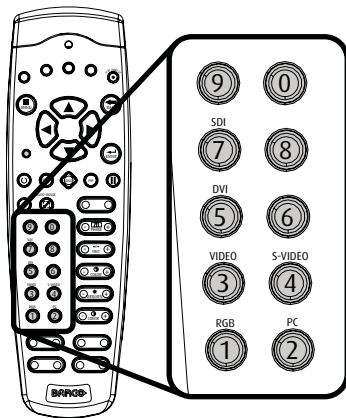


Image 6-3  
RCU: Digit buttons

### Example

Press the **Address** button and within 5 seconds, press **4** to program the RCU address to "4".



To guarantee good communication, point the RCU towards the one of the infrared receivers of the MCM-50.

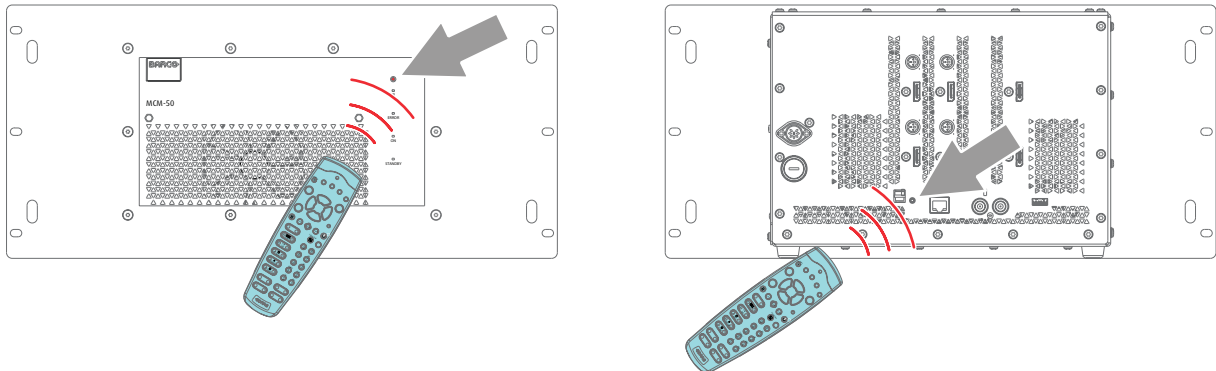


Image 6-4  
IR receiver



If no button is pressed within 5 seconds after the Address button has been pressed, the RCU serial address remains unchanged.



Each MCM-50 has a common address (which by default is 0). So programming the RCU address to 0 will establish communication to any brand new MCM-50 as it comes out of the box.

## 6.2 Powering the MCM-50

### Introduction

As soon as the AC mains power adapter is connected to both the MCM-50 unit and the wall outlet, the MCM-50 starts configuring and goes to active state. If the MCM-50 is part of a full display system - which will be the case - a specified power-on sequence must be followed to allow EDID communication.

### Powering the MCM-50

Connect the power supply to both the MCM-50 and the wall outlet.

### Power-on sequence

1. Network switch (if present); allows IP address assignment to MCM-50 in case of a DHCP/DNS network;
2. Projector connected with the MCM-50. (F50 series projector).
3. MCM-50;
4. Sources; the sources can now read the EDID data on the MCM-50 inputs.

## 6.3 Activating the MCM-50

### Introduction

The MCM-50 can be switched to standby and back to active state at any time.

### Switching the MCM-50 from active state to standby?

Press the standby button on the RCU for 3 seconds.

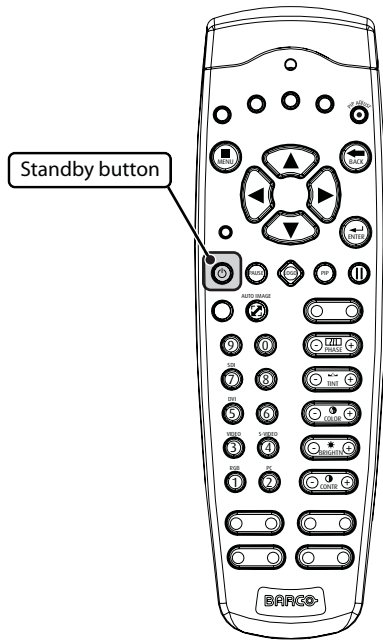


Image 6-5  
RCU: standby button

### Switching the MCM-50 from standby to active state?

Press the standby button on the RCU (do not press longer than 1 second).

## 6.4 Setting the MCM-50 address

### Introduction

The MCM-50 has two different IR addresses:

- Common address.
- Device address;

The **Common address** is typically used to address multiple MCM-50s at once or to address the device at its very first use. By default, the common address is set to **0**, but it can be set to **1** as well to avoid interaction with other non-Barco devices, programmed to the same IR address.

The **Device address** is used to address one MCM-50 at a time. This address can be set in the range 0..255 (default is 1). It must be taken into account however that a standard RCU can only communicate with devices having their address set in the range 0..9.

The MCM-50 address and the RCU address must be set to the same value to allow communication.

### Setting the MCM-50 address

1. In the OSD, navigate to *Installation > IR address...* and press **ENTER** to select.

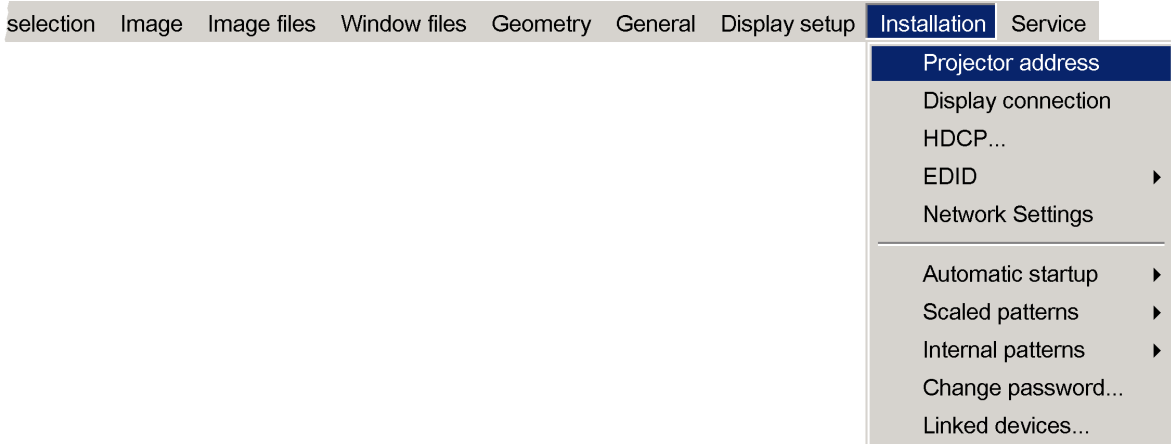


Image 6-6



2. In the *addresses* dialog box, fill out the desired value for the addresses.
  - Device address.
  - Common RC5 address

The screenshot shows a dialog box titled "IR address". It contains two input fields: "Unique RC5 address" with the value "5" and "Common RC5 address" with the value "0".

Image 6-7

3. Exit the menu.

## 6.5 Network configuration

### Description

The MCM-50 can be connected to a network allowing it to be accessed from and controlled by a device within the same (local) network. The network connection can be used for following:

- file transfer;
- remote control;
- MCM-50 firmware upgrade;
- debug logging;
- debugging.

Two types of network configuration can be set:

- Private subnet: unique fixed IP addresses are used;
- DHCP network: the MCM-50 is connected to a DHCP network where IP addresses are assigned automatically.

Network type	Description
Fixed IP	<p>Manually assign an IP address, Subnet Mask, Default Gateway address.</p> <ul style="list-style-type: none"> <li>• Set the <b>IP address</b> to the desired value. It identifies the MCM-50 location on the local network. The IP address must be unique within the local subnet.</li> <li>• Set the <b>Subnet Mask</b> as appropriate for the local subnet.</li> <li>• Set the <b>Default Gateway</b> to the IP address of the local router on the same local network as this will be used to forward traffic to destinations beyond the local network. If there is no router on the MCM-50 local network then set this field to any unique IP address on the local network.</li> </ul>
DHCP	<p>Enabling DHCP is meant for automatic IP address assignment.</p> <p>A DHCP network lets network administrators centrally manage and automate the assignment of IP addresses in an organization's network. This is done by a DHCP server in the same network. The DHCP server must be up and running at any time.</p> <p>Depending on the lease time, a new IP address can be assigned to the MCM-50 on a regular base.</p>

### Network settings

The Ethernet configuration settings of the MCM-50 are explained in the table below.

Parameter	Description	Type of field
<i>MAC Address</i>	MAC Address of the MCM-50 (programmed into the Ethernet board)	Informative only
<i>IP Address (Current)</i>	Current IP Address of the MCM-50	Informative only
<i>Current Subnet Mask</i>	Subnet Mask	Informative only
<i>Current Gateway</i>	Gateway	Informative only
<i>Use Fixed IP</i>	When this radio button is selected, the IP address, Subnet Mask and Gateway (optional) need to be entered manually.	Tickable radio button

## 6. Setup and configuration

Parameter	Description	Type of field
<i>Use DHCP</i>	When this radio button is selected, the MCM-50 will dynamically obtain its IP address from the DHCP server. This implies that a DHCP server is active in the local network and that a Host name is entered in the MCM-50.	Tickable radio button
<i>IP Address</i>	IP address in case of Fixed IP	Editable if <i>Use Fixed IP</i> is set.
<i>Subnet Mask</i>	Subnet Mask in case of Fixed IP	Editable if <i>Use Fixed IP</i> is set.
<i>Gateway</i>	Gateway IP address (optional) in case of Fixed IP	Editable if <i>Use Fixed IP</i> is set.
<i>Host name</i>	Host name in case of DHCP network	Editable if <i>Use DHCP</i> is set.

### Overview

- Configuring the MCM-50 for a Private Subnet
- Configuring the MCM-50 for a DHCP network

### 6.5.1 Configuring the MCM-50 for a Private Subnet

#### Description

To configure the MCM-50 for a Private Subnet, the following steps are required:

- connect the MCM-50 to the network;
- in the MCM-50, enter a fixed IP address, Subnet Mask and optionally a Gateway IP address;
- set the network configuration of any device that is connected to the same subnet to a fixed IP address within the same subnet range.

#### Setting a fixed IP address in the MCM-50

1. In the OSD, navigate to *Installation > Network Settings...* and press **ENTER** to select.

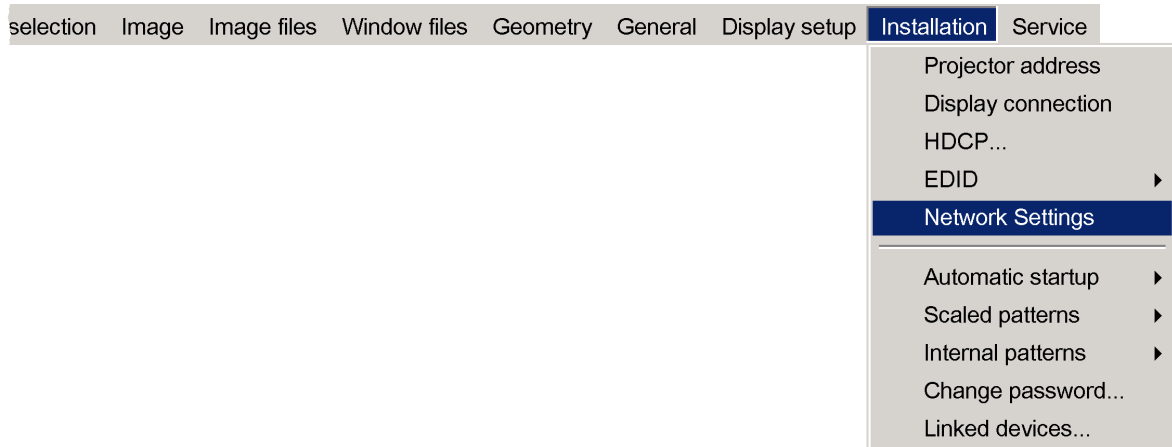


Image 6-8

2. In the dialog box that appears, navigate to *Use Fixed IP* and press **ENTER** to select.

**Network Settings**

Current

MAC Address: 00.04.a5.81.0e.26

IP Address: 010.192.000.054

Subnet Mask: 255.255.254.000

Gateway: 010.192.000.001

Use Fixed IP

Use DHCP

Fixed IP settings

IP Address: 010.192.000.054

Subnet Mask: 255.255.254.000

Gateway: 010.192.000.001

DHCP settings

Hostname: 0

Apply settings    Cancel

Image 6-9

The **Fixed IP** settings fields are enabled.

3. Enter the following parameters:

- IP address;
- Subnet Mask;
- Gateway (optional).

4. Select **Apply settings**.

A dialog box is displayed, showing the progress of the update.

5. Exit the menu.

### 6.5.2 Configuring the MCM-50 for a DHCP network



**CAUTION:** Make sure that a DHCP server is available and active in the network.

#### Description

In DHCP setup, the IP address is assigned automatically. No network settings except for Hostname have to be entered manually.

To configure the MCM-50 for a DHCP enabled network, the following steps are required:

- connect the MCM-50 to the DHCP network;
- in the MCM-50, enable DHCP.



In standard conditions, the network detection only takes a few seconds. This means that the total time needed to go from power ON to active mode is only a few seconds. This value can vary depending on the speed of the network connection.

When the DHCP mode is enabled but no DHCP server is running on the network or no Ethernet cable is plugged in, the network detection cannot be completed: after 5 seconds a time-out occurs and the network configuration retreats to a default mode in which a fixed IP address (169.254.0.1) is set. Once the Ethernet cable is connected, or the DHCP server becomes active again, the configuration automatically switches to DHCP enabled and tries to obtain an IP address from the DHCP server again.

#### Enabling DHCP in the MCM-50

1. Connect the MCM-50 to a DHCP network.
2. In the OSD, navigate to *Installation > Network Settings...* and press **ENTER** to select.

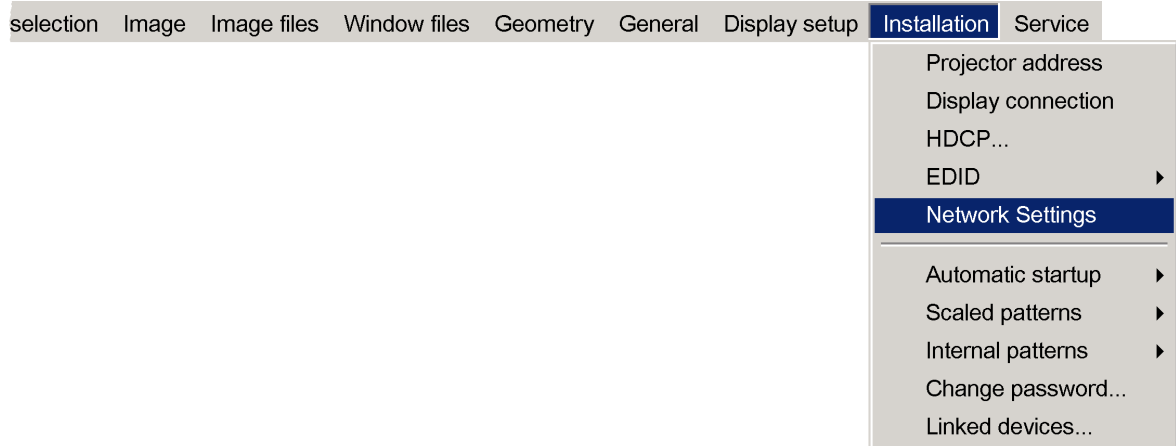


Image 6-10

3. In the dialog box that appears, navigate to *Use DHCP* and press **ENTER** to select.

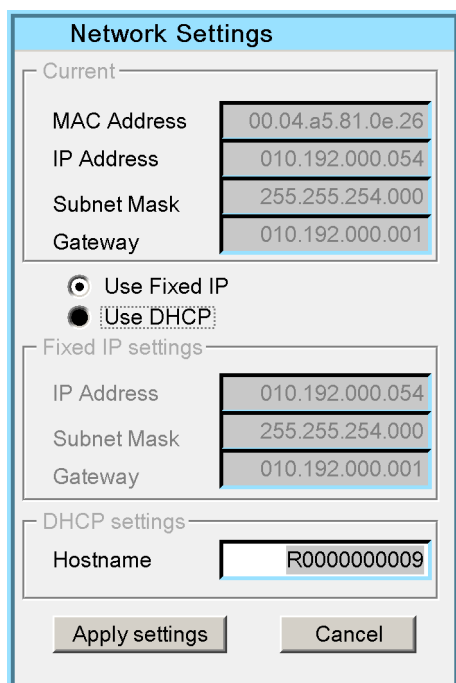


Image 6-11

The **DHCP settings** field is enabled.

4. In the **Hostname** edit box, enter the Host name of the MCM-50.

5. Select **Apply settings**.

A dialog box is displayed, showing the progress of the update.

6. Exit the menu.

## 6.6 Linking MCM-50 devices in a multi-channel system

### Description

It is possible to perform some alignment steps in multiple channel display systems in a semi-automatic way by linking multiple MCM-50 devices. In this case, all MCM-50 devices of the display system must be linked through Ethernet and one of them must be assigned to be the Master.

The *Linked Devices* dialog box of the MCM-50 allows to link up to 50 (Slave) MCM-50 devices to a single Master. The way to link MCM-50 devices is as follows:

- Make sure non of the Slave MCM-50 devices is assigned as *Master*;
- Assign the Master MCM-50 as being the Master;
- In the Master MCM-50, define all Slave MCM-50 devices (IP address or Host name);
- Decide for which Slave MCM-50 devices the linking must be activated and what features need to be linked.

During alignment, one can now choose to match the colors of all projectors or monitors by simply clicking one of the Dynacolor buttons. This assumes however that colors have been accurately measured and defined in the MCM-50 for each channel of the display system. This can only be done by a Barco trained and qualified technician.

### Setting an MCM-50 to be Master

1. In the OSD of the MCM-50 to be Master, navigate to *Installation > Linked devices...* and press **ENTER** to select.

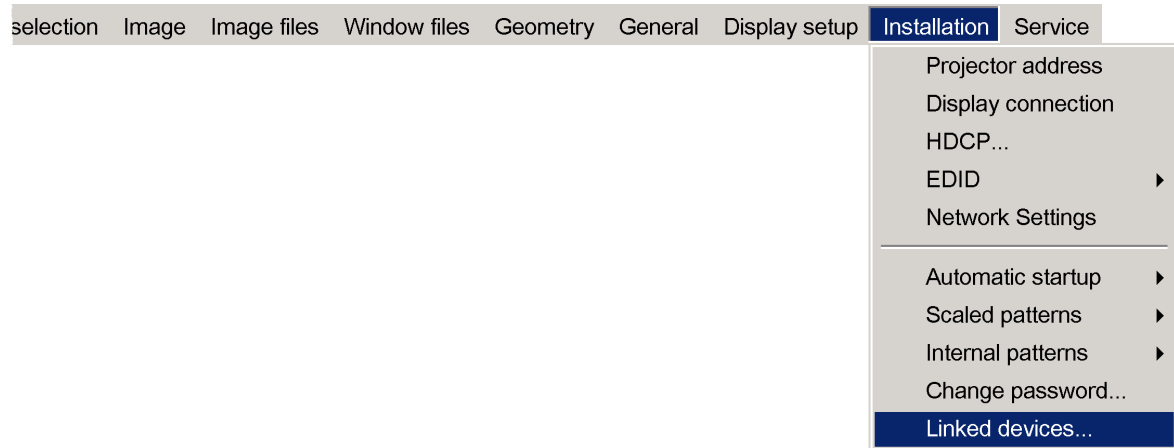


Image 6-12

2. In the dialog box that appears, set the Master check box.

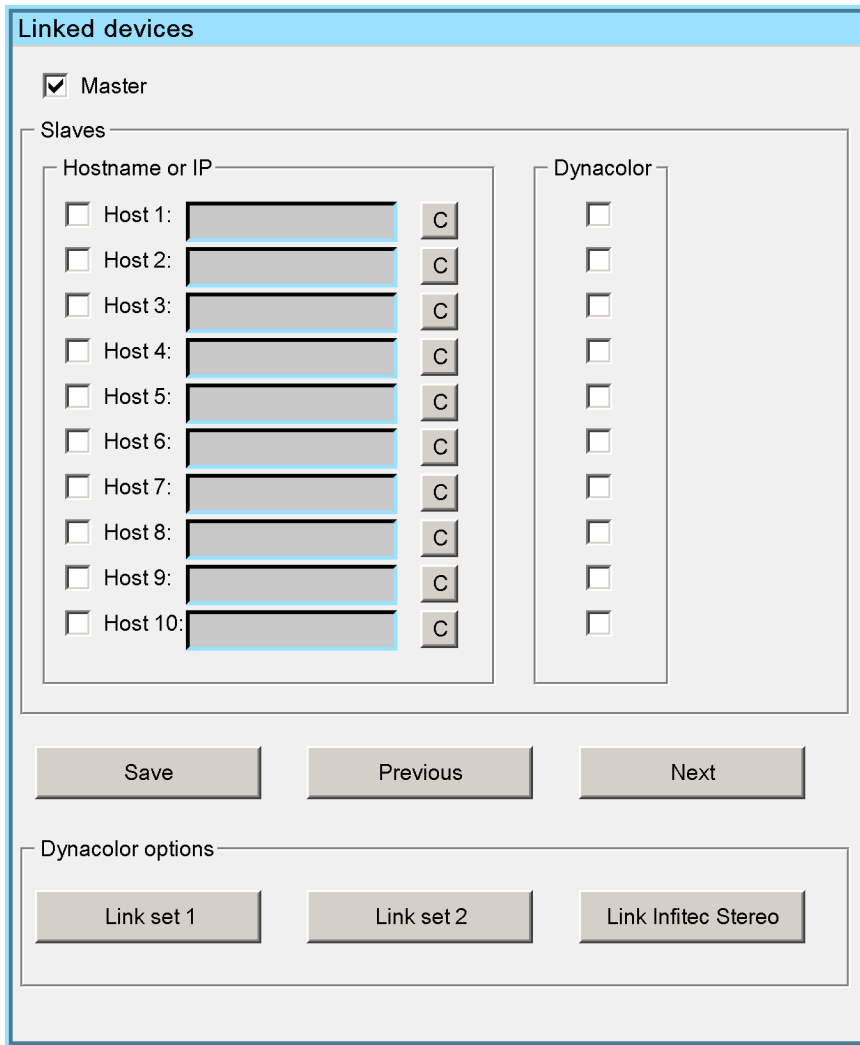


Image 6-13

### Defining the Slave devices in the Master MCM-50

1. In the OSD of the Master MCM-50, navigate to *Installation > Linked devices...* and press **ENTER** to select.

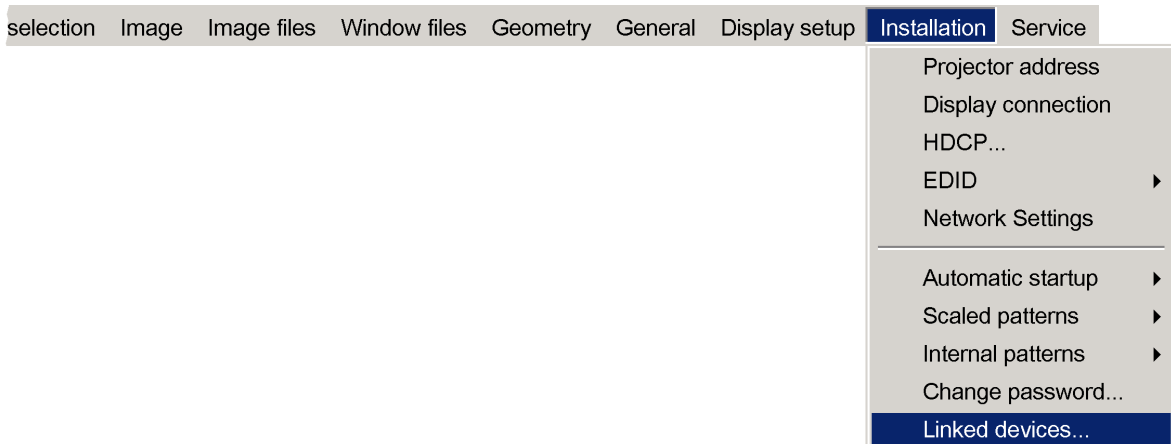


Image 6-14

2. In the dialog box that appears, select the Host **x** checkbox and press **ENTER**.  
**Note:** *x* represents the number of the Host.

The **IP address** edit box is enabled.

3. Fill in the **IP address** or **Hostname** of the Slave MCM-50.

**Linked devices**

Master

Slaves

Hostname or IP

Host 1: 010.192.000.054 C

Host 2: C

Host 3: C

Host 4: C

Host 5: C

Host 6: C

Host 7: C

Host 8: C

Host 9: C

Host 10: C

Dynacolor

Save Previous Next

Dynacolor options

Link set 1 Link set 2 Link Infitec Stereo

Image 6-15

**Note:** To clear an IP address or Host name from the edit box, click the **C** button.

- Set the Dynacolor checkbox if the color settings of the Slave MCM-50 should be controlled by the master during color alignment.

### Setting an MCM-50 to be Slave

- In the OSD of the MCM-50s to be Slave, navigate to *Installation > Linked devices...* and press **ENTER** to select.

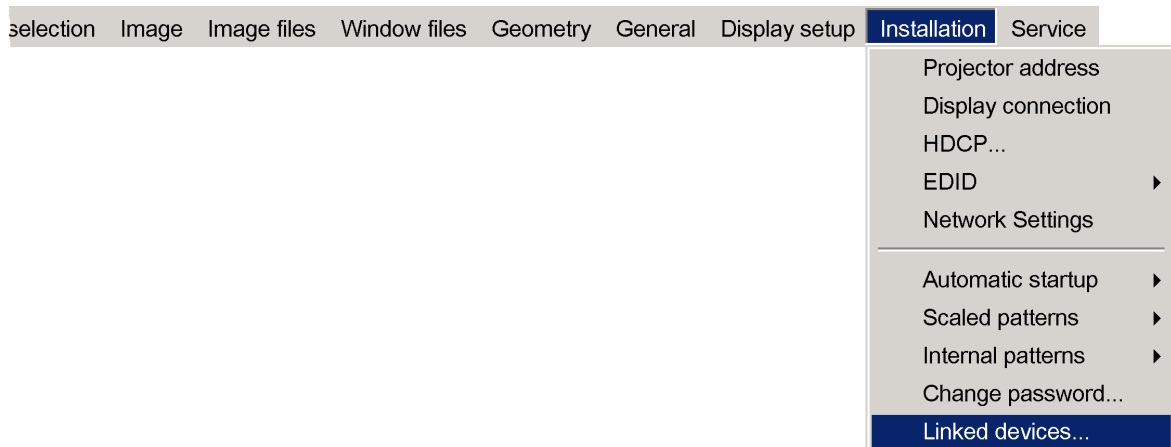


Image 6-16

- In the dialog box that appears, clear the Master check box.

**Linked devices**

Master

Slaves

Hostname or IP		Dynacolor	
<input type="checkbox"/> Host 1:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 2:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 3:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 4:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 5:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 6:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 7:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 8:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 9:	<input type="text"/>	<input type="checkbox"/>	
<input type="checkbox"/> Host 10:	<input type="text"/>	<input type="checkbox"/>	

Dynacolor options

Image 6-17



## 7. GETTING STARTED

### About this chapter

Once the device is installed, set up and configured, it is ready for daily use and/or for advanced configuration and alignment. This chapter describes basic procedures.

### Overview

- Starting the MCM-50
- Displaying a single source
- Displaying multiple sources: Stitched Layouts
- Basic image adjustment

### 7.1 Starting the MCM-50

#### Power up the MCM-50

See "Powering the MCM-50", page 27.

#### Activate the MCM-50

See "Activating the MCM-50", page 27.

### 7.2 Displaying a single source

#### Description

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

#### How to select a source from OSD?

1. In the OSD, navigate to *Source selection* and open the drop down menu.
2. Select the source to be displayed.

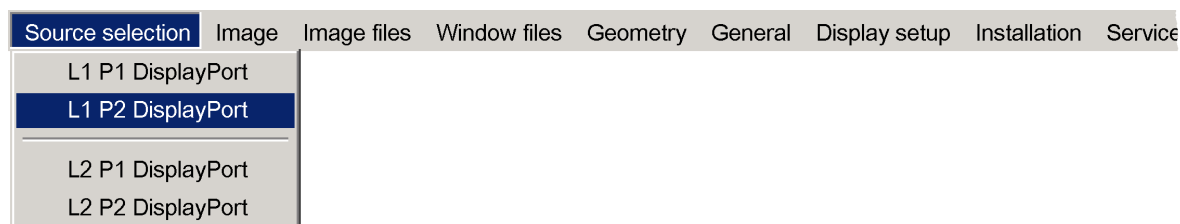


Image 7-1

3. Press **ENTER** to display the selected source.



An available source is indicated by a Barco logo  in the prefix. A displayed source is indicated by a bullet in the prefix.

### 7.3 Displaying multiple sources: Stitched Layouts

#### Introduction

The first time you use your new MCM-50, the selected source is displayed in the device's native resolution (2x 1280 x 1600@60 Hz (Mono)). 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 **Stitch Layout**: the sources are stitched together.

## 7. Getting started

Depending on the selected Stitch Layout you can for each input select in which half or quadrant it must be displayed.

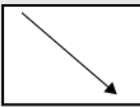
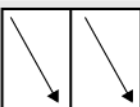

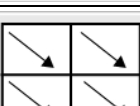

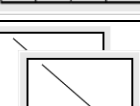
Further you can select the sync of which input (or source) must be used by the projector to display the full image.

The selected Stitch Layout type is stored in a **Window File**, that is an XML configuration file.



**The scan direction defined in the Window file must meet the source signal scan direction.**

The table below describes the different Stitch Layouts and scan directions.

Type of layout	Description	Mode
 : Single (Top down)	The source is displayed in full screen with image being scanned from top left to bottom right in one continuous process.	Mono / Active stereo
 : Dual 1 x 2 (Top down)	Two inputs are required. The sources are displayed next to each other. The images are scanned from top left to bottom right.	Mono / Active stereo
 : Dual 2 x 1 (Top down)	Two inputs are required. The sources are displayed on top of each other. The images are scanned from top left to bottom right.	Mono / Active stereo
 : Quad 2 x 2 (Top down)	Four inputs are required. The sources are displayed in four quadrants. The images in all the quadrants are scanned from top left to bottom right.	Mono / Active stereo
 : Quad 1 x 4 (Top down)	Four inputs are required. The sources are displayed next to each other. The images in all the quadrants are scanned from top left to bottom right.	Mono / Active stereo
 : 2 x single (Top down)	Two inputs are required. The sources are displayed one above the other. The images are scanned from top left to bottom right.	Passive stereo

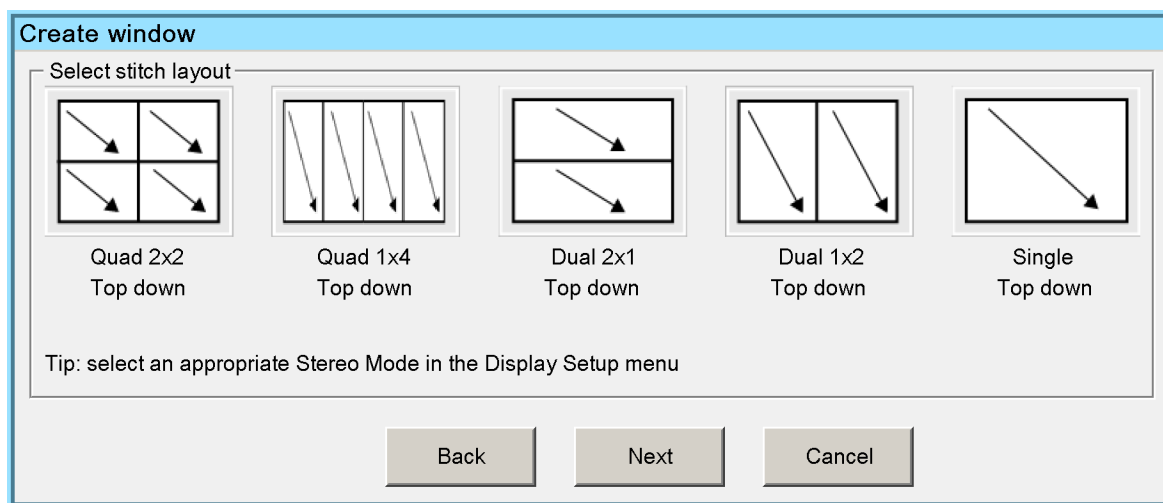


Image 7-2

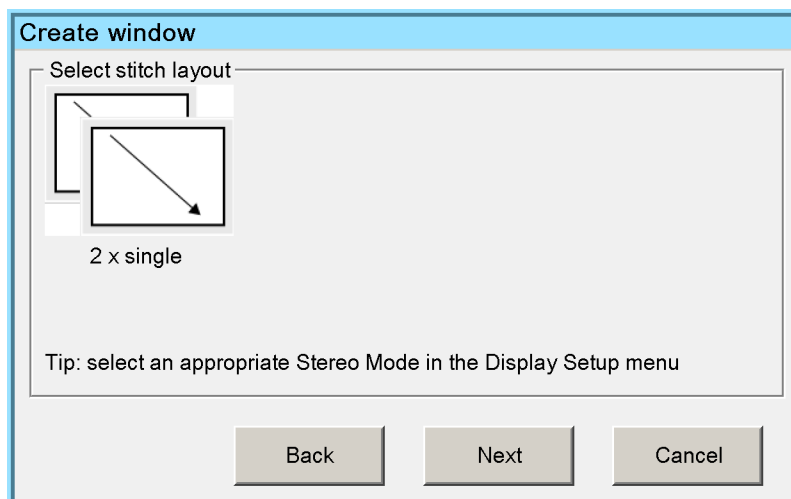


Image 7-3

### Positioning and scaling of the source signals

If one single source signal is used to be displayed full screen (Stitch Layout = *Single*), the image is stretched or shrunk to the device's native resolution.

If multiple source signals are used to make up the full image (Stitch Layout = *Dual* or *Quad*) and they all have the **same resolution**, they are first stitched, then stretched or shrunk to fit the device's native resolution and aspect ratio.

If multiple source signals are used to make up the full image (Stitch Layout = *Dual* or *Quad*) and they have **different resolutions** or if one signal is missing, each source signal is centered in its target area in its native resolution. If the source image is too large, it is cropped. If it is too small, black borders are visible around the image. If a signal is missing, the corresponding half or quadrant is blanked.

#### 7.3.1 Details on Stitched Layouts

##### Lock source

To maintain synchronous operation amongst the image halves or quadrants, the frame start (i.e. vertical sync) of each source that make up the Stitch Layout may deviate no more than 150 lines from the frame start of the Lock source. Moreover, it must be less than the Sync Variance Limit setting (see concerning topic).

If the deviation of the frame start of each source (in lines) that make up the Stitch layout is known in relation to the frame start of the Lock source, and if this deviation is within specification of the projector, the Sync Variance Limit must be set to a value that is a bit higher.

#### 7.3.2 Creating a Window file

##### Example

As an example, creating a Window file for Stitch Layout Dual 2 x 1 (Top down) is explained for a projector in table front configuration. The procedures for the other Stitch Layouts and other configurations are similar.

##### How to create a Window file?

1. In the OSD, navigate to *Window files > Create > Mono / Active stereo [or Passive Stereo]...* and press **ENTER** to select.

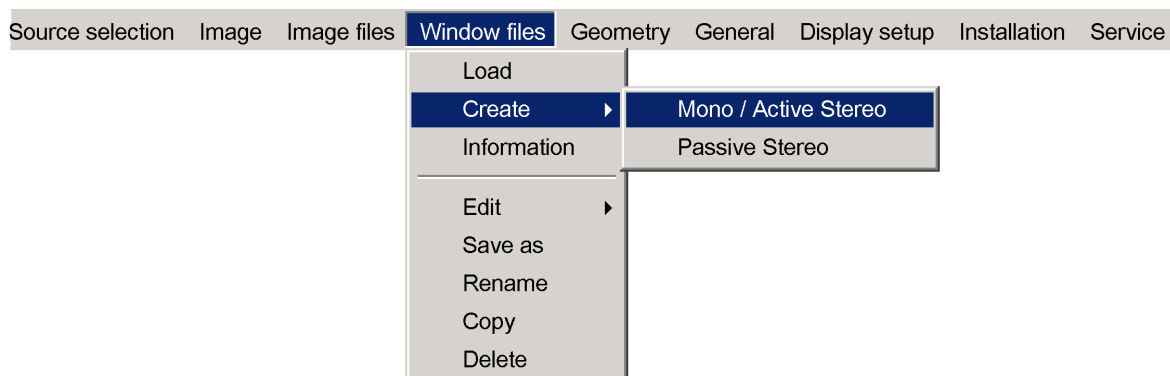


Image 7-4

## 7. Getting started

The following dialog appears.

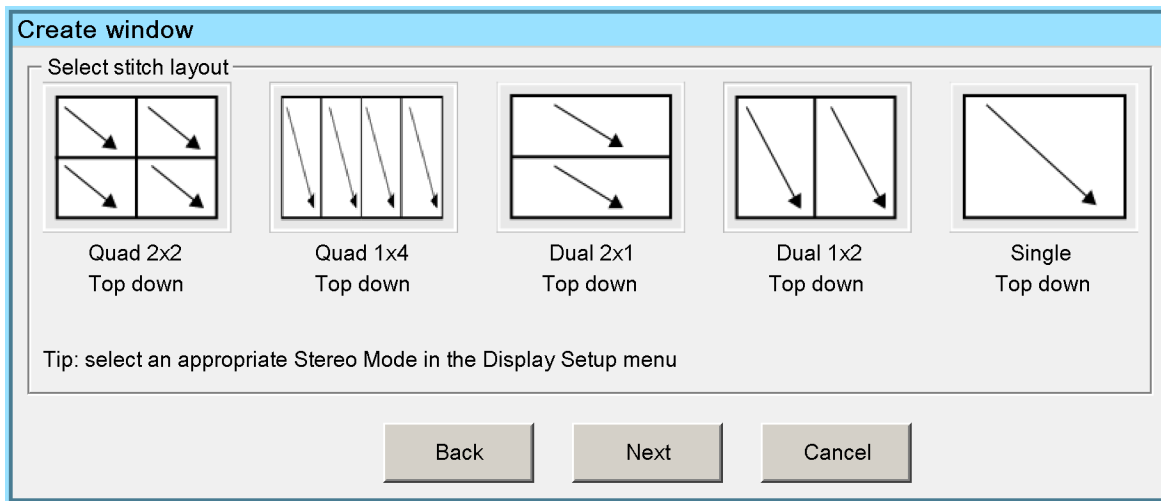


Image 7-5

2. Select Stitch Layout Dual 2 x 1 (Top down) and press **Next** to continue.
3. In the *Sources* section, click the source (or input) to be displayed on the top half of the image.

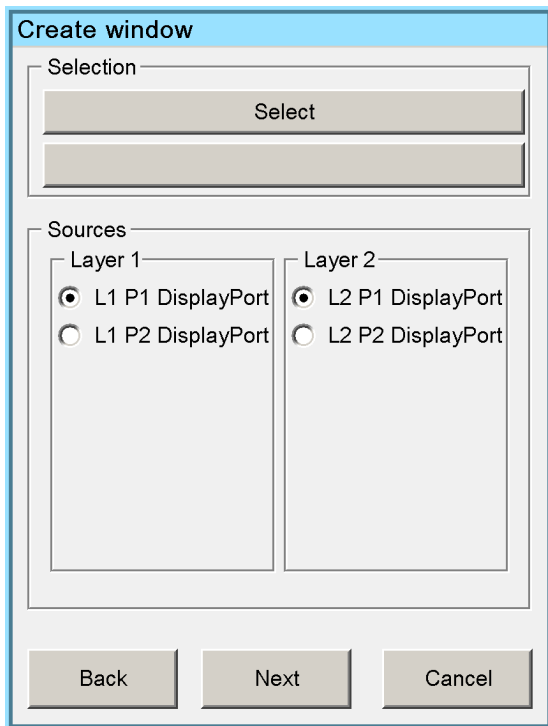


Image 7-6

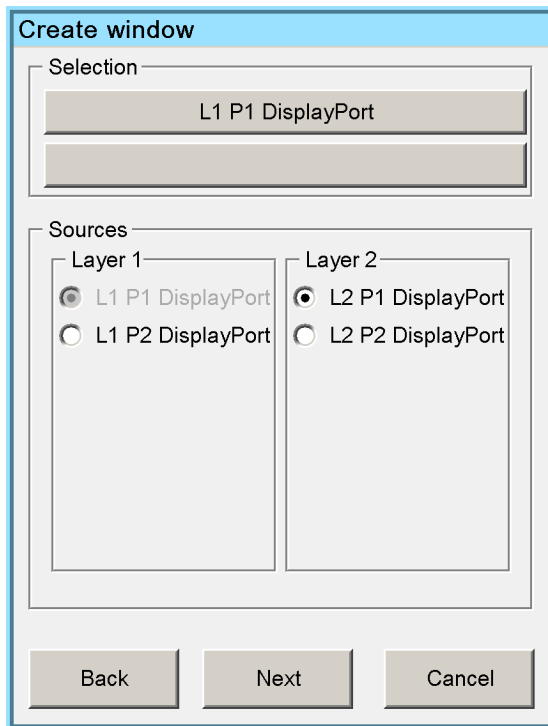


Image 7-7

The selected source appears in the first button (indicating the top half) of the *Selection* section and is disabled from the *Sources* section.

4. Select a source (or input) to be displayed on the bottom image half.

Image 7-8

The selected source appears in the second button (indicating the bottom half) of the *Selection* section and is disabled from the *Sources* section.

5. Click **Next**.
6. In the section *Lock on source*, select the input from which the sync should be used to display the image.

Image 7-9

7. Click **Finish** to confirm.

**Note:** The image might take a few seconds to load according to the settings.

### 7.3.3 Viewing Window file information

#### Description

You can view details about the currently selected Window file in the *Window information* dialog.

- *Window properties* field: information about the window;
- *Source properties* field: details about the sources used in the selected layout;
- *Source sync* phase: indication of the phase of the sources in the selected layout. The slider of the **lock source** is in the center position of the slider bar. If all sources are locked externally – as they should be – their sliders will also be positioned in the center of the respective slider bars. Only if a source is not in sync with the lock source, the corresponding slider is drifting on its slider bar, indicating an external sync problem to be solved, since it results in image artifacts.

#### How to view Window file information?

1. In the OSD, navigate to *Window files > Information...* and press **ENTER** to select.

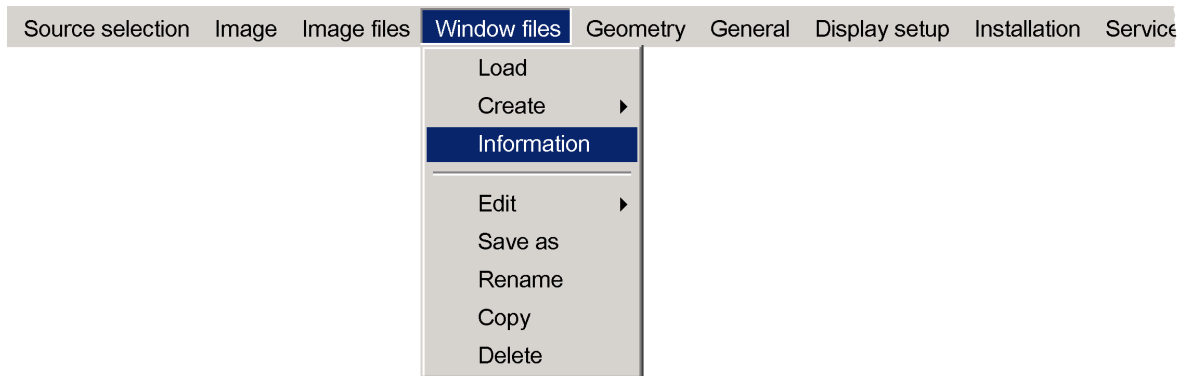


Image 7-10

2. You can view the information about the Window file that is currently active.

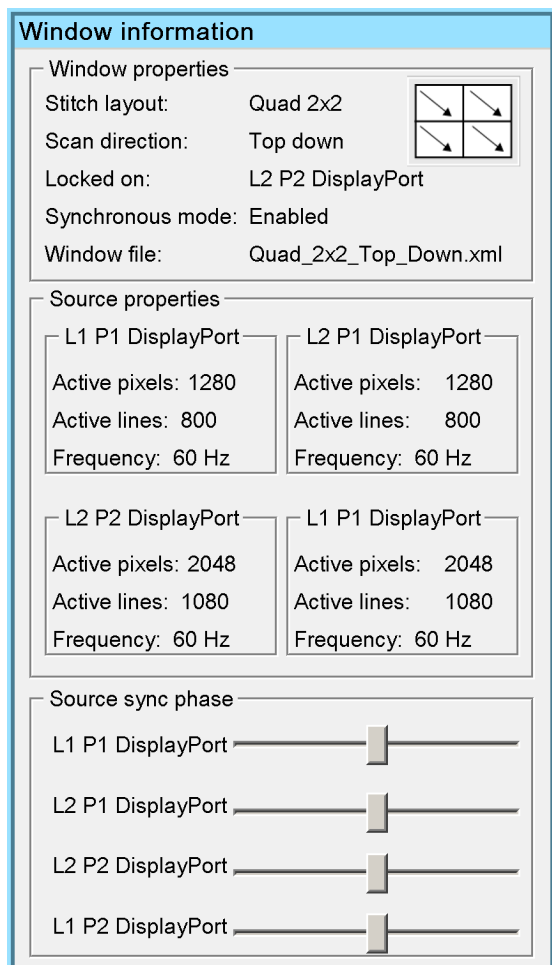


Image 7-11

### 7.3.4 Editing a Window file

#### Description

An existing Window file can be edited at any time using the *Edit* option. The following procedures explain the steps to edit a Window file.

#### Overview

- Locking to the sync of another source
- Editing Stitch Layout
- Input Stereo Sync settings

#### 7.3.4.1 Locking to the sync of another source

#### Description

The sync of which source to lock on, can be changed at any time.

#### How to lock to another source?

1. In the OSD, navigate to *Window files > Edit > Lock source...* and press **ENTER** to select.

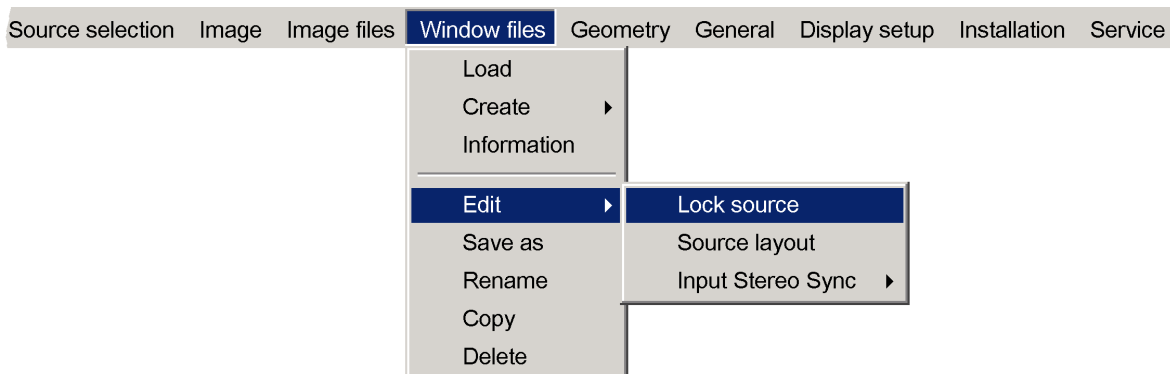


Image 7-12

2. From the dialog box, select the input from which the sync (master sync) should be used to display the image.

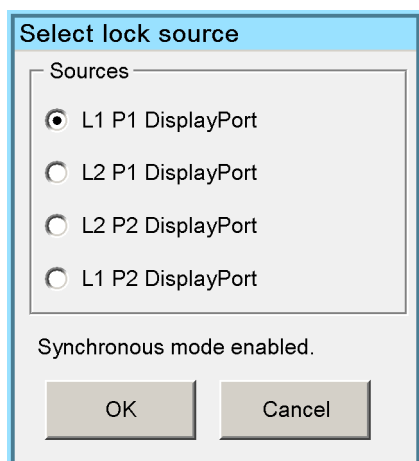


Image 7-13

3. Press **OK** to confirm.
4. Exit the menu.

#### 7.3.4.2 Editing Stitch Layout

#### Description

You can switch the source displayed in one half or quadrant to another by simply swapping the inputs.

### How to edit source layout?

1. In the OSD, navigate to *Window files > Edit > Source layout...* and press **ENTER** to select.

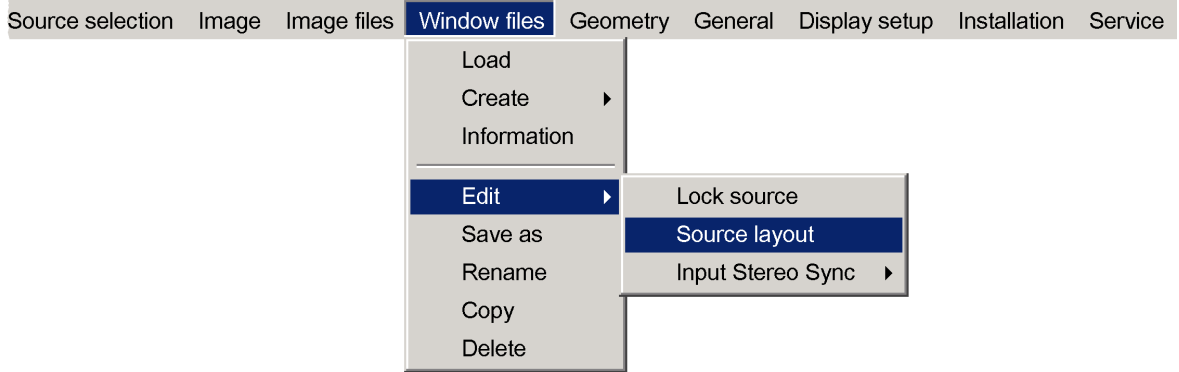


Image 7-14

2. In the dialog box, click the two sources that need swapping position.

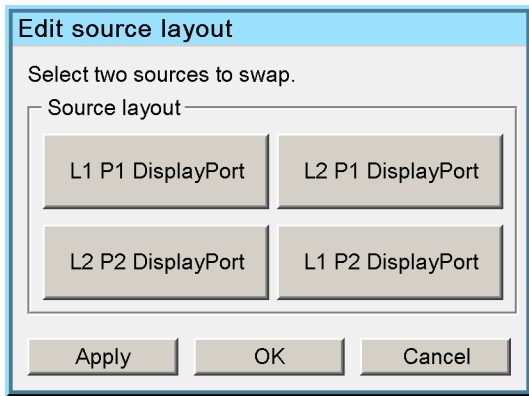


Image 7-15

3. Click **Apply** if you want to swap the position of two other sources and go back to step 2.

4. Press **OK** to confirm.

### 7.3.4.3 Input Stereo Sync settings

#### Description

Select if the Input Stereo Sync has to be swapped or not (normal).

#### How to set the Input Stereo Sync?

1. In the OSD, navigate to *Window files > Edit > Input Stereo Sync > Normal [or Swapped]...* and press **ENTER** to select.

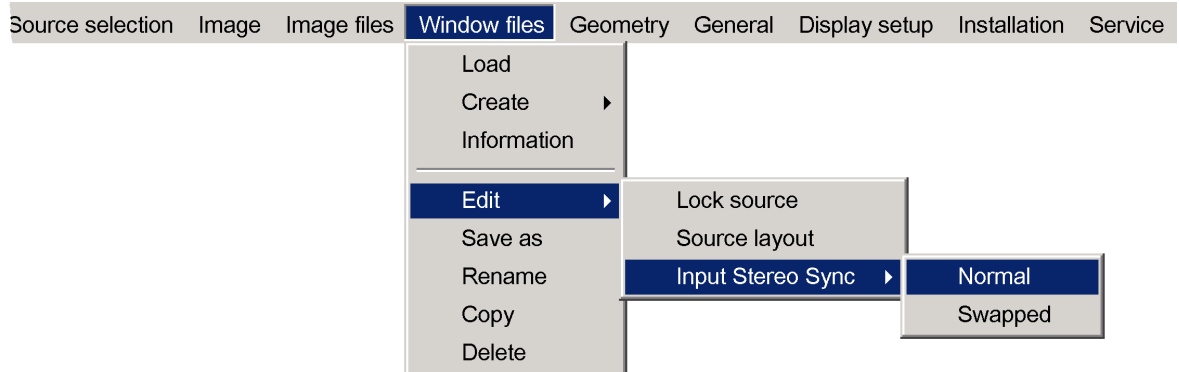


Image 7-16



### 7.3.5 Saving a Window file

#### Description

The currently active Window file can be copied by using *Save as...*

#### How to copy a Window file?

1. Make sure that a Window file is active and in the OSD, navigate to *Window files > Save as...*

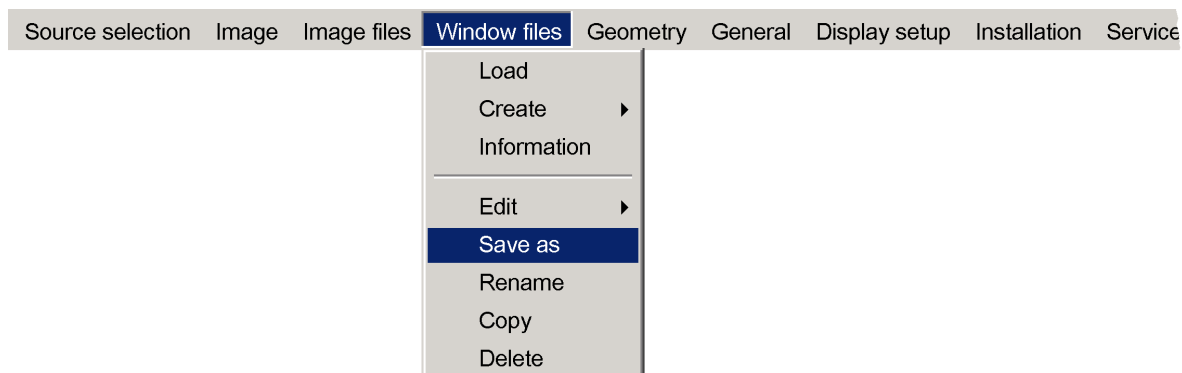


Image 7-17

2. Press **ENTER** to select.
3. In the dialog box, enter the desired name for the copied file.

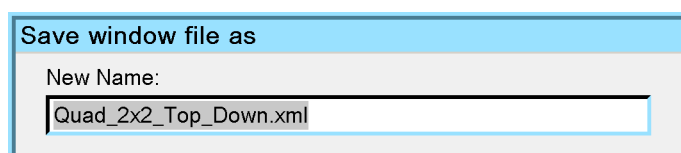


Image 7-18

4. Confirm by pressing **ENTER**.
5. Exit the menu.

### 7.3.6 Loading a Window file

#### Description

When a source is being displayed, you can manually load a different Window file to display the displayed source(s) in a different layout or to lock on a different source sync.

#### How to load a Window file?

1. In the OSD, navigate to *Window files > Load...* and press **ENTER** to select.

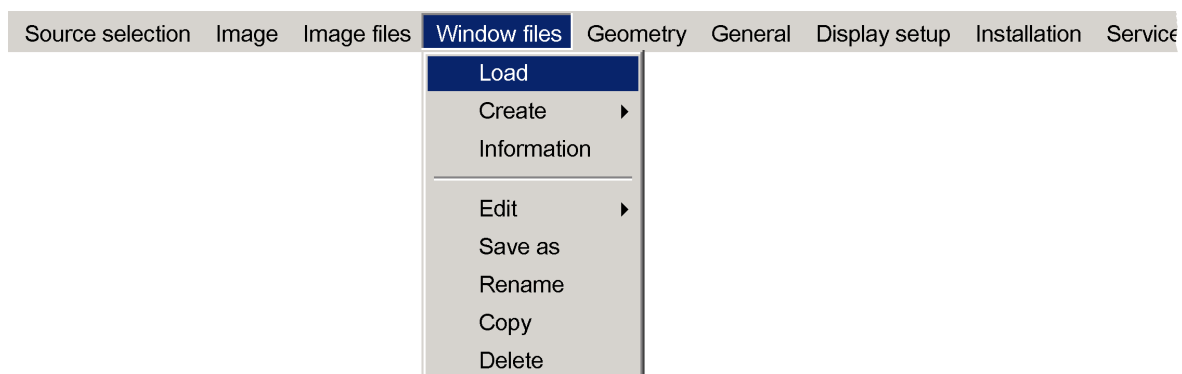


Image 7-19

2. In the dialog box, navigate to the desired Window file.

## 7. Getting started

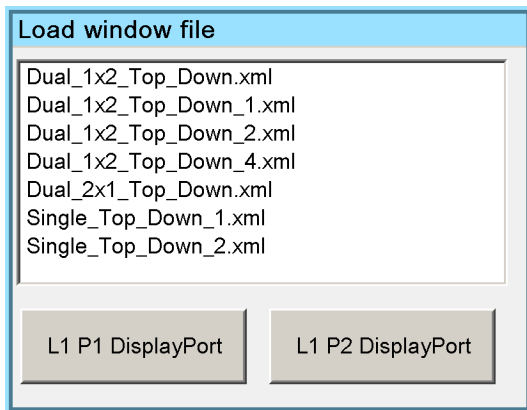


Image 7-20

For every Window file selected, the details of the sources that will be displayed in each half or quadrant or full screen is shown.

3. Press **ENTER** to confirm.
4. Exit the menu.

### 7.3.7 Renaming a Window file

#### Description

Any custom Window file can be renamed.

#### How to rename a Window file?

1. In the OSD, navigate to *Window files* > *Rename...* and press **ENTER** to select.

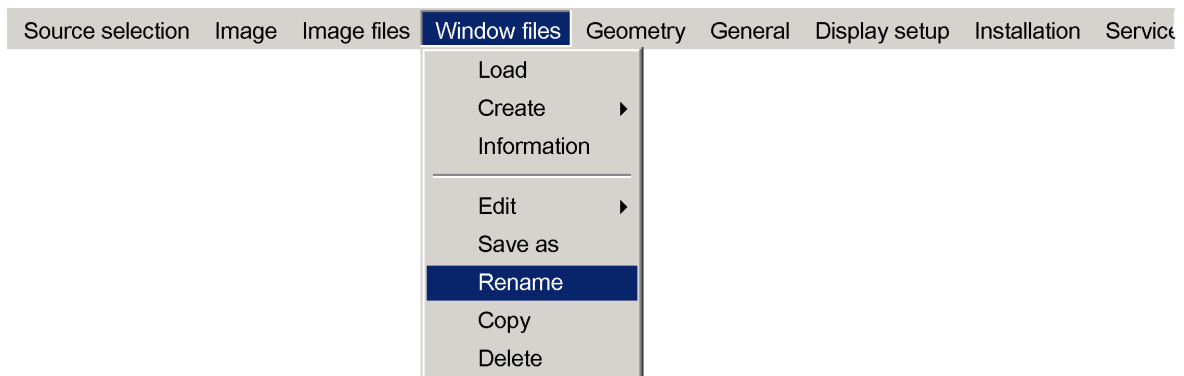


Image 7-21

2. In the dialog that appears, select the Window file to be renamed and press **ENTER** to confirm.

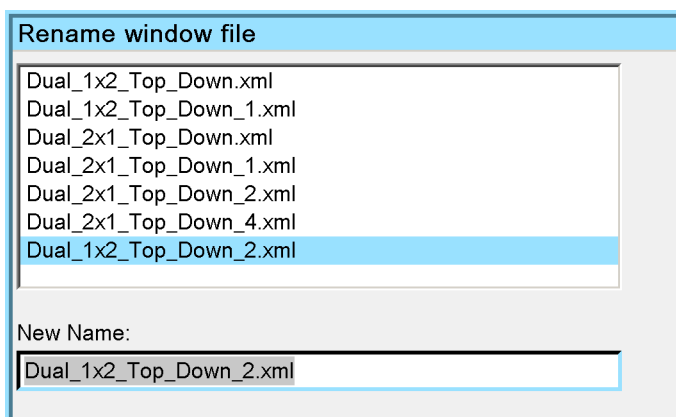


Image 7-22

The selected file name appears in the edit box at the bottom of the dialog box.

3. In the edit box, change the file name to your wishes.
4. Confirm by pressing **ENTER**

- Exit the menu.

### 7.3.8 Copying a Window file

#### Description

Any custom Window file can be copied to a new custom Window file at any time.

#### How to copy a Window file?

- In the OSD, navigate to *Window files* > *Copy...* and press **ENTER** to select.

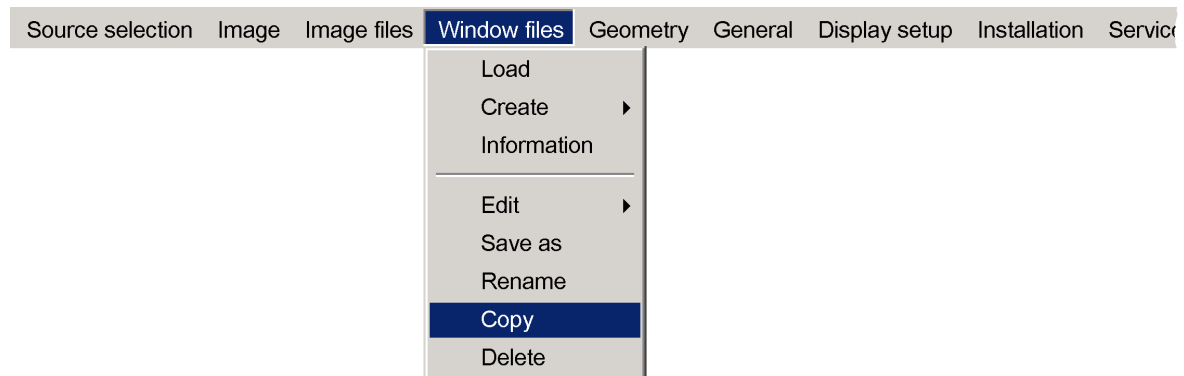


Image 7-23

- In the list of the dialog box, navigate to the Window file that needs to be copied and press **ENTER** to confirm.

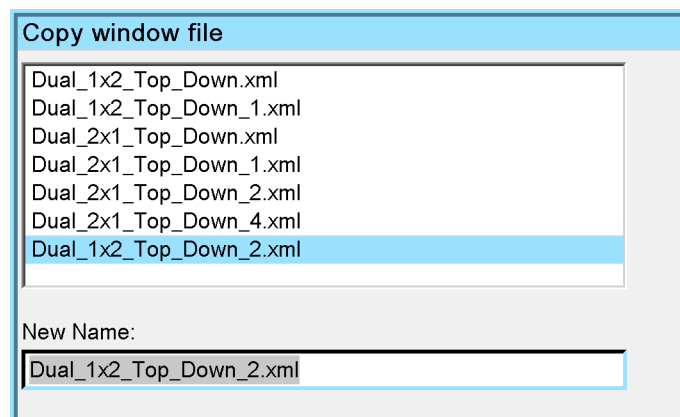


Image 7-24

The selected file name appears in the edit box at the bottom of the dialog box.

- In the edit box, enter the name of the copy by changing the original file name.
- Confirm by pressing **ENTER**.
- Exit the menu.

### 7.3.9 Deleting a Window file

#### Description

Any custom Window file can be deleted. It is also possible to delete all custom Window files at once.

#### How to delete a Window file?

- In the OSD, navigate to *Window files* > *Delete* and press **ENTER** to select.

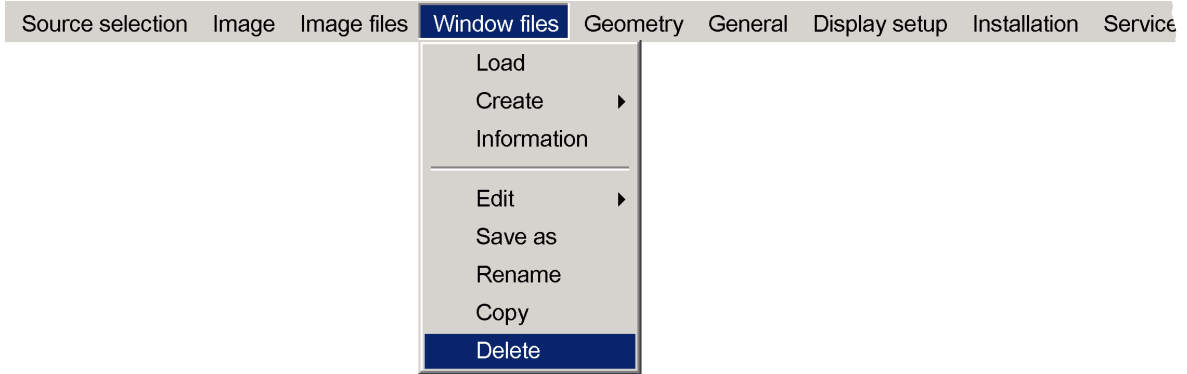


Image 7-25

2. In the list of the dialog box, navigate to the Window file to be deleted.

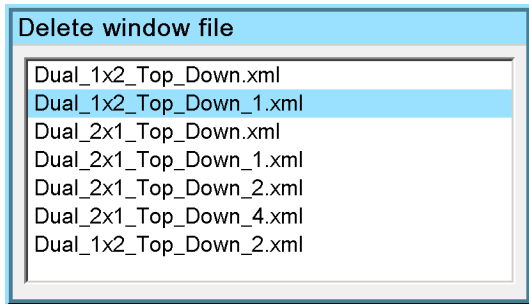


Image 7-26

3. Confirm by pressing **ENTER**.

A confirmation window appears, follow the instruction and make your choice.

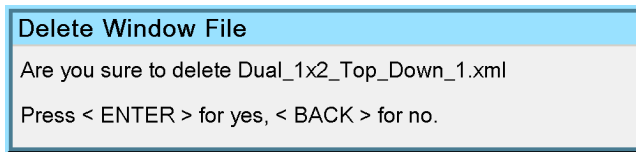


Image 7-27

4. Exit the menu.

## 7.4 Basic image adjustment

### About this chapter

This chapter describes the procedure to perform basic image adjustment like brightness, contrast and gamma.

Brightness and Contrast should never be changed in case of multiple channel systems: other ways of alignment are used in similar display systems. Gamma should always be set to the value corresponding to the gamma setting of the image generator.

### Overview

- Adjusting the brightness
- Adjusting the contrast
- Adjusting the gamma

#### 7.4.1 Adjusting the brightness

##### Description

It is possible to adjust the brightness (or black level) of the projected image within the range 0 to 255. Default value is 128. In multiple channel systems the default value must be set on all devices.

##### How to adjust brightness?

1. In the OSD, navigate to *Image > Settings > Brightness...* and press **ENTER** to select.

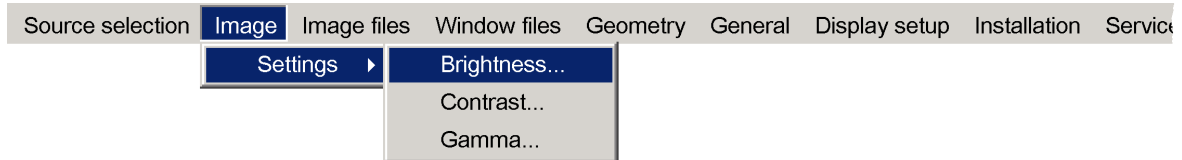


Image 7-28

2. In the dialog box, select the source for which you want to change the brightness.

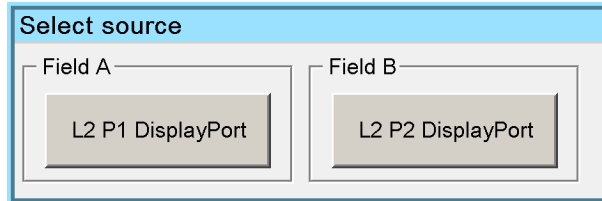


Image 7-29

3. Change the value to your wishes.



Image 7-30

4. Exit the menu.

## 7.4.2 Adjusting the contrast

### Description

It is possible to adjust the contrast (= white level) of the projected image within the range 0 to 255. Default value is 128. Changing the contrast is change the ratio of full white compared to full black. In multiple channel systems, the contrast must be set to the default value on all devices.

### How to adjust contrast?

1. In the OSD, navigate to *Image > Settings > Contrast...* and press **ENTER** to select.

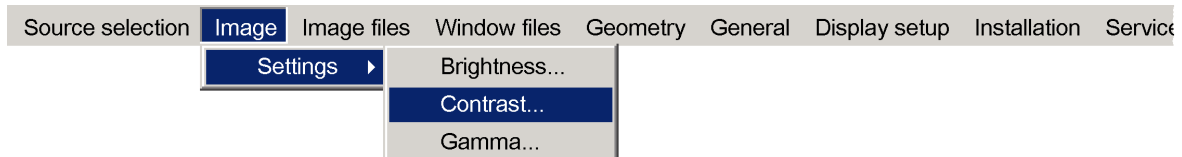


Image 7-31

2. In the dialog box, select the source for which you want to change the contrast.

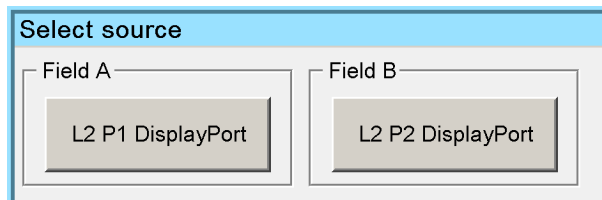


Image 7-32

3. Change the value to your wishes.

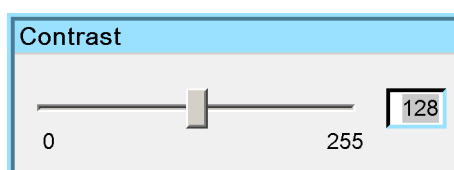


Image 7-33

4. Exit the menu.

### 7.4.3 Adjusting the gamma

#### Description

The gamma setting defines the reproduction of the mid tones of a projected image. A correct gamma setting results in a maximum of gradations (brightness levels) in the projected image.

The gamma can be set in the range 0 to 3.2 (in steps of 0.2). Default value is 2.2. This value should meet the gamma setting of the source (e.g. graphical card of a computer that is used as a source). In case of doubt, leave the gamma to its default setting.

#### How to adjust gamma?

1. In the OSD, navigate to *Image > Settings > Gamma...* and press **ENTER** to select.

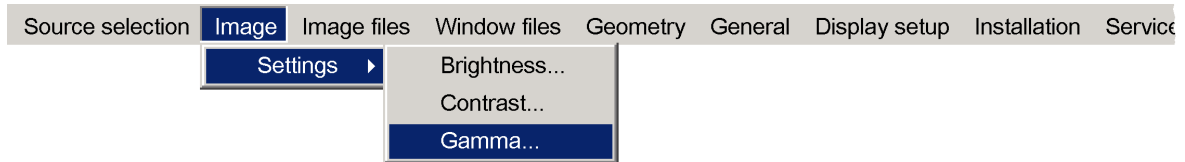


Image 7-34

2. In the dialog box, select the source for which you want to change the gamma.

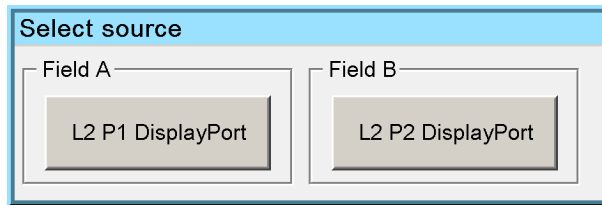


Image 7-35

3. Change the value to your wishes.

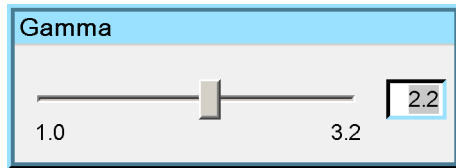


Image 7-36

4. Exit the menu.

## 8. OSD PREFERENCES

### About this chapter

The OSD is the menu bar and dialog boxes, generated by the device, that can be shown on the display. Navigation through the OSD and control of it is done via the RCU or the local keypad.

When opening a drop down menu, by default only the basic menu items are shown. The menu item *More...*, available below the menu separator at the bottom of some drop down menus, indicates the availability of additional advanced menu items. A password is needed to display those advanced menu items.

The OSD appears like the image below:



Image 8-1

From each of the menu items a drop down menu box can be opened. From the menu items of a drop down menu showing a ► at the end, another drop down menu can be opened (e.g. Settings ►). From menu items showing three dots (e.g. Gamma...), a dialog box can be opened. Dialog boxes can be purely informative or they provide features to change settings or data. Some menu items can be selected to simply enable or disable device features.

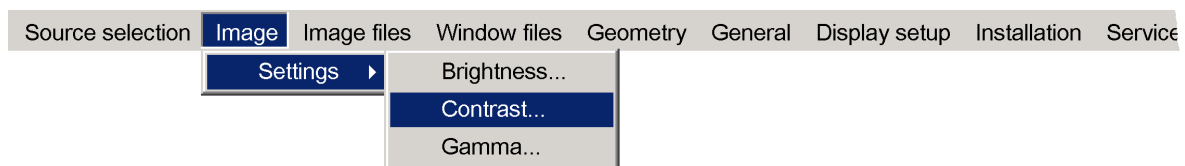


Image 8-2

The sections below explain in detail how to operate the OSD.

### Overview

- Displaying the advanced menu items
- Navigating through the OSD
- Opening a drop down menu
- Opening a dialog box
- Activating a menu item of a drop down menu
- Moving a slider in a slider box
- Entering data in an edit box

## 8.1 Displaying the advanced menu items



The advanced menu items are protected by a password. By default the password is 0000 but the operator can change it to any value between 0000 and 9999.

### How to display the advanced menu items?

1. Press **ENTER** to display the menu bar.
2. Use the arrow key ► to select any of the menu items: a highlighted item indicates the selected item.
3. Press the arrow key ▼ to open the drop down menu.
4. Press the arrow key ▼ a multiple times to select *More...*
5. Press **ENTER** to open the dialog box.
6. Enter the password:
  - press ◀ or ▶ to select the character to be changed;
  - press ▲ or ▼ to change the value of the selected character, or enter a digit by pressing the according key on the RCU.
7. Confirm the password by pressing **ENTER**.

The advanced menu items are now displayed at the bottom of the drop down menu, below the menu separator.

## 8.2 Navigating through the OSD

### How to navigate through the OSD?

1. Make sure the RCU address has been set to the same unique IR address of the device or to its common RC5 address.
2. On the RCU, use the arrows ▲, ▼, ◀ and ▶ to navigate through the menu items: a highlighted menu item indicates the actual position.

**Note:** *The same rules apply when navigating within a dialog box!*



Scrolling through the menu bar or through the drop down menus or through a list is a cycle, which means that after the last item has been selected, the next selected item will be the first item again.

## 8.3 Opening a drop down menu

### How to open a drop down menu form the main menu bar?

1. Navigate to the desired menu item.
2. On the RCU, press ▼ to open the drop down menu.

### How to open a drop down menu from a drop down menu item?

1. Navigate to the desired menu item, having an arrow (▶) next to it.
2. On the RCU, press ▶ to open the drop down menu.

## 8.4 Opening a dialog box

### How to open a dialog box?

1. Navigate to the desired menu item, having three dots next to it (e.g. *Contrast...*).
2. On the RCU, press **ENTER** to open the dialog box.

## 8.5 Activating a menu item of a drop down menu

### How to activate a menu item of a drop down menu (e.g. On / Off)?

1. Navigate to the menu item of your choice: a highlighted menu item indicates the selection.
2. Confirm by pressing **ENTER**.  
The activated item is indicated by a bullet in front of it.

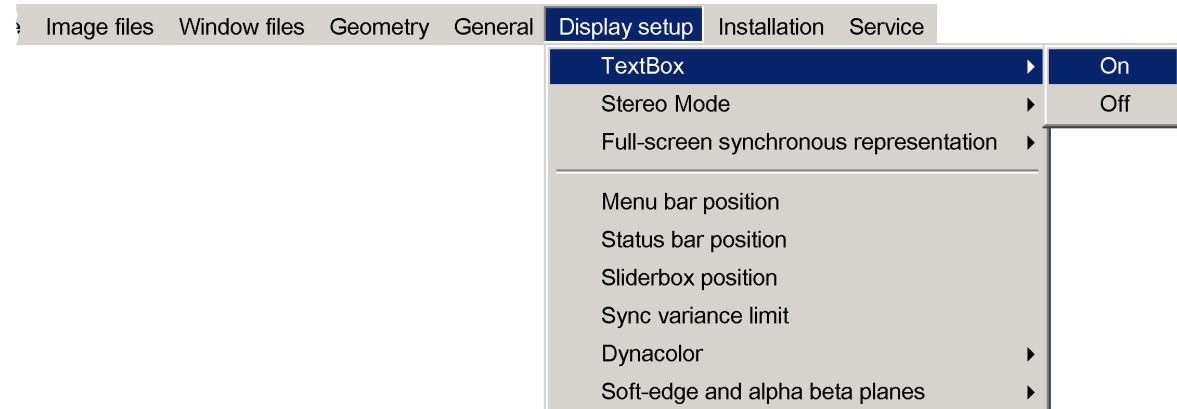


Image 8-3



## 8.6 Moving a slider in a slider box

### How to move a slider in a slider box?

1. From a menu item, open the slider box by pressing **ENTER**.

The slider box appears. E.g.

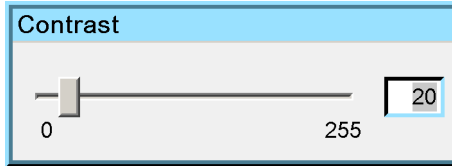


Image 8-4

2. Use ◀ or ▶ to move the position of the slider.

## 8.7 Entering data in an edit box

### How to enter data in an edit box?

1. Navigate to the desired edit box: an edit box having a blue background color is selected.

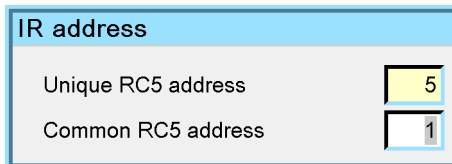


Image 8-5

2. Press **ENTER** to activate it.
3. Enter the value (digits or characters):
  - use ◀ and ▶ to select the character to be changed: a highlighted character (blue background color) can be changed;
  - use ▲ and ▼ to change the value of the highlighted character, or press the desired digit button on the RCU.
4. Press **ENTER** to confirm.



## 9. BASIC OPERATION

### About this chapter

This chapter describes the steps to make basic use of your device in the best way.

First of all, some **general features** are listed: displaying information about the device, freezing the image, automatic startup after a default amount of uninterrupted runtime hours and changing the password to get access to the advanced features of the device.

Another section fully describes how to adjust **timings** to correctly display a source in cases where it is not fully or correctly displayed at first connection. This is done by changing Image Files.

The **color reproduction** of the device can be changed: the full native set of colors for the device can be selected (single channel display systems) or a limited set of colors can be enabled to match colors amongst the devices of a multiple channel display system.

### Overview

- General settings
- Source alignment: timings
- Colors: using Dynacolor

## 9.1 General settings

### 9.1.1 Identification

#### Description

The identification screen displays the MCM-50's main characteristics. The details include MCM-50 type, MCM-50 address, firmware version, serial number and MCM-50 runtime. This data is most important in case of irregularities and if Barco needs to be contacted for additional support.

#### Viewing the MCM-50's details

1. In the OSD, navigate to *General > Identification* and press **ENTER** to select.

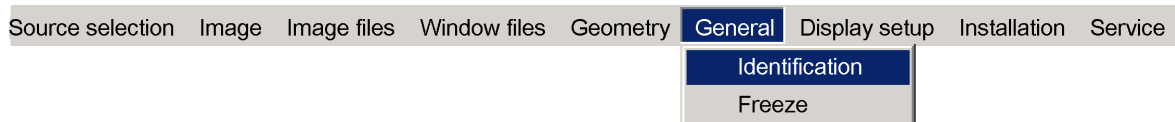


Image 9-1

2. In the text box that appears, you can view the device information.

Identification	
Type	MCM-50
Address	: 5
Software	: 0.12
Serial no	: 0000000009
Runtime	699 hrs

Image 9-2

3. Exit the menu.

### 9.1.2 Freeze

#### Description

Using the Freeze function, the displayed image is "frozen".

#### Freezing the image display

In the OSD, navigate to *General > Freeze* and press **ENTER** to select. The image is frozen.

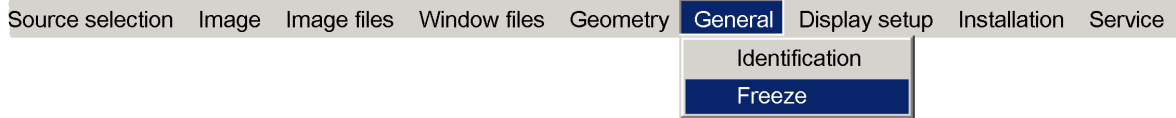


Image 9-3



To exit the FREEZE mode, follow the same procedure described above.

### 9.1.3 Automatic startup

#### Description

The automatic startup allows to bypass the standby state, i.e. when the MCM-50 is powered it automatically comes to active state without waiting in standby for an activation command.

This means that when the mains power comes up again after a power failure, the MCM-50 automatically restarts, recovering the latest settings (source(s), Window file, Image file, Geometry file, etc.).



This function can be disabled if undesired or inadequate for safety reasons. By default, this function is disabled.

#### How to enable/disable the Automatic startup?

1. In the OSD, navigate to *Installation > Automatic Startup > On or Off*.

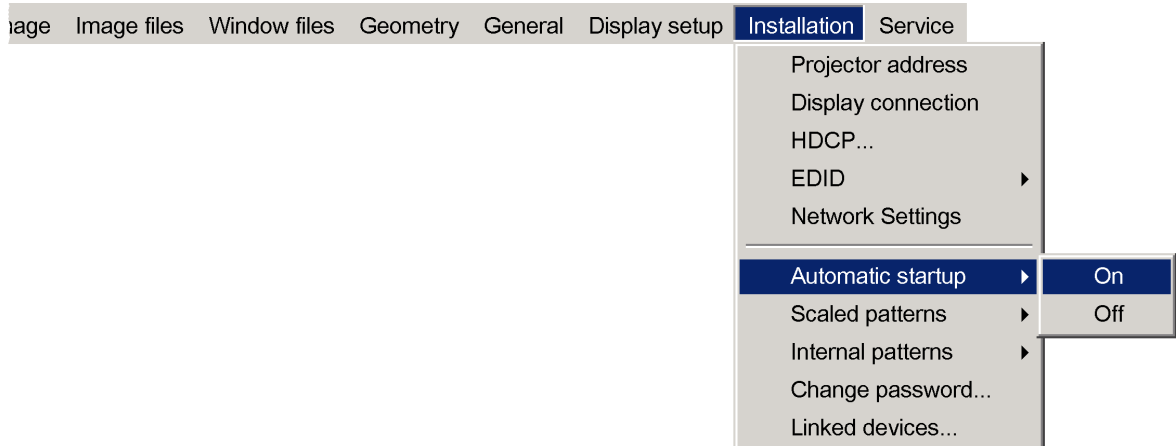


Image 9-4

2. Press **ENTER** to confirm your selection.
3. Exit the menu.

### 9.1.4 Change password

#### Description

When the OSD is launched, only the basic menu items of the drop down menus are accessible. Below the menu separator of a drop down box, *More...* indicates that advanced menu items are available, but hidden. A password is needed to get these advanced menu items to be displayed. This password can be set to any value in the range 0000 to 9999. Default is "0000".



If you have forgotten the password, a Barco qualified technician must be contacted.

#### Changing the password

1. In the OSD, navigate to *Installation > Change password...* and press **ENTER** to select.

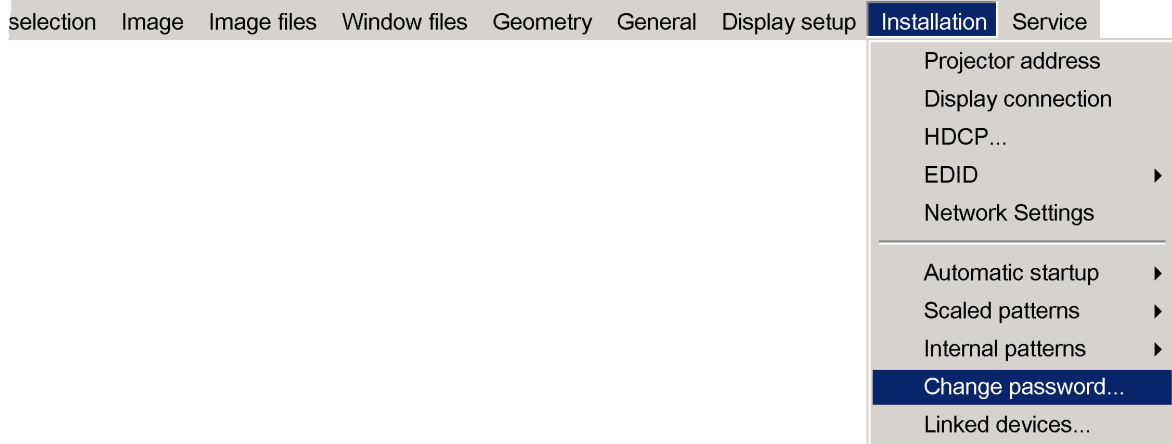


Image 9-5

2. In the dialog box that appears, fill out the following fields:
  - Enter old password;
  - Enter new password;
  - Confirm new password.

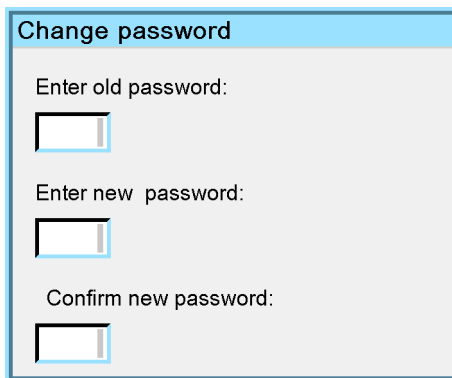


Image 9-6

3. Exit the menu.

## 9.2 Source alignment: timings

### Introduction

The device requires certain data to display the source signal in the best way. This data includes characteristics of the source signal and is stored as **Image files**. The device has a library of **Standard** Image files that covers most of the commonly used source signal formats and timings.

The moment a source signal is connected, the device scans the signal:

- If a source is displayed for the first time from a particular input connector, a copy of the best matching Standard Image file from the device's default library is stored as a **Custom** Image file and used to display the source signal (It is saved only after manual adjustments).
- When a source signal has been displayed from the same input connector before, the device recognizes it and uses the same Custom Image file that has been created before.

You can edit Custom Image files to make changes to the timings in specific applications (iBlend, multiple channel display systems). Or you can decide to manually select a different Custom Image file to be used to display a source.

The name of a Custom Image file uses the following format: `Custom/<Filename>.xml`, where `<Filename>` is a random string.



**A good practice is to include resolution and vertical refresh rate in the filename.**

You can perform the following tasks from the *Image files* menu:

- *Load*: to manually load a Custom Image file to display the selected source;
- *Edit*: to manually change the parameters of a Custom Image file;
- *Save as*: to copy the currently active Custom Image file;
- *Rename*: to rename a Custom Image file;
- *Copy*: to copy an existing Custom Image file;
- *Delete*: to delete some or all Custom Image files.

### 9.2.1 Loading a Custom Image file

#### Description

When a source is displayed, you can manually load another Custom Image file to display the concerning source.



**No Custom Image file can be loaded if no source has been selected.**

#### How to manually load a Custom Image file?

1. In the OSD, navigate to *Image files > Load...* and press **ENTER** to select.

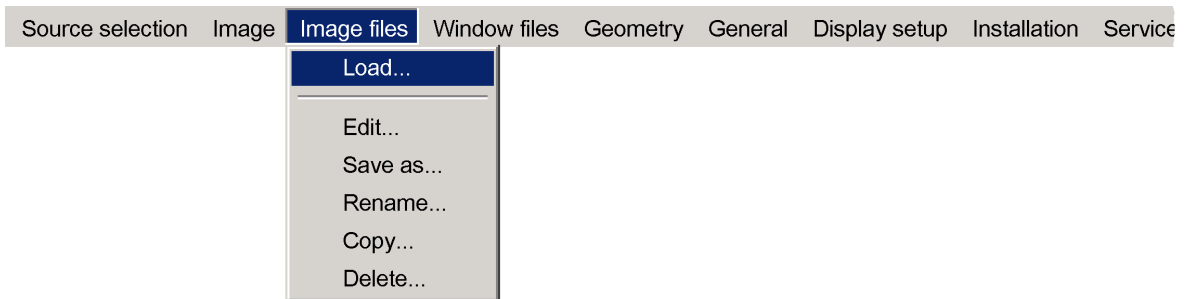


Image 9-7

2. In the dialog box, select the source for which you want to load the Custom Image file.

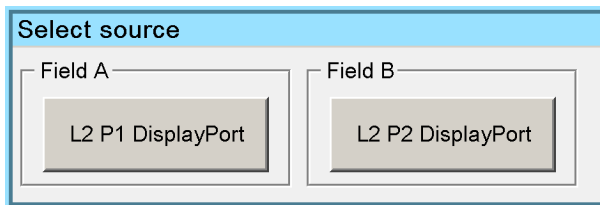


Image 9-8

3. In the dialog box, navigate to the desired Custom Image file and press **ENTER** to select.

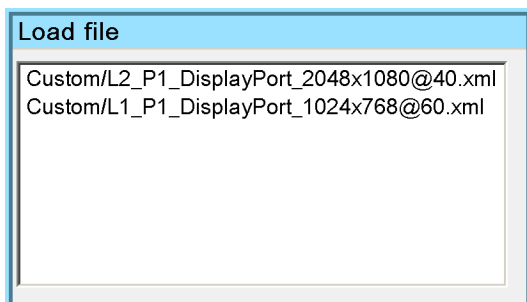


Image 9-9

4. Exit the menu.

### 9.2.2 Editing a Custom Image file

#### Introduction

Since only digital sources are supported in MCM-50, Custom Image files do normally not need modifications. Only in special cases, such as iBlend and multiple channel display systems, changes to the timings can be required.



**For each selected input, a dedicated Custom Image file is created/selected. Changes to one Custom Image file only apply to the corresponding part of the total image.**

The table below indicates which Image file parameters can be changed and the use cases where this could be required. If you are not sure, leave the parameters to their default values.

Parameter	Editable in advanced mode(Y/N)	Use case
Horizontal Total pixels	N	-
Horizontal Active pixels	Y	<ul style="list-style-type: none"> <li>By default, same value as image generator setting for this channel;</li> <li>In case of iBlend, the amount of pixels to be displayed on this part of the image (quadrant, half, full).</li> </ul>
Horizontal Start pixels	Y	<ul style="list-style-type: none"> <li>Slightly change the value if the leftmost vertical line(s) or the rightmost vertical line(s) is (are) missing;</li> <li>Change the value in case of iBlend to display the correct part of the total pixels of the source signal.</li> </ul>
Horizontal Period	N	-
Vertical Total lines	N	-
Vertical Active lines	Y	<ul style="list-style-type: none"> <li>By default, same value as image generator setting for this channel;</li> <li>In case of iBlend, the amount of lines to be displayed on this part of the image (quadrant, half, full).</li> </ul>
Vertical Start lines	Y	<ul style="list-style-type: none"> <li>Slightly change the value if the top horizontal line(s) or the bottom horizontal line(s) is (are) missing;</li> <li>Change the value in case of iBlend to display the correct part of the total pixels of the source signal.</li> </ul>

The procedures below describe in detail the advised way to align a source and to adjust the Custom image file.



**Refer to the source specifications before entering the data.**

### Changing Custom Image file parameters

1. In the OSD, navigate to *Image files > Edit...* and press **ENTER** to select.

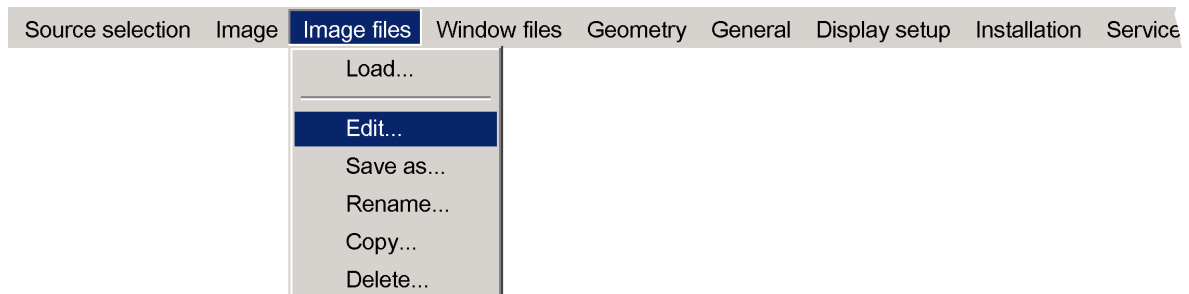


Image 9-10

2. In the *Select source* dialog box, select the source for which you want to edit the Custom Image file.

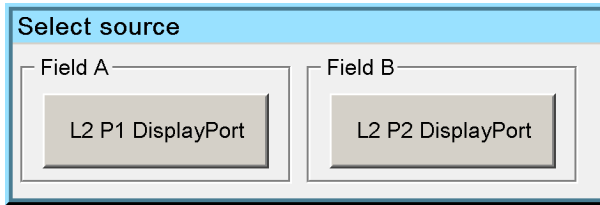


Image 9-11

3. Press **ENTER** to confirm.
4. In the dialog box, click **Advanced**.

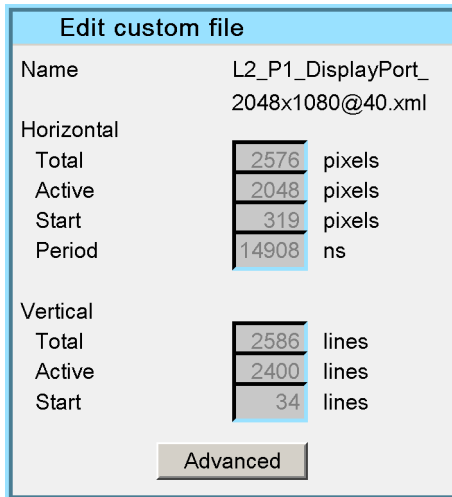


Image 9-12

5. In the *Advanced* dialog box, set *UsePictureBox* to 1. This enables some edit fields in the *Edit custom file* dialog box.

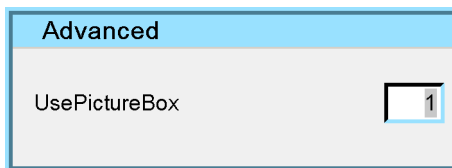


Image 9-13

6. Press **Back** to return the *Edit custom file* dialog box.
7. In the *Edit custom file* dialog box, change the parameters to your wishes.

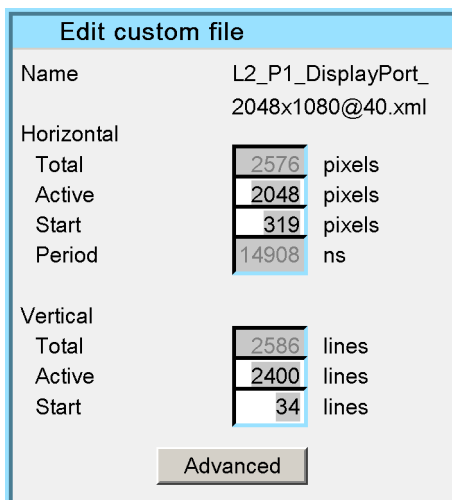


Image 9-14

8. Exit the menu and follow the instructions on the screen to save the new settings.



### 9.2.3 Saving a Custom Image file

#### Description

The Custom Image file of a selected source can be copied by using *Save as...*

#### How to copy a Custom Image file?

1. In the OSD, navigate to *Image files > Save as...* and press **ENTER** to select.

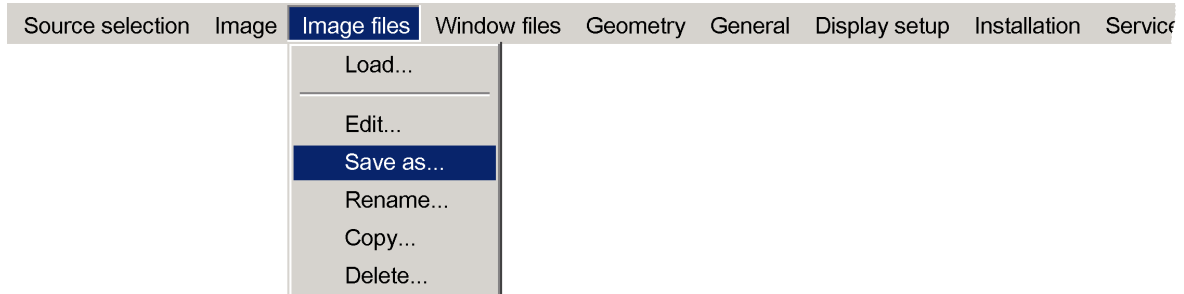


Image 9-15

2. In the dialog box, enter the desired name for the new file.

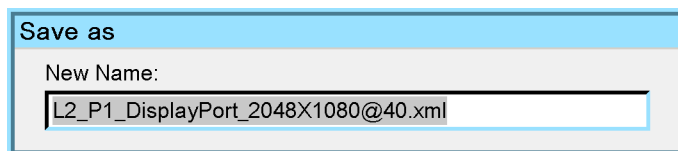


Image 9-16

3. Confirm by pressing **ENTER**.

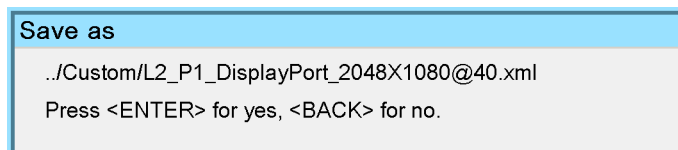


Image 9-17

4. A confirmation request window appears:
  - press **ENTER** to confirm.
  - press **BACK** to return.
5. Exit the menu.

### 9.2.4 Renaming a Custom Image file

#### Description

Any Custom Image file can be renamed at any time.

#### How to rename a Custom Image file?

1. In the OSD, navigate to *Image files > Rename...* and press **ENTER** to select.

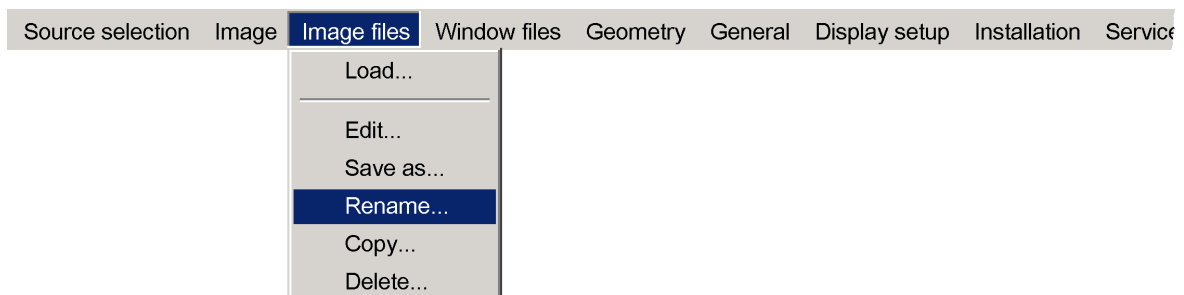


Image 9-18

2. In the list of the dialog box, navigate to the Custom Image file that needs to be renamed.

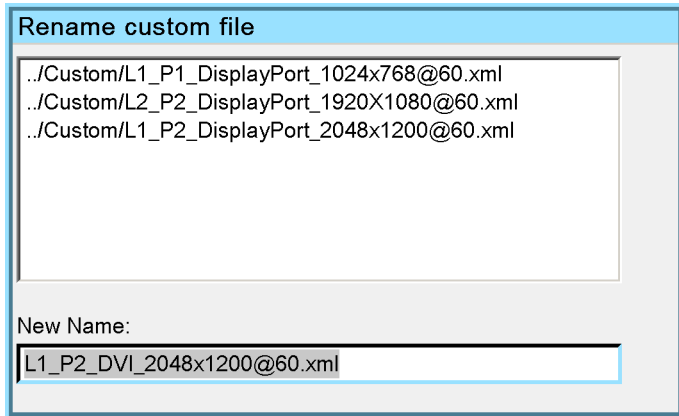


Image 9-19

3. Confirm by pressing **ENTER**.

The selected file name appears in the edit box at the bottom of the dialog box.

4. In the edit box, change the file name to your wishes and press **ENTER** to confirm.

5. Exit the menu.

### 9.2.5 Copying a Custom Image file

#### Description

Any Custom Image file or Standard Image file can be copied to a new Custom Image file at any time.

#### How to copy a Custom Image file?

1. In the OSD, navigate to *Image files* > *Copy...* and press **ENTER** to select.

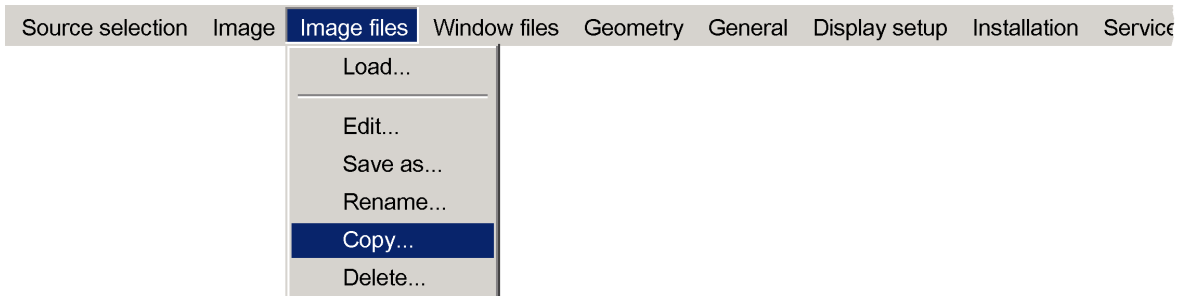


Image 9-20

2. In the list of the dialog box, navigate to the Custom/Standard Image file that needs copying.

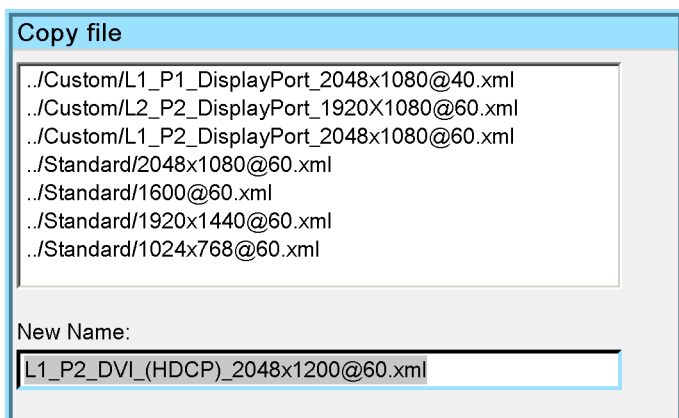


Image 9-21

3. Confirm by pressing **ENTER**.

The selected file name appears in the edit box at the bottom of the dialog box.

4. In the edit box, enter the name of the new file by changing the original file name.

5. Confirm by pressing **ENTER**.

6. Exit the menu.

### 9.2.6 Deleting a Custom Image file

#### Description

Any Custom Image file can be deleted at any time. You can also choose to delete all Custom Image files at once.

#### How to delete a Custom Image file (or all)?

1. In the OSD, navigate to *Image files > Delete...* and press **ENTER** to select.

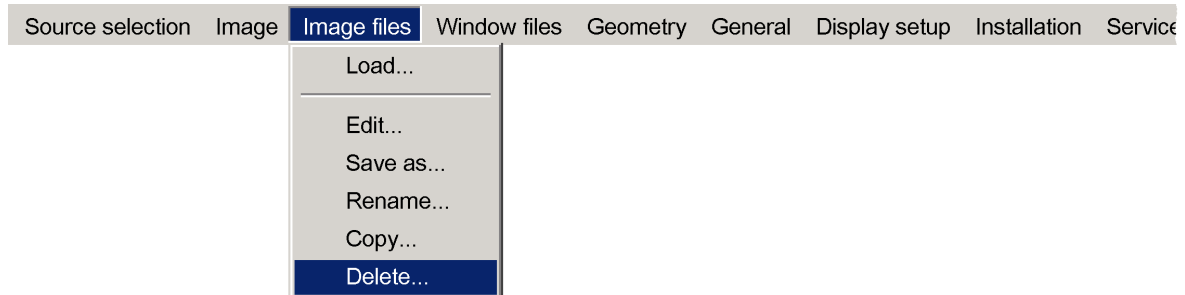


Image 9-22

2. In the list of the dialog box, navigate to the Custom Image file to be deleted or to *All custom files*.

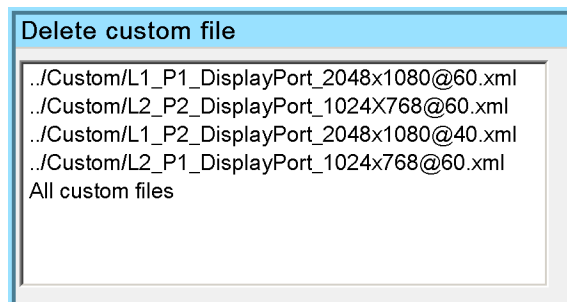


Image 9-23

3. Confirm by pressing **ENTER**.

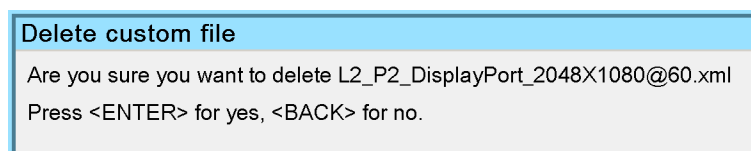


Image 9-24

4. A confirmation request window appears:

- press **ENTER** to confirm;
- press **BACK** to return.

5. Exit the menu.

## 9.3 Colors: using Dynacolor

#### Description

DynaColor is an advanced feature for perfect color matching across all systems in a multiple channel display system, to slightly change the color impression or to force a customized color temperature to the projected image. Different DynaColor settings can be stored in a single device, each set being used in a specific mode, such as Stereo mode.

Enabling the DynaColor changes the device's native color range to the color range as specified in the active DynaColor set.

This section explains how to enable a Dynacolor set. In the "Advanced operation" chapter we learn how to fine tune colors to our wishes and in the "Expert operation" chapter it is explained how to calibrate the colors of the device.

Also note that the Dynacolor settings are now stored and applied for each different output mode!

### Enabling/disabling Dynacolor?

1. In the OSD, navigate to *Display setup* > *Dynacolor* > *Enable* > *On* or *Off*.

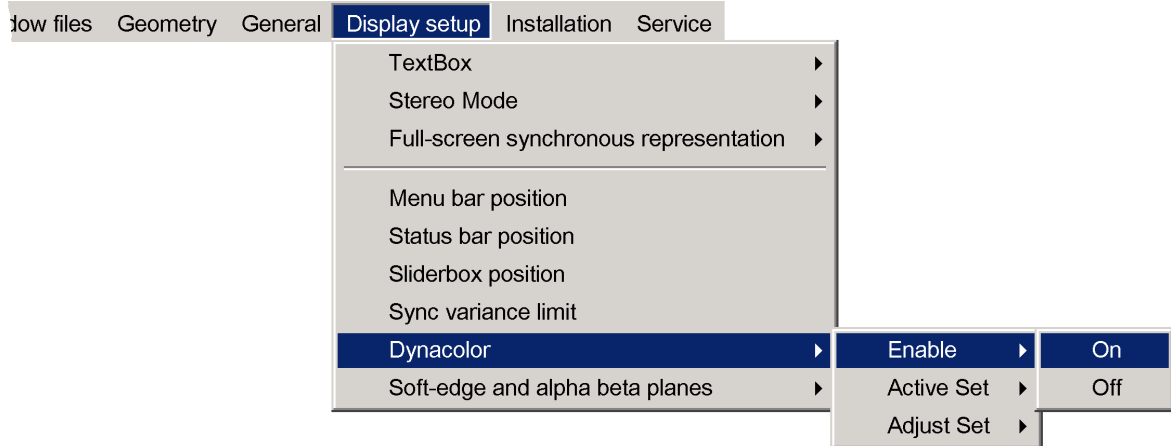


Image 9-25

2. Press **ENTER** to confirm the selection.

# 10. ADVANCED OPERATION

## Overview

- Geometry adjustment
- Using Dynacolor sets

## About this chapter

This chapter describes the basic geometry adjustment for a single channel setup, that is used to align the image to the screen if this is not fully achievable by mechanical positioning and lens shift and zoom. Mainly keystone correction and basic geometry correction for single curved screens are explained in this section. Read the Geometry section in the **Expert** chapter for more details about geometry correction.

Also Dynacolor sets are described in detail: which sets are used depending on the device parameters and options.

## 10.1 Geometry adjustment



### Geometry adjustment

The process of digitally manipulating the position of each pixel of the source image to a different position in the projected image.

### About this section

Geometry adjustments make this device more flexible to be used in wide variety of curved and flat-screen applications, ranging from flat or straightforward cylindrical displays to the wildest shapes that can be imagined. By pre-distorting the image inside the device, a correct geometry can be achieved on curved screens without requiring additional computational power on the image generator.

This section explains the geometry adjustment principle and lists the procedures to perform geometry adjustment: this enables us to correct vertical and horizontal keystone, to create bows to meet the shape of cylindrical and spherical screens and to align the channels onto each other in a multiple channel display setup. It is at all times possible to reset geometry mode by mode (starting from the lowest mode, being 33 x 33).

### 10.1.1 Geometry adjustment principle

#### Description

Geometry adjustment enables the **relocation of pixel groups** in an image in order to introduce spacial distortion. To make the procedure comprehensible, there are some rules and features.



**The use of geometry adjustment leads to image quality loss! The more geometry adjustment is applied, the more quality loss.**

To considerably reduce the labour intensiveness and complexity of geometry adjustment it is not possible to grab any pixel of the image and move it to a new position. Instead we have a limited set of pixels that can be relocated: the so called **anchor points**.

Moving an anchor point causes pixels in the same region to be moved gradually with this one pixel, depending on their distance to it. The size of the region of impact depends on the anchor point: some anchor pixels have impact on the full image, while others have impact on a small area only. The full image is divided in **33 x 33 regions**. The smallest region of impact is one of these 99 regions.

## 10. Advanced operation

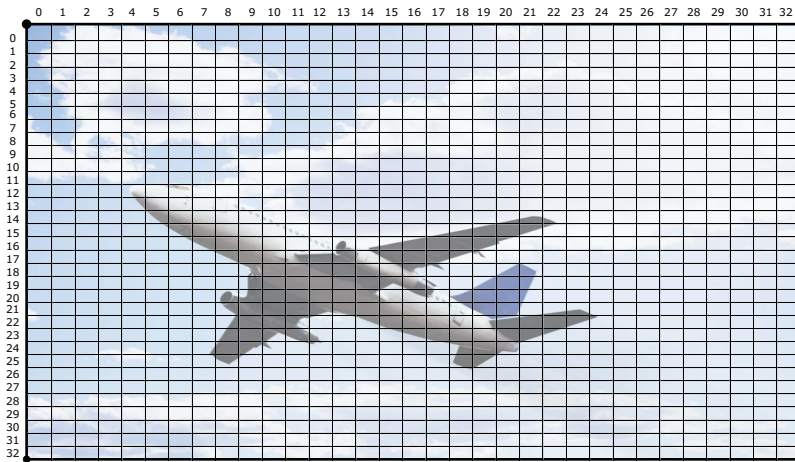


Image 10-1  
SIM 10: 33 x 33 regions in an image

Geometry adjustment is divided in **six modes**:

- 2 x 2 (highest mode);
- 3 x 3;
- 5 x 5;
- 9 x 9;
- 17 x 17;
- 33 x 33 (lowest mode).

The six modes represent **21 levels**, each level representing its own group of **anchor points**.

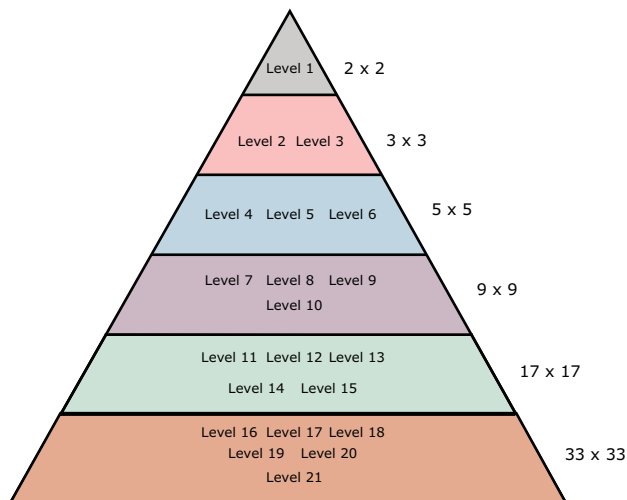


Image 10-2  
Level hierarchy

The **hierarchy** of these levels is very important: each level interacts with all lower levels. Adjusting a point on a certain level affects the points in all or some of the lower levels. The impact depends on the level itself. Therefore it is important to adjust the geometry starting from level one and going down to lower levels as required. In practice it will not be needed to adjust the anchor points of levels 7 and lower.

In 2 x 2 mode, we only have one level, including all four (2 x 2) anchor points, being the image corners. This mode is especially used to correct horizontal and vertical keystone.

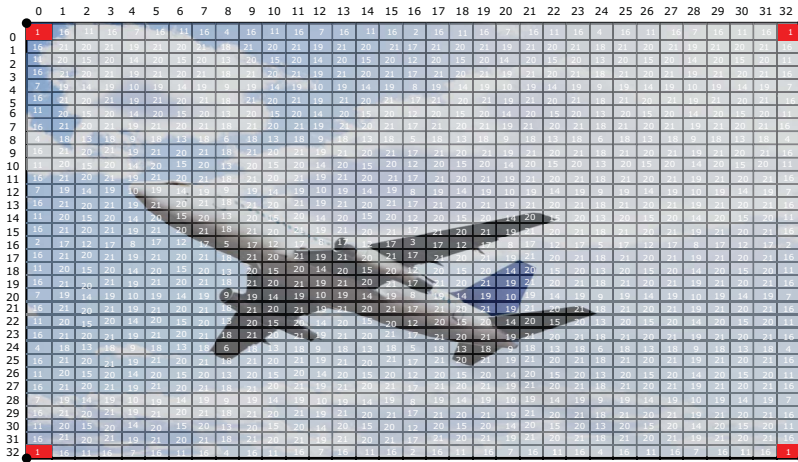


Image 10-3  
Geometry adjustment: 2 x 2 mode

In 3 x 3 mode, the image side centers represent the level two anchor points, whereas the image center represents the level three anchor point. Together with the higher level anchor points (level 1, four anchor points), we come to a total of nine (3 x 3) anchor points in this geometry mode. This mode can be used to fine tune the overlap area in multiple channel display systems and to make corrections to meet curved and double curved screens.

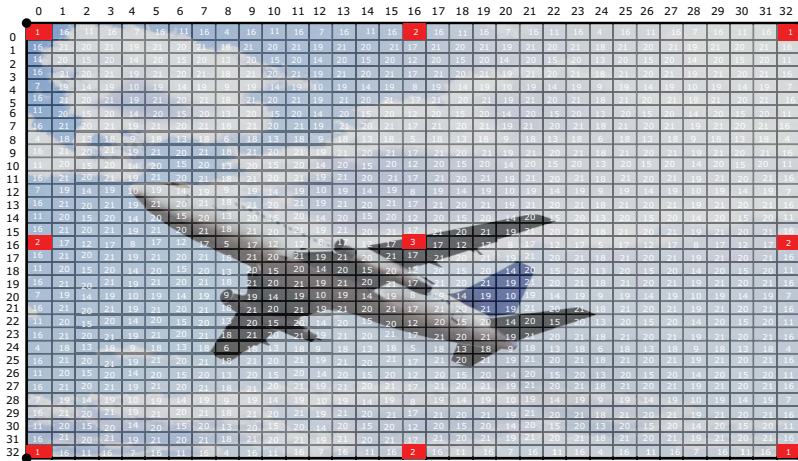


Image 10-4  
Geometry adjustment: 3 x 3 mode

In 5 x 5 mode, we add three more levels, being level four (eight anchor points), level five (four anchor points) and level six (four anchor points). So this mode includes 25 (5 x 5) anchor points in total. See the image below.

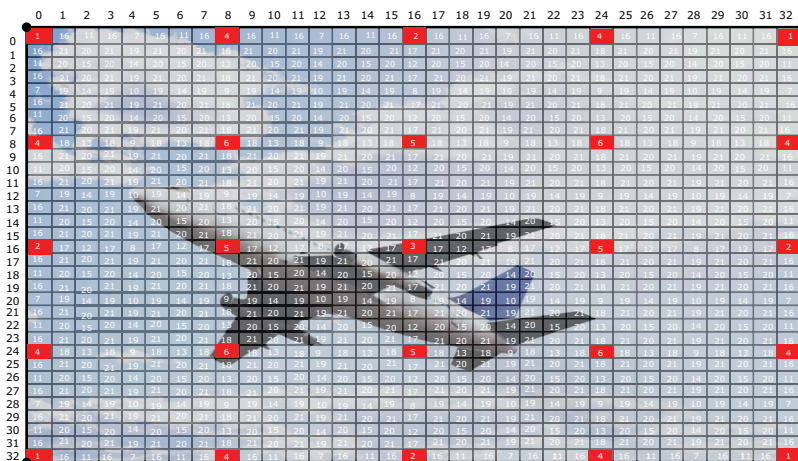


Image 10-5  
Geometry adjustment: 5 x 5 mode

This logic can be extrapolated for the lower models and levels, being level seven to level 21, however in practice these modes and levels are rarely used.

### 10.1.2 Keystone correction workflow

#### Adjusting vertical and horizontal keystone

1. Open the Geometry edit dialog for 2 x 2 mode. See "Selecting the geometry level ", page 70. The default selected anchor point is the left top corner of the image.
2. If required, select another anchor point of this level (i.e. corner points). See "Selecting an anchor point", page 71.
3. Move the selected anchor point to the desired position. See "Moving an anchor point in small steps", page 72 and "Moving an anchor point in large steps", page 73.  
**Note:** *Anchor points should only be moved inside the visible image area since moving an anchor point to the outside causes loss of image content.*

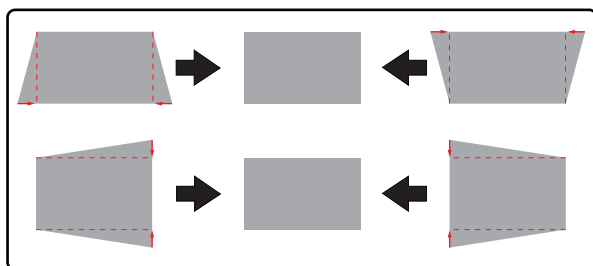


Image 10-6  
Keystone correction

4. Select each of the other anchor points in this level in turn and move them to the desired position to end up with a perfectly rectangular image.

### 10.1.3 General geometry adjustment workflow

#### Performing geometry adjustment

1. Open the Geometry edit dialog for 2 x 2 mode. See "Selecting the geometry level ", page 70. The default selected anchor point is the left top corner of the image.
2. If required, select another anchor point of this level. See "Selecting an anchor point", page 71.
3. Move the selected anchor point to the desired position. See "Moving an anchor point in small steps", page 72 and "Moving an anchor point in large steps", page 73.  
**Note:** *Anchor points should only be moved inside the visible image area since moving an anchor point to the outside causes loss of image content.*
4. Select each of the other anchor points in this level in turn and move them to the desired position.
5. Then, select each of the anchor points of the next lower level in the selected geometry mode and adjust their position.
6. Repeat the previous step for all levels of the current geometry mode in turn.
7. If the geometry cannot be fully adjusted in the current mode, select the next lower geometry mode. See "Selecting the geometry level ", page 70.
8. Repeat step 2 to step 7 until the geometry is fully adjusted to the specifications.

### 10.1.4 The Geometry edit dialog



The images below show adjustments performed on a hatch pattern generated internally by the device (see *Internal patterns*).

#### The Geometry edit dialog

In the OSD, browse to *Geometry > Edit*, select one of the modes and press **ENTER** to display the semitransparent Geometry edit dialog.

This Geometry edit dialog acts as an intuitive user interface to perform all the geometry adjustments on the fly. Each individual anchor point can be selected and moved to the desired location in real time.

Depending on the geometry mode, the dialog box may slightly differ, the dialog box below is for a 2x2 mode adjustment.



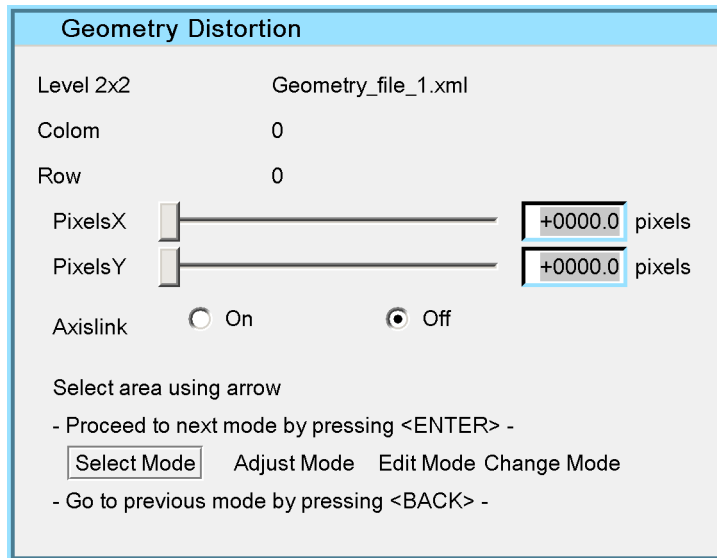


Image 10-7

The table below describes every item in the Geometry edit dialog box.

Field/Adjustment	Description	Notes
Level 2x2	Denotes the selected geometry adjustment mode.	Level can be 2x2, 3x3, 5x5, 9x9, 15x15 or 33x33.
Column	Column number corresponding to the selected anchor point.	This number refers to the 33 x 33 grid.
Row	Row number corresponding to the selected anchor point.	This number refers to the 33 x 33 grid.
PixelsX	This slider bar and edit box are used to define the new position of the anchor point along the X axis, relative to its original position.	In table front mode, and if <i>Axislink</i> is set to off, a positive value moves the anchor point to the right side. High values can introduce some clipping effects.
PixelsY	This slider bar and edit box are used to define the new position of the anchor point along the Y axis, relative to its original position.	In table front mode, and if <i>Axislink</i> is set to off, a positive value moves the anchor point down. High values can introduce some clipping effects.
Axis link	See "Setting the Axis link to ON or OFF", page 77.	It is advised to leave <i>Axislink</i> to its default setting, being off.
Select Mode / Adjust Mode / Edit Mode / Change Mode	See "Selecting an anchor point", page 71, "Moving an anchor point in small steps", page 72 and "Moving an anchor point in large steps", page 73.	

As soon as the Geometry dialog is displayed, the first anchor point for this mode is by default selected.

Another anchor point in this adjustment mode can be selected at any time. The selected anchor point is marked with a small **yellow dotted box**. The region of impact is marked with a **blue dotted box**.

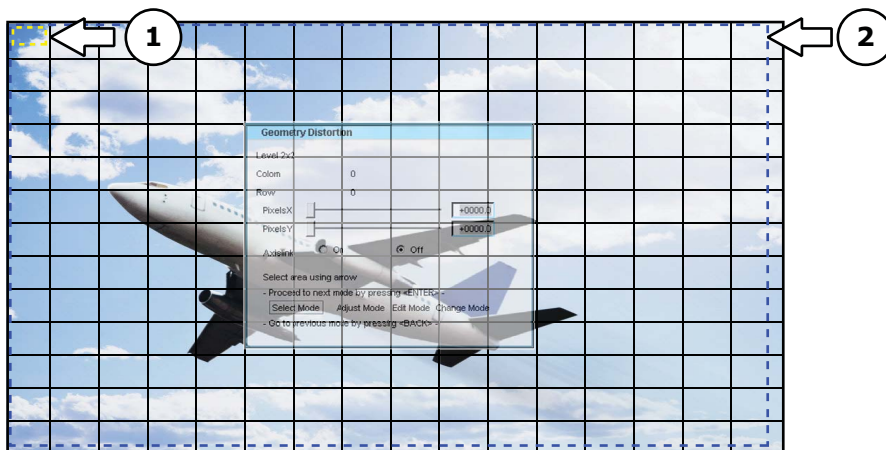


Image 10-8  
Geometry edit dialog: Adjustment points

1. Selection box
2. Interaction box



Applying the relocation of an anchor point may take a few seconds.

### 10.1.5 Selecting the geometry level

#### Selecting the geometry level

In the OSD, navigate to *Geometry > Edit > 2x2* or *3x3* or *5x5* or *9x9* or *15x15* or *33x33* and press **ENTER** to select.

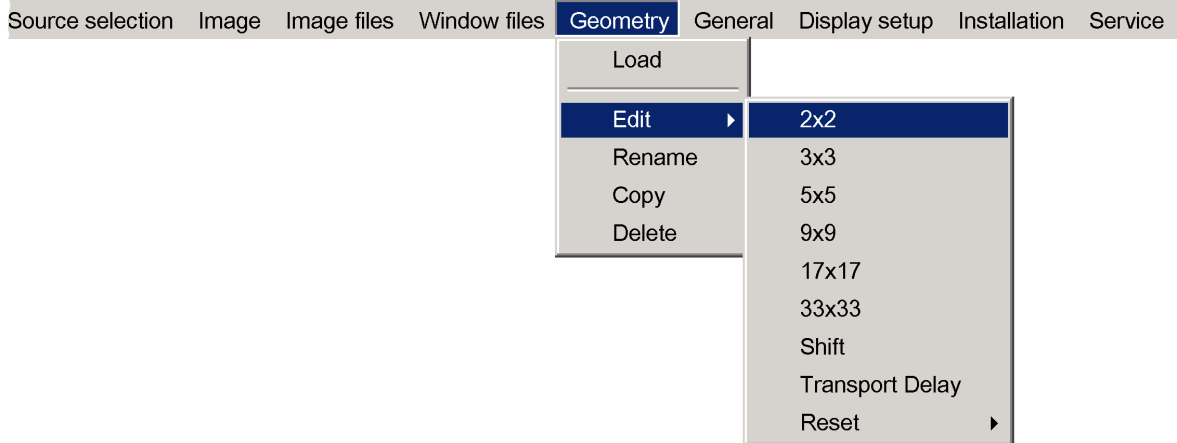


Image 10-9

In the Geometry edit dialog, the selected *Level 2x2* appears.

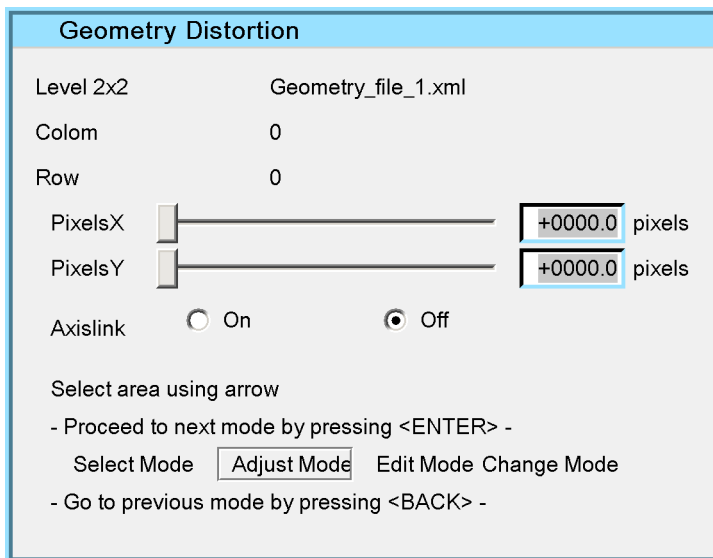


Image 10-10



Always start adjusting the geometry at the highest level (i.e. 2 x 2) and go down only one level at the time.

**Select Mode** is enabled and the top/left (row = 0 ; column = 0) corner is selected.

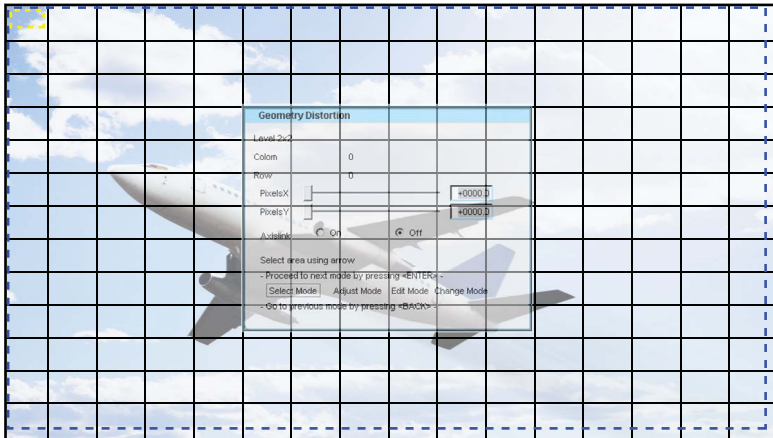


Image 10-11  
Geometry adjustment: Select mode

## 10.1.6 Selecting an anchor point

### Description

In **Select Mode**, you can select any of the anchor points of the selected level and of the higher levels. You cannot adjust or edit the selected anchor point in this mode.

### Selecting an anchor point

1. After selecting the level from the *Geometry Distortion* edit dialog, by default, **Select Mode** is enabled and the top/left (row = 0 ; column = 0) corner is selected.

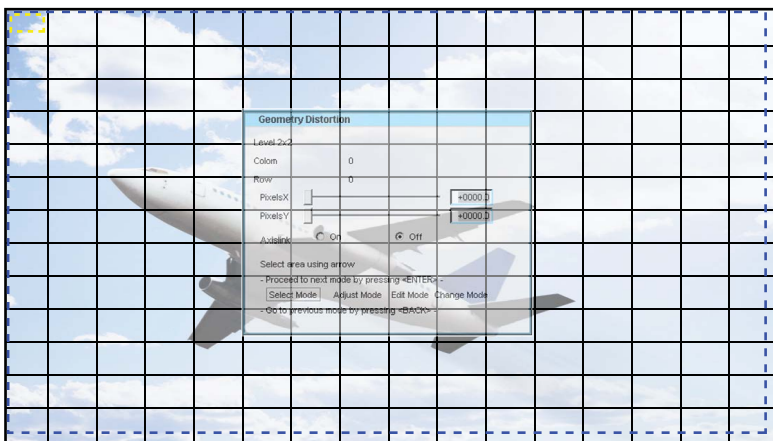


Image 10-12  
Selection: Row 0; Column 0

2. Use the arrow keys on the RCU (►, ▼, ◀ and ▲) to select the another adjustment point.  
E.g. In 3 x 3 mode, ► would jump to column 15, row 0. In 2 x 2 mode, ► would jump to column 32, row 0. See image below.

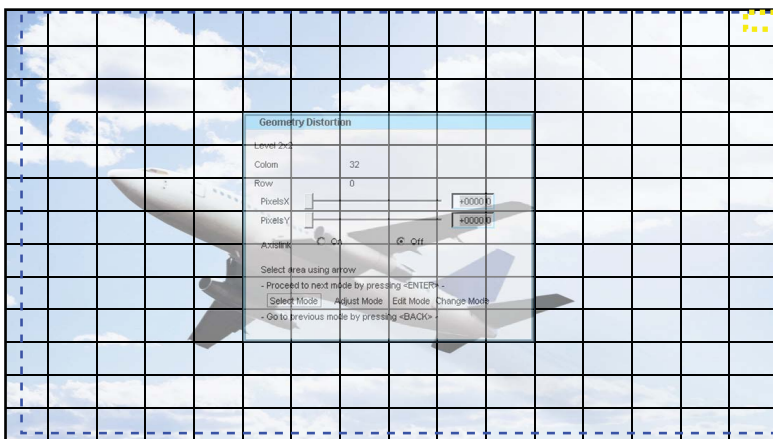


Image 10-13  
Selection: Row 0; Column 32



Keep the 33 x 33 grid in mind to find out the position of the anchor points.

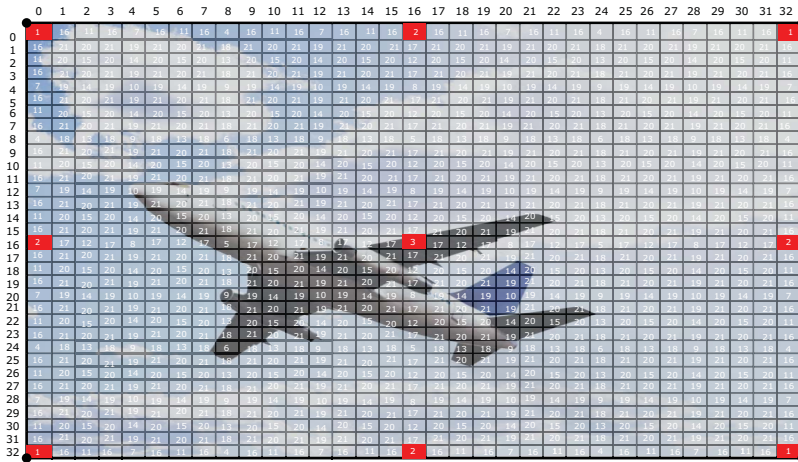


Image 10-14

### 10.1.7 Moving an anchor point in small steps

#### Description

**Adjust mode** is used to do small geometry adjustments using the arrow keys on the RCU. Each step is only 1/32 of a pixel. For larger adjustments the **Adjust mode** is not the ideal method. In that case the use of the **Edit mode** and **Change mode** is advised.

The steps below explain the procedure to adjust the anchor point on (row 0, column 0) along the X axis in 2x2 mode.

#### Using the arrow keys to move an anchor point

1. After selecting the anchor point in **Select mode**, press **ENTER** to switch to **Adjust Mode**.

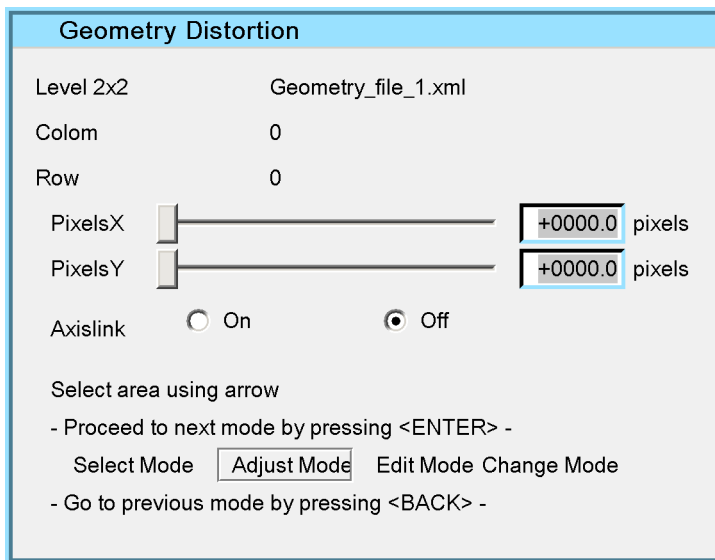


Image 10-15

2. Press ◀ and ▶ a multiple times or keep the arrow pressed to move the anchor point along the X-axis.

Also notice the impact of moving a top level anchor point in the example below.

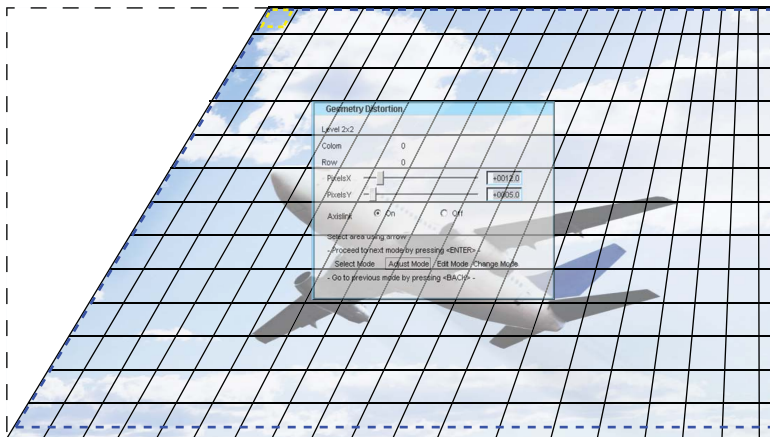


Image 10-16  
Adjusting the PixelsX and PixelsY positions

3. Press **▲** and **▼** a multiple times or keep the arrow pressed to move the anchor point along the Y-axis.

### 10.1.8 Moving an anchor point in large steps

#### Description

**Edit Mode** enables you to select the *PixelsX* or *PixelsY* edit box whereas in **Change Mode** you can edit the value of the selected *PixelsX* (i.e. relative movement along the X-axis; can be negative) or *PixelsY* (i.e. relative movement along the Y-axis; can be negative).

#### Editing the values of X and Y coordinates

1. In the Geometry edit dialog, navigate to **Edit Mode** by pressing **ENTER**.
2. Press **▲** or **▼** to select the edit box of *PixelsX* or the edit box of *PixelsY*.

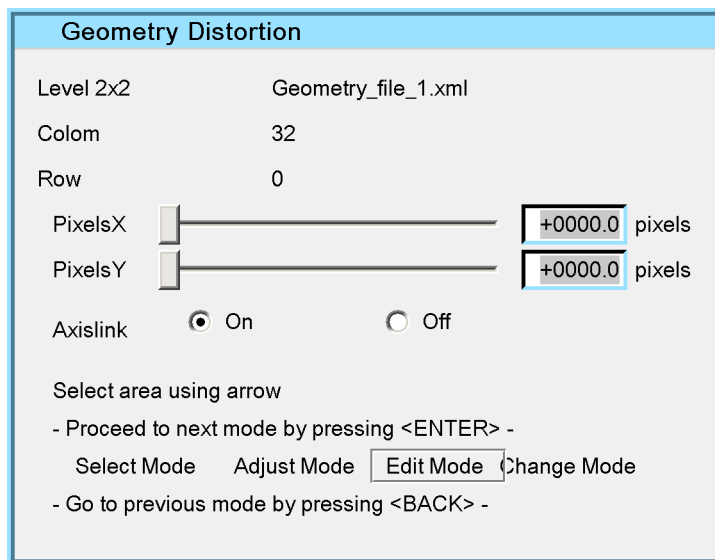


Image 10-17

3. Press **ENTER** to select **Change Mode**.  
The selected (*PixelsX* or *PixelsY*) edit box is highlighted.
4. Enter a new value.

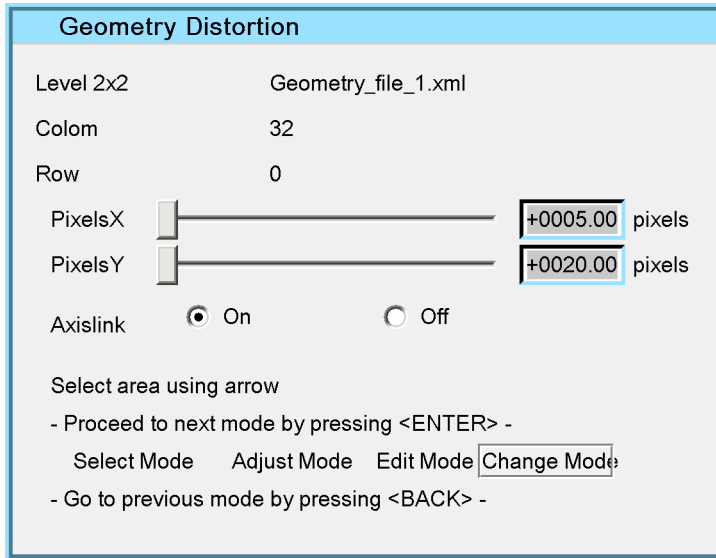


Image 10-18

### 10.1.9 Geometry reset

#### Description

All geometry adjustments can be reset at once or you can decide to restore the Geometry setting to one of the modes. This can be done from the Geometry Edit menu.

- **Reset all levels:** all geometry adjustments are deleted, ending up with a **non distorted image** where all geometry adjustment values are 0!
- **Restore to a mode:** All geometry adjustments of the lower modes are reset (all geometry correction values are set to 0). The correction values of the selected mode and all the higher modes are retained.

E.g. if you select *Restore to 3x3* all adjustment values in modes 5x5, 9x9, 17x17 and 33x33 are set to 0.

#### Resetting all levels

1. In the OSD, navigate to *Geometry > Edit > Reset > Reset all levels* and press **ENTER** to select.

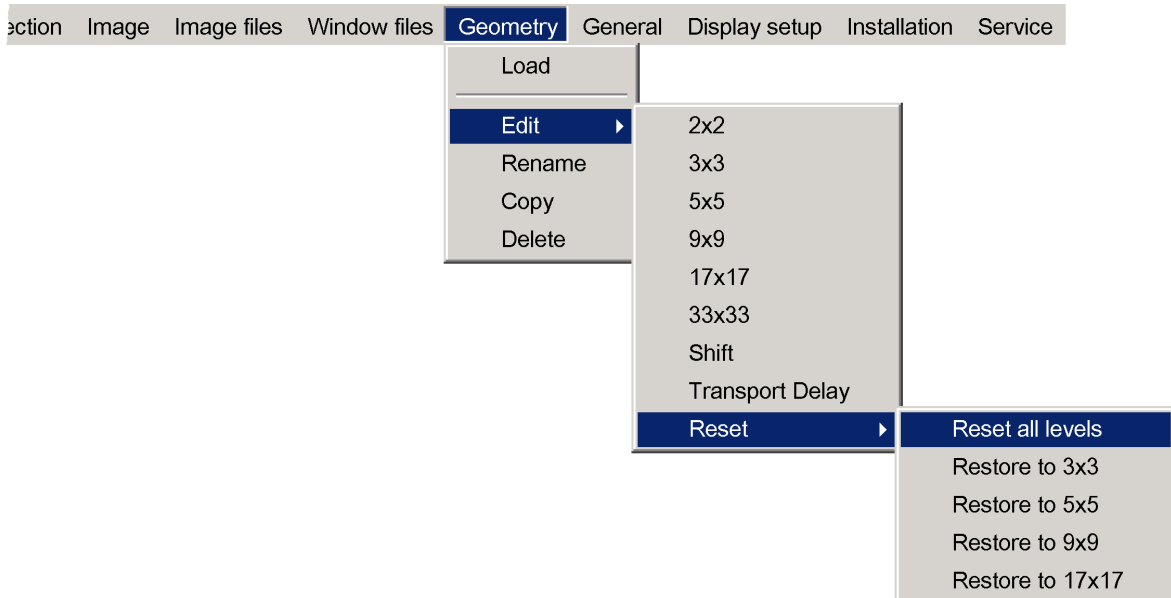


Image 10-19

2. Exit the menu.

#### Restoring to a mode

1. In the OSD, navigate to *Geometry > Edit > Reset > Restore to 3x3 (or 5x5 or 9x9 or 17x17)* and press **ENTER** to select.

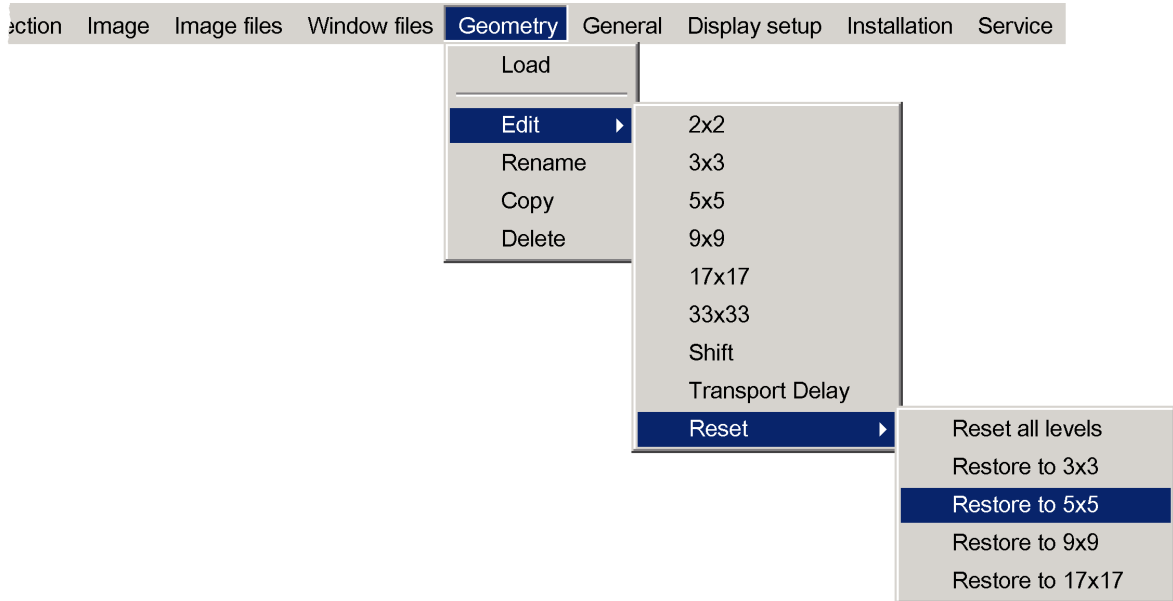


Image 10-20

The following diagram illustrates the geometry adjustment restored to mode 9x9.

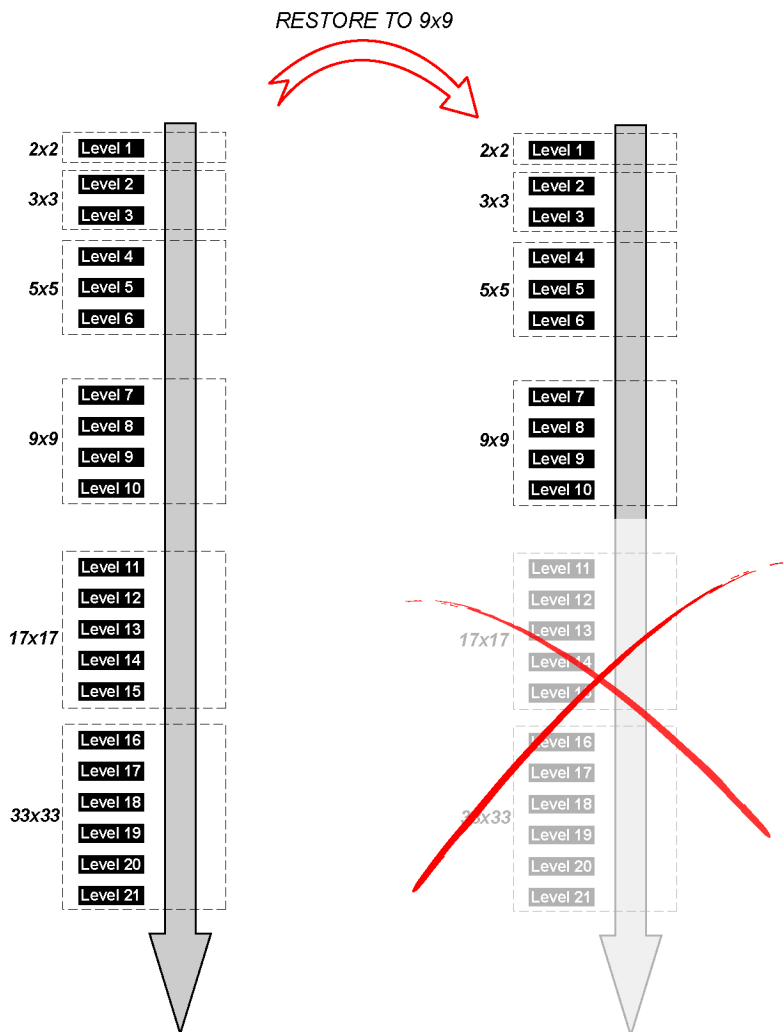


Image 10-21  
Restore to 9x9

2. Exit the menu.

## 10.2 Using Dynacolor sets



To apply the color corrections previously saved in a Dynacolor set, make sure that Dynacolor is enabled.

### Description

Depending on the device parameters and options, different Dynacolor sets can and will be used when Dynacolor is enabled.

The following three Dynacolor sets can be selected and defined:

- **Set 1:** standard Dynacolor set, can be selected if the (optional) Infitec filter in the projector is not inserted;
- **Set 2:** standard Dynacolor set, can be selected if the (optional) Infitec filter in the projector is not inserted;
- **Infitec set:** Dynacolor set with advanced color tracking — should be selected when the optional Infitec filter in the projector is inserted;

### How to select a Dynacolor set?

1. In the OSD, navigate to *Display setup > Dynacolor > Active set > Set 1, Set 2 or Infitec set.*

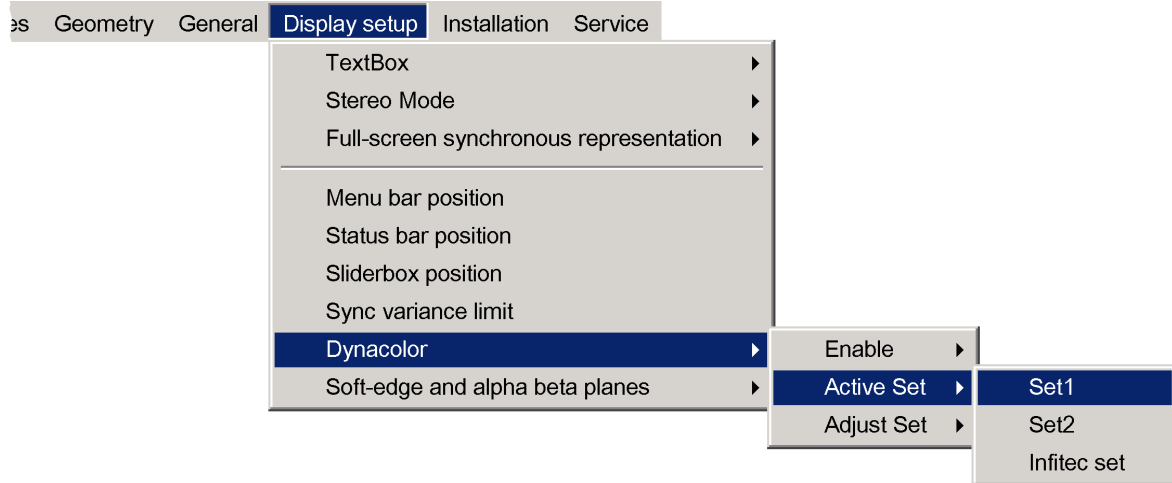


Image 10-22

2. Press **ENTER** to select.



To know about Dynacolor adjustments for various sets defined, please see the *Expert operation* chapter.



# 11. EXPERT OPERATION

## About this chapter

In this chapter we further discuss the highest level features of the MCM-50.

In the geometry section we explain how the coordinate system can be changed to enable a different way of adjusting the geometry, how the geometry data can be managed, how the image can be shifted on the F50 series projector and how we can manually set the time that can be used for geometry adjustment processing. This turns out to be very important in multiple channel display systems.

In the soft edge section; electronic blend is explained in detail: in multiple channel display systems, we can make the images of adjacent channels overlap in part. To correct for the doubled brightness in the overlap areas, electronic soft edge can be used. The same feature can also be used to blank parts of the image. In the overlap area of multiple channel display systems, we can adjust black color to make it meet the black of the non overlap areas in your display system.

Using Dynacolor, we can change the color temperature of the image or we can fine tune the image colors to match multiple channels to each other.

Finally we discuss how we can align a set of gray levels amongst multiple channels in your display system.

## Overview

- Geometry
- Soft Edge and Black Level
- Dynacolor

## 11.1 Geometry

### About this section

In this section we explain how the coordinate system can be changed to enable a different way of adjusting the geometry, how the geometry data can be managed, how the image can be shifted on the projector and how we can manually set the time that can be used for geometry adjustment processing. This turns out to be very important in multiple channel display systems.

### Overview

- Setting the Axis link to ON or OFF
- Working with Geometry files
- Shifting the image on the projector panel
- Transport delay

#### 11.1.1 Setting the Axis link to ON or OFF

##### Description

Axis link can be set to On or Off. Default is **Off**:

- *Off*: the adjustment coordinate system is absolute.
- *On*: the adjustment coordinate system coincides with the edges of the distorted image. This setting is only used in very dedicated display systems.

##### Example (2 x 2 mode) – Axis link set to Off

1. Start with a non-distorted image.
2. Set **Axislink** to *Off*.
3. Adjust the value of **PixelsX** (row 0; col 0) to +300 to move the top left corner to the right.

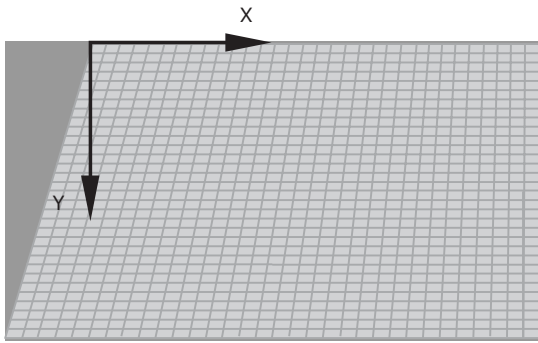


Image 11-1  
Example: Axis link set to Off

- Now adjust the **PixelsY** position to +300 to move the top left corner down.  
The left corner is shifted downwards along the Y-axis which is still vertical.

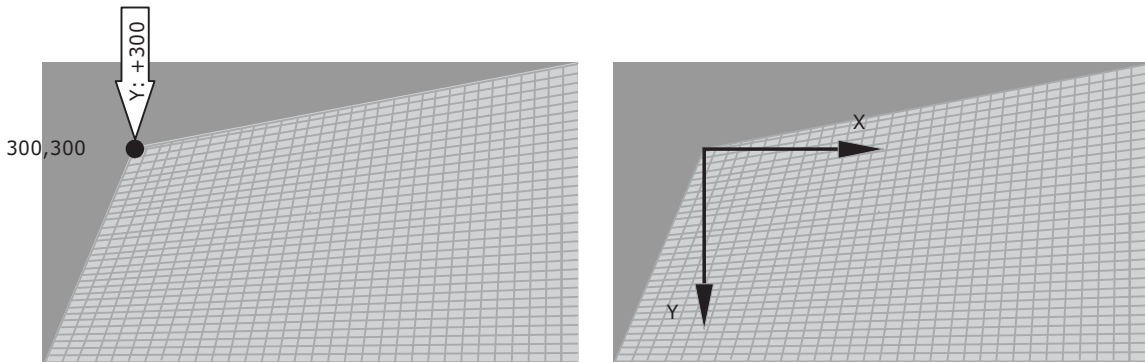


Image 11-2  
Example: Axis link set to Off

### Example (2 x 2 mode) – Axis link set to On

Following procedure illustrates a basic 2 x 2 adjustment with **Axislink** set *On* and *Off*.

- Start with a non-distorted image.
- Set **Axislink** to *On*.
- Adjust the value of **PixelsX** (row 0; col 0) to +300 to move the left top corner to the right.

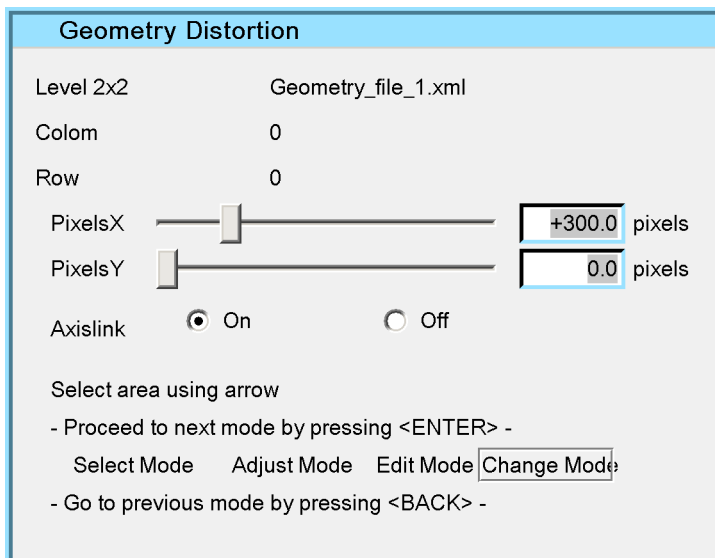


Image 11-3

This operation introduces a tilt to the Y-axis.

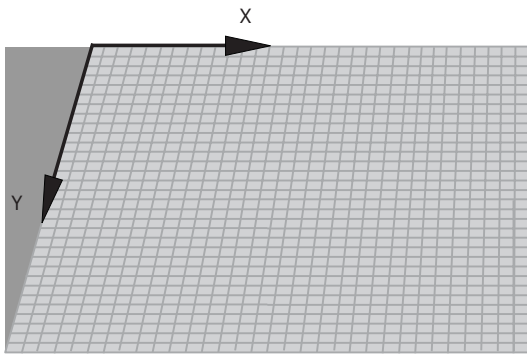


Image 11-4  
Example: Axis link set to On

4. Now adjust the **PixelsY** position to +300 to move the left top corner down.

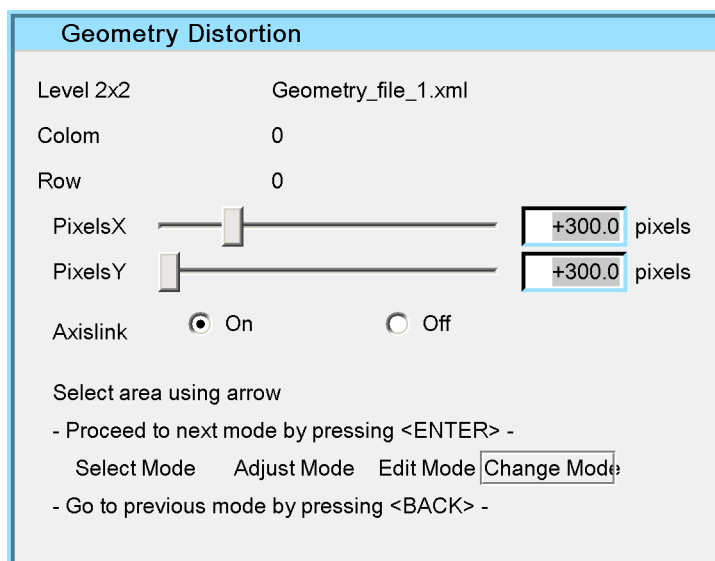


Image 11-5

The left corner is shifted down in the direction of the tilted Y-axis.

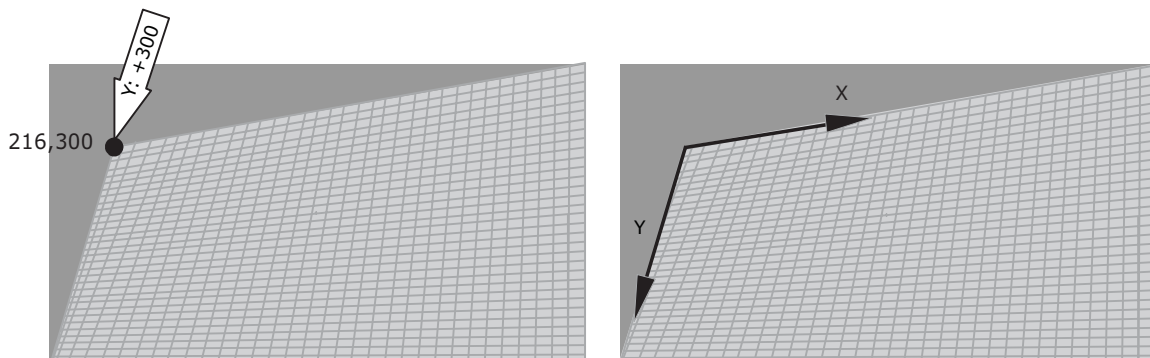


Image 11-6  
Example: Axis link set to On

### 11.1.2 Working with Geometry files

#### Description

All geometry related data is stored in Geometry files. The device's memory contains a list of Standard Geometry files created for demo purposes, e.g. to demonstrate the warping capabilities of the device.

The moment we start adjusting the geometry, a Custom Geometry file is created in which all adjustments are stored. The active geometry file can always be adjusted. If it is a Custom Geometry file, the changes will overwrite the original values. If it is a Standard Geometry file, the content is copied to a Custom Geometry file first and then the data is changed.

## 11. Expert operation

It is possible to Upload Custom Geometry files from a computer to the device or to download Custom Geometry files from the device to a computer if this computer is in the same network as the device.

The file notation in the Geometry files menu describes a file path.

For example : `./Standard/Nodist.xml`

Name	Description
Standard	file directory, also the type of file: Custom or Standard
Nodist	file name
xml	extension

The Geometry operations that you can perform are as follows.

### Overview

- Loading a Geometry file
- Renaming a Geometry file
- Copying a Geometry file
- Deleting a Geometry file

### 11.1.2.1 Loading a Geometry file

#### Description

When a source is displayed, the operator can manually load a Standard or Custom Geometry file to display the source image with the geometry adjustments as defined in the selected file.

#### Loading a Geometry file

1. In the OSD, navigate to `Geometry > Load...` and press **ENTER** to select.

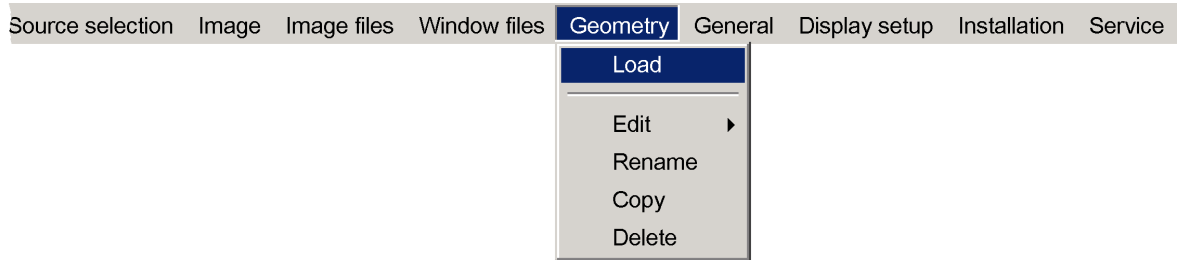


Image 11-7

2. In the dialog box, navigate to the Geometry file and press **ENTER** to select.

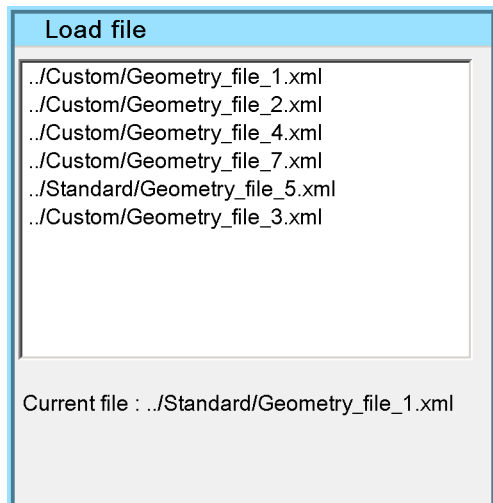


Image 11-8

3. Exit the menu.

### 11.1.2.2 Renaming a Geometry file

#### Description

It is easily possible to change the file name of Custom Geometry files.

#### Renaming a Geometry file

1. In the OSD, navigate to *Geometry > Rename...* and press **ENTER** to select.

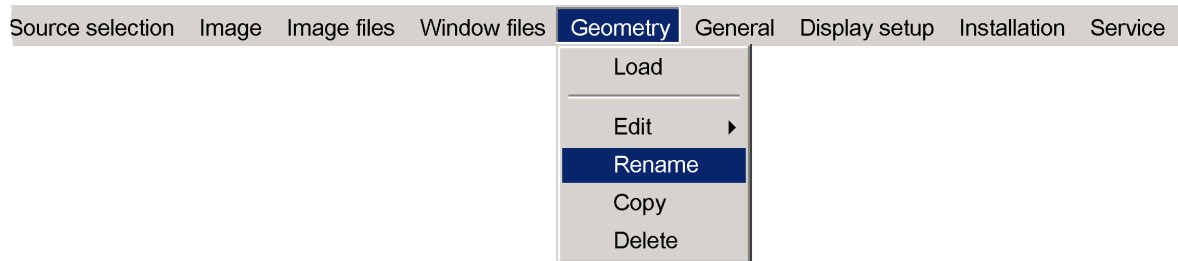


Image 11-9

2. In the dialog box, navigate to the Geometry file to be renamed and press **ENTER** to select.  
The selected file name appears in the edit box at the bottom of the dialog box.
3. In the edit box, change the name to your wishes and press **ENTER** to confirm.

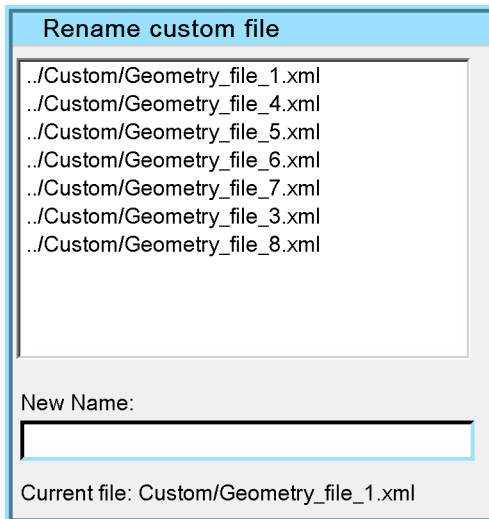


Image 11-10

4. Exit the menu.

### 11.1.2.3 Copying a Geometry file

#### Copying a Geometry file

1. In the OSD, navigate to *Geometry > Copy...* and press **ENTER** to select.

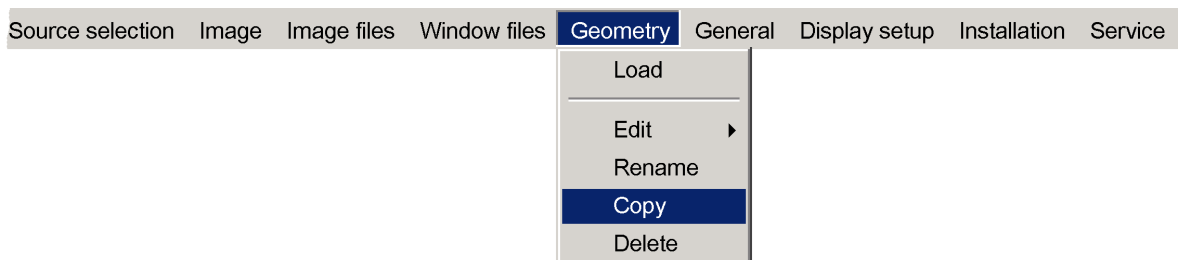


Image 11-11

2. In the dialog box, navigate to the Geometry file to be copied and press **ENTER** to select.

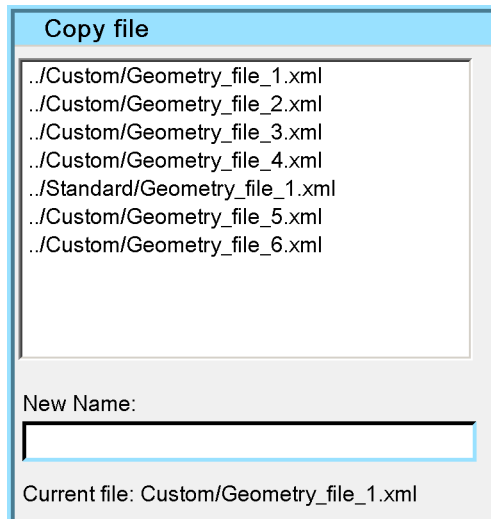


Image 11-12

The selected file name appears in the edit box at the bottom of the dialog box.

3. In the edit box, change the original file name to the desired name for the copy.
4. Confirm by pressing **ENTER**.
5. Exit the menu.

### 11.1.2.4 Deleting a Geometry file

#### Description

Custom Geometry files can be deleted at any time.

#### Deleting a Geometry file

1. In the OSD, navigate to *Geometry > Delete...* and press **ENTER** to select.

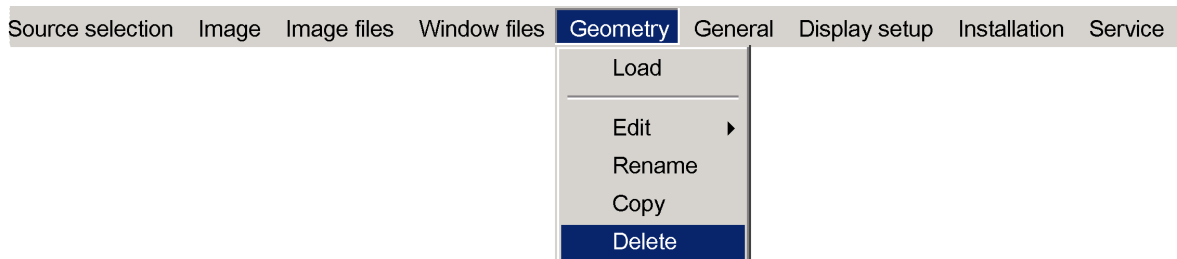


Image 11-13

2. In the dialog box, navigate to the Geometry file to be deleted and press **ENTER** to select.

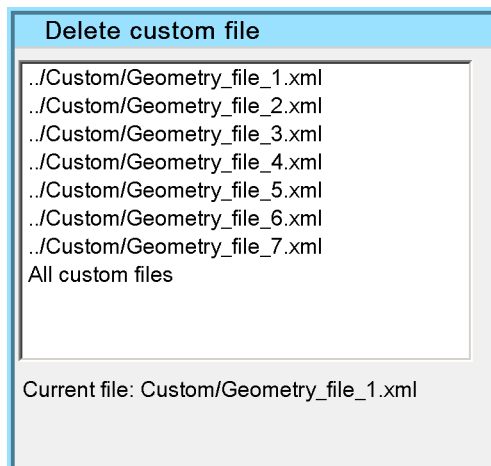


Image 11-14

3. Confirm by pressing **ENTER**.

A confirmation window appears, follow the instruction and make your choice.

- Exit the menu.

### 11.1.3 Shifting the image on the projector panel

#### Description

It is possible to shift the whole image on the projector panel. This is considered as an equal movement of the 4 corner points in 2 x 2 mode. The Geometry edit dialog box is used for adjusting the shift. After shifting the image on the projector panel parts of the image might not be visible anymore.

#### Shifting the image on the projector panel

- In the OSD, navigate to *Geometry > Edit > Shift...* and press **ENTER** to select.

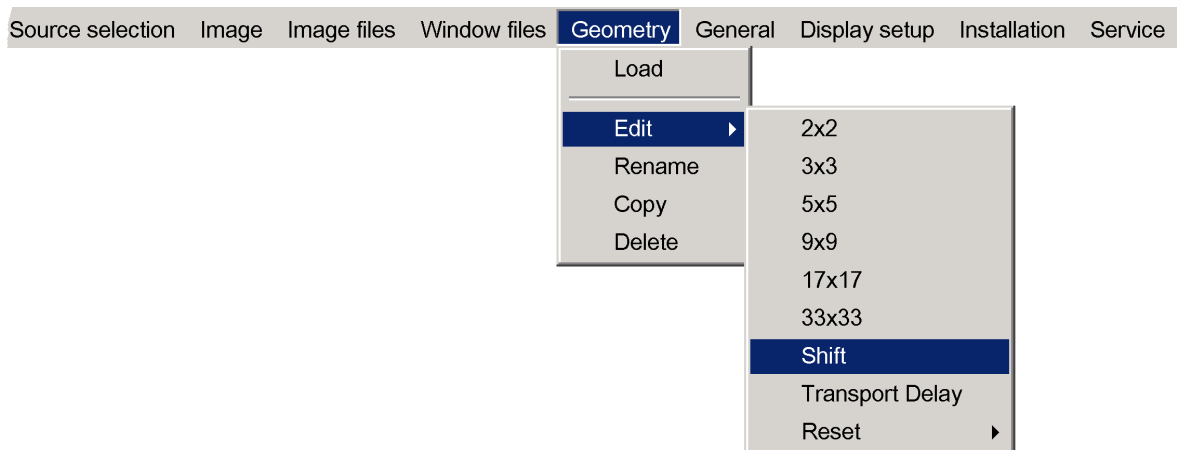


Image 11-15

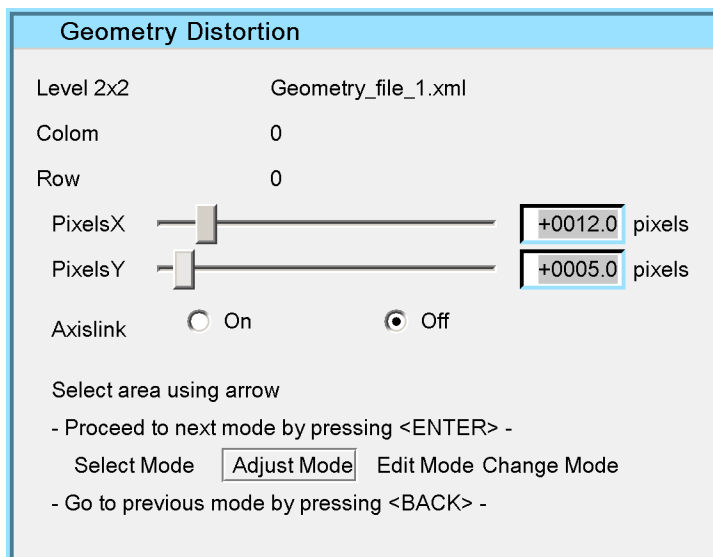


Image 11-16

**Note:** By default the **Adjust mode** is selected instead of the **Select mode** in case of the usual geometry adjustment.

- Use the arrow keys on the RCU to shift the image only a few pixels or press **ENTER** to navigate to *Edit mode* if you want to shift the image over a bigger distance.

## 11. Expert operation

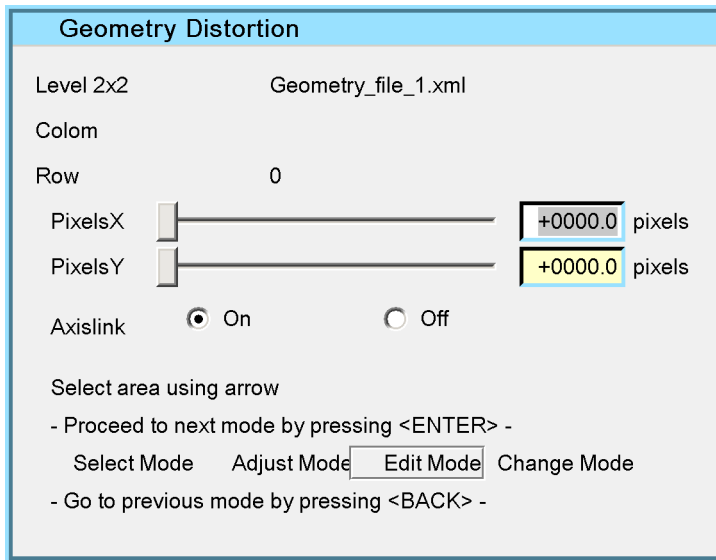


Image 11-17

- Use the ▼ and ▲ arrow keys on the RCU to select the *PixelsX* (horizontal shift) or *PixelsY* (vertical shift) edit box.
- Press **ENTER** to navigate to *Change mode*.

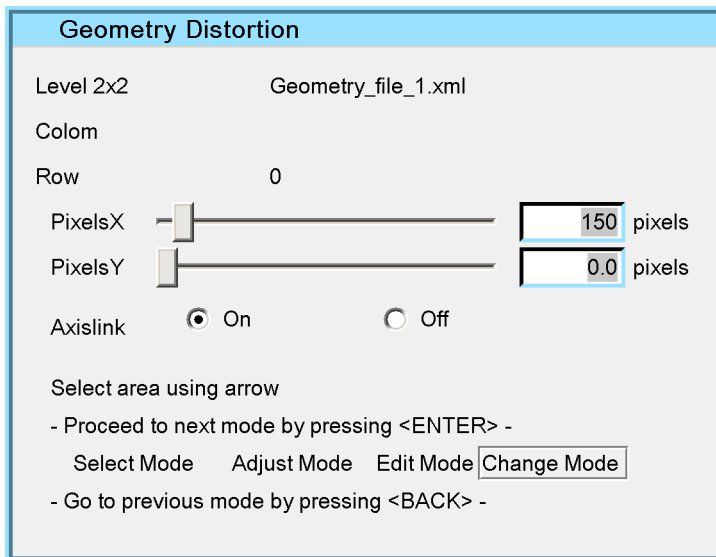


Image 11-18

- Use the arrow keys on the RCU to enter a new value in the selected edit box. The image is shifted according to the value entered.

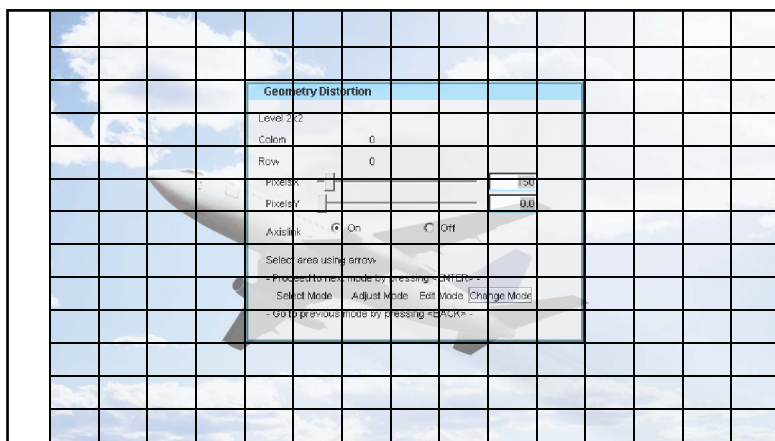


Image 11-19  
Shift adjustment



6. Exit the menu.

### 11.1.4 Transport delay

#### Description

Transport delay is the time interval that is required to fully process the image.

Transport delay can be set to *Automatic* or to *Manual*. Default is *Automatic*.

- **Automatic:** the device takes the minimum safe value, required to fully perform the image processing.
- **Manual:** the delay can be changed in the range 0 to 1023, expressed in line duration of the lock source.

#### Advised use of Transport delay

In a single channel display system, you can leave the Transport delay setting to *Automatic*.

In multiple channel display systems, it is strongly advised to follow this sequence:

1. Make sure that the Transport delay of all projectors is set to *Automatic*.
2. Adjust the geometry until it is well aligned in all devices.
3. Check the Transport delay value in all devices and find the highest value.
4. Switch Transport delay to *Manual* in all projectors.
5. Enter the highest value that was found as new Transport delay value in all devices.



A Transport delay set too short will introduce 'clipping' phenomenons in the image.

#### Adjusting the Transport delay

1. In the OSD, navigate to *Geometry > Edit > Transport Delay...* and press **ENTER** to select.

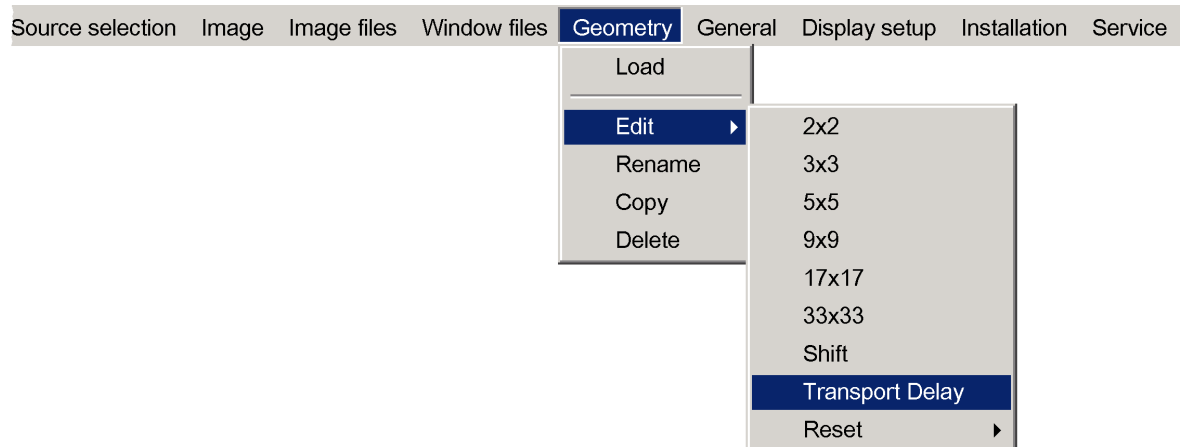


Image 11-20

The *Transport delay* dialog box is displayed.

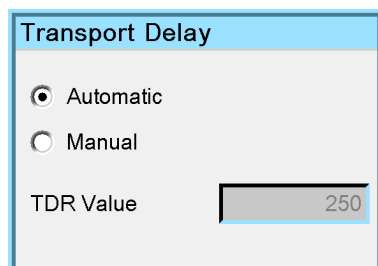


Image 11-21

2. Select the desired option: *Automatic* or *Manual*.  
If the option *Manual* is selected, then the *TDR value* text box is enabled. To set the TDR value see the procedure below.

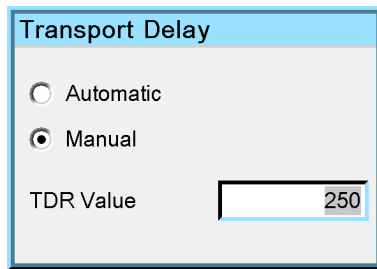


Image 11-22

**Note:** The Transport Delay is by default set to 200.

3. Exit the menu.

## 11.2 Soft Edge and Black Level

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### Overview

- Soft Edge and Black Level explained
- Soft Edge area shape
- General Soft Edge workflow
- Alpha planes
- Beta planes
- The Soft Edge selection dialog
- The Soft Edge edit dialog
- Selecting an anchor point
- Moving an anchor point in small steps
- Moving an anchor point in large steps

### 11.2.1 Soft Edge and Black Level explained

#### Soft Edge and Black Level principle

To achieve a seamless multiple channel image on one single large screen, we can make the adjacent images from two or more devices overlap in part. In the overlap areas where the image of two channels is joined, we find twice the brightness, so we need to apply a gradual feather or Soft Edge blending on both channels to reduce the higher brightness to normal. This Soft Edge blending can be realized with photographic plates put in front of the projection lens (especially used in case of dark sceneries) or with the Electronic Soft Edge Matching (ESEM) feature of the device (especially used in case of bright images).

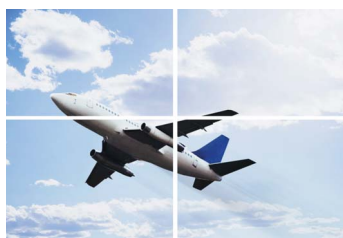


Image with hard edge



Image without soft edge adjustment



Image with soft edge adjustment

Image 11-23  
Example: Soft edge blending

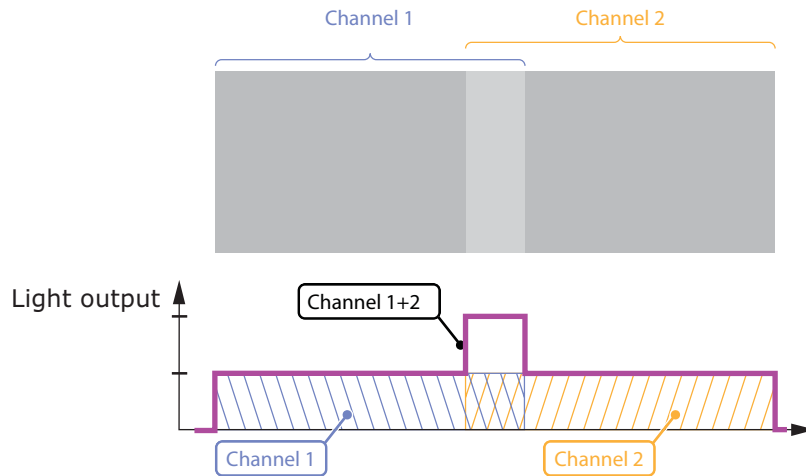


Image 11-24  
Without Soft Edge

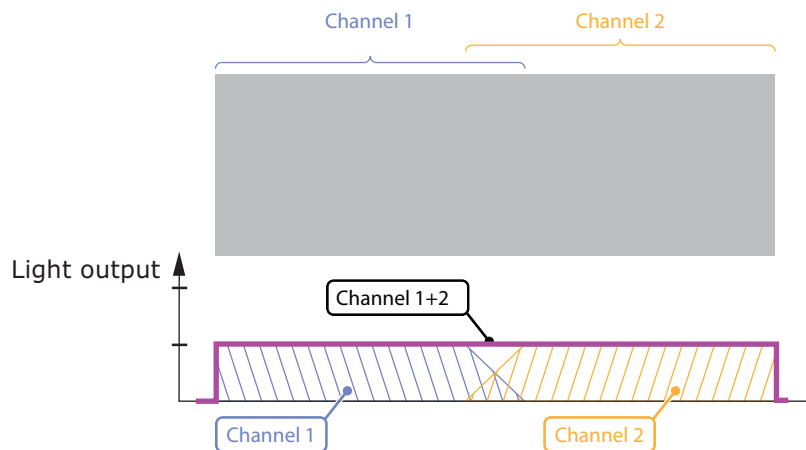


Image 11-25  
With Soft Edge

Next to blending, Soft Edge can also be used to blank parts of the image. This turns out to be extremely useful in applications where mechanical constructions are blocking a part of the image (e.g. cockpit, mechanical supports, etc.).

Finally it is possible to match “full black” in the non overlap areas to “full black” in the overlap areas by making it a little brighter.

### How does Electronic Soft Edge blending work?

The process of **Soft Edge** blending involves electronic manipulation of individual pixels to ensure the correct intensity depending on its position in the specified blend zone. While adjusting Soft Edge a bitmap is created, having the native resolution of the device. The value of each pixel of the image to be projected is **multiplied** by the value of the corresponding pixel on the bitmap before it is displayed. This bitmap is called the **internal Alpha Plane**.

By performing **Black Level** adjustment, another bitmap is created, again having the native resolution of the device. The value of each pixel on the bitmap is **added** to the value of the corresponding pixel of the image to be projected before it is displayed. This bitmap is called the **internal Beta Plane**.

The advanced Soft Edge user interface in the OSD makes it possible to create the correct shape of the Soft Edge area in a flexible way. By using the Black Level user interface, only pixels outside the overlap areas as defined with the Soft Edge user interface are changed.

### External Alpha and Beta Planes

It is also possible to create your own Alpha Plane and Beta Plane and upload it to the device. These “external” planes must meet some rules:

- The bitmap resolution must be 1280 x 800 pixels; it is scaled up to 2560 x 1600 in the device;
- Only one Alpha Plane and one Beta Plane can be stored in the device. Uploading an Alpha Plane or a Beta plane overwrites the original one if it was present;
- The external Alpha Plane must have exactly this name: *alpha.tiff*;
- The external Beta Plane must have exactly this name: *beta.tiff*;
- The external Alpha Plane accepts colored pixels;
- The external Beta Plane only accepts Black pixels, White pixels and Gray pixels.

## 11. Expert operation

The effect of external Alpha and Beta Planes can be expressed as follows:

$$\text{Projected image} = \text{Alpha Plane} * \text{Source image} + \text{Beta Plane}$$

External and Internal Alpha and Beta Planes can be enabled simultaneously.

### 11.2.2 Soft Edge area shape

#### Description



The soft edges are created on the distorted image, i.e. it is available at the borders of the distorted image.

Using the Soft Edge user interface, you can create a Soft Edge area and/or a blanked area on each of the four edges of the image. Each edge where the blending is to be applied has a **grid of anchor points**. Depending on the selected level, the amount of anchor points can vary from 4 to 25. By default the grid is rectangular, symmetric and it covers 12.5% of the width or height of the image.

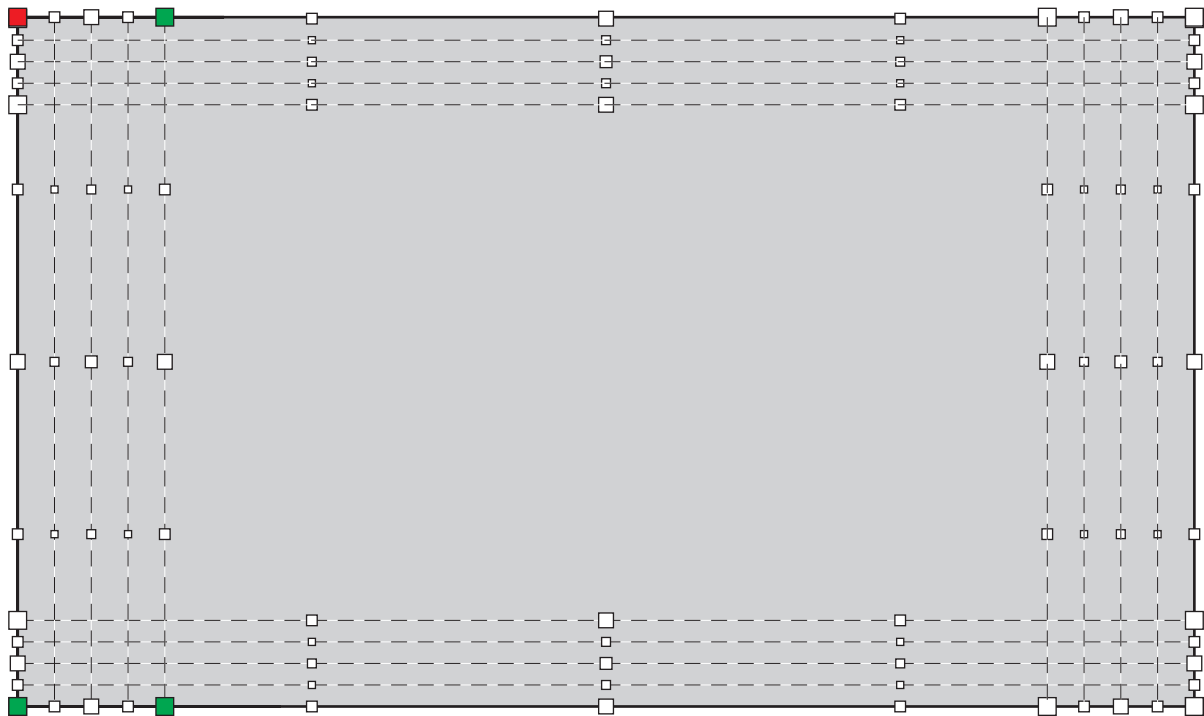


Image 11-26  
Soft Edge anchor points

The anchor points are numbered from 0 to 24 and can be moved to the desired location to determine the size and shape of the Soft Edge area on the selected edge. By moving anchor points zero to four, a blanked area is created.

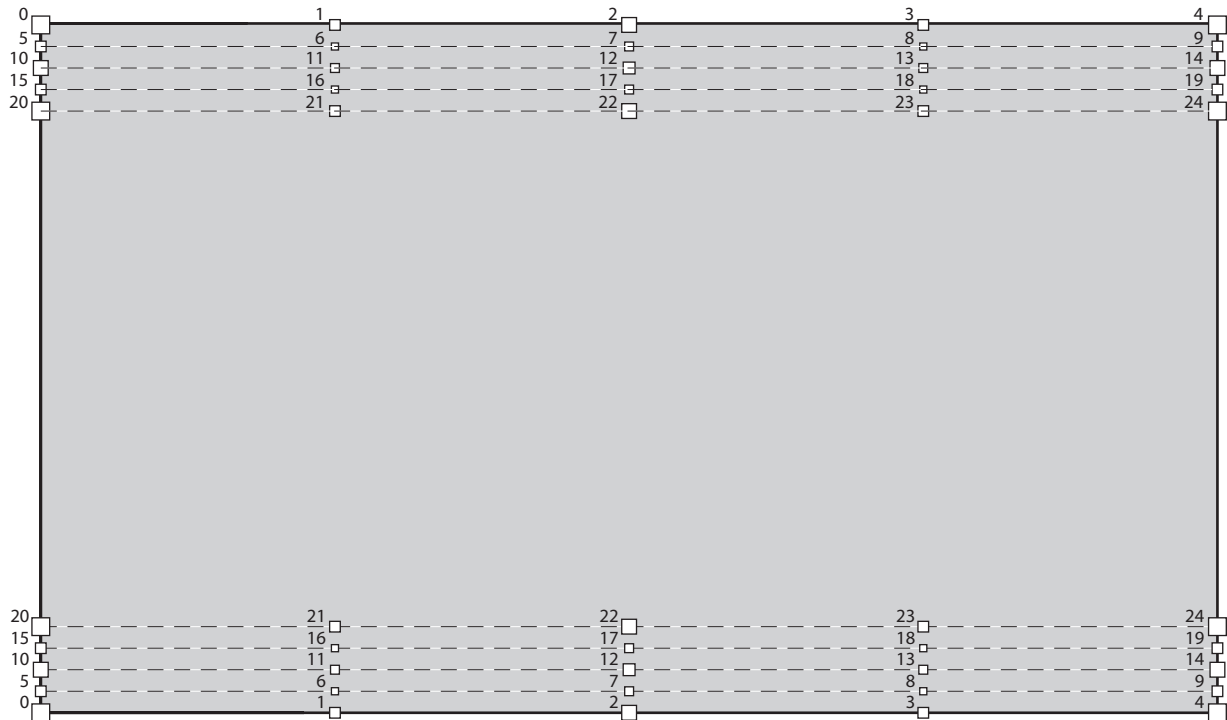


Image 11-27  
Anchor point numbering: top and bottom edges



Image 11-28  
Anchor point numbering: left and right edges

### Level hierarchy

Similar to Geometry levels, Soft Edge adjustment has **hierarchy levels**.

Each level represents a group of anchor points and interacts with other levels: moving an anchor point on a certain level affects points in the levels underneath. Therefore it is required to start shaping the Soft Edge area from the highest level and go to lower levels while completing the procedure.

In Level 1, the four corners of the default soft edge zone act as anchor points. Moving any of them affects the whole area. When moving an anchor point of Level 6, only a smaller part of the whole area is affected. The images below show the levels and corresponding anchor points in the left side Soft Edge area and an example of a weirdly shaped left side Soft Edge + blanking.

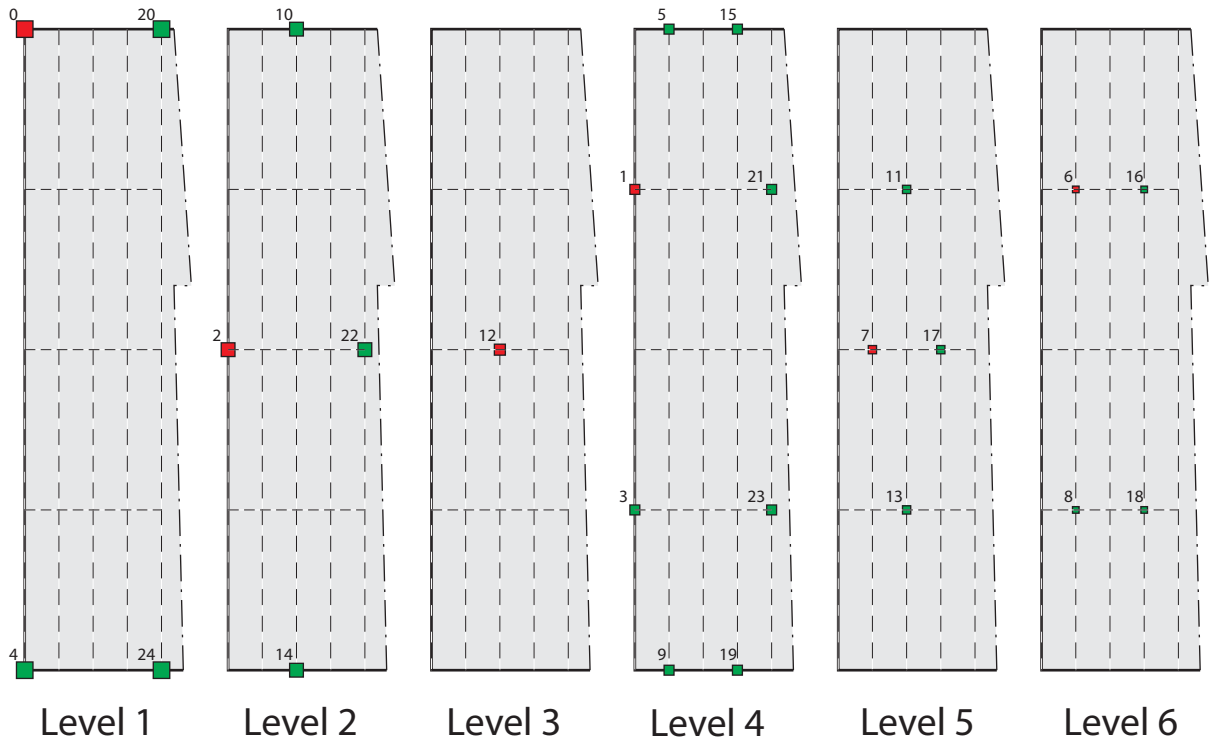


Image 11-29  
Soft Edge Levels

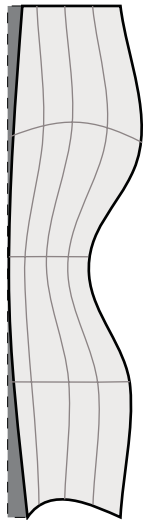


Image 11-30  
Shaped Soft Edge

Anchor points have the following features and restrictions:

- Anchor points of a higher level are marked by a bigger square than anchor points of a lower level;
- Anchor points are color coded:
  - Red square: the selected anchor point, i.e. the anchor point that can be moved;
  - Green square: anchor point(s) belonging to the same level as the selected anchor point;
  - White square: anchor point(s) belonging to a different level than the selected one.
- An anchor point cannot be moved beyond another anchor point.

### 11.2.3 General Soft Edge workflow

#### Introduction

Before you start creating a Soft Edge, make sure that geometry (Geometry adjustment), colors (Dynacolor) and brightness are perfectly aligned amongst all devices.

#### Creating a Soft Edge

1. In the OSD, browse to *Display setup > Soft-edge and alpha beta planes > Edit...* and press **ENTER** to open the *Soft Edge Selection* dialog.

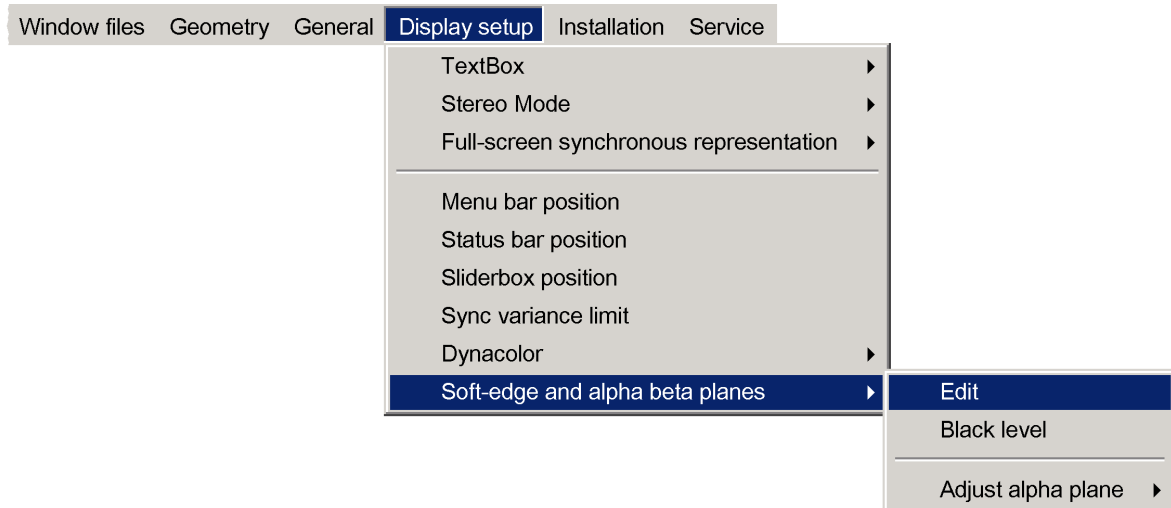


Image 11-31

2. In the *Soft Edge Selection* dialog, enter the following selections:
  - Plane: set checkbox *Internal*;
  - Source: click *Full white*;
  - Edges: set the check boxes of the edges where you want to create a Soft Edge;
  - Adjustment guide: click *On*;
  - Hierarchy levels: select the lowest level you expect to need.

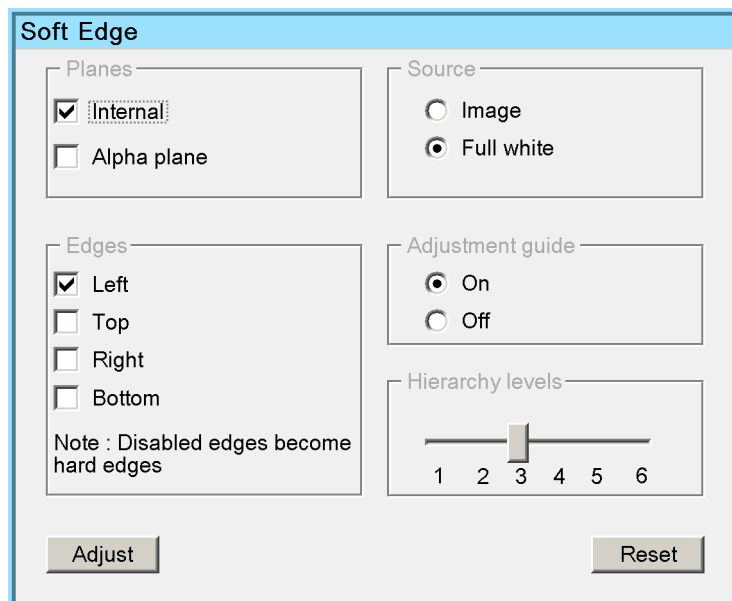


Image 11-32

3. Click **Adjust** to open the *Soft Edge Edit* dialog.

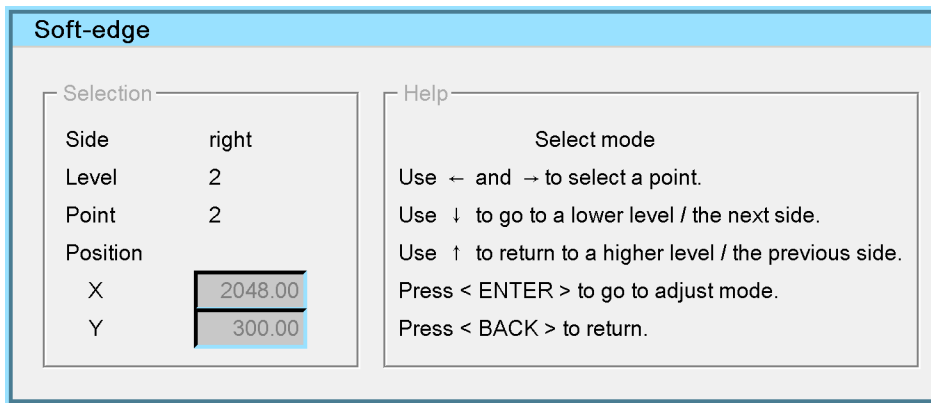


Image 11-33

4. Select one of the edges where a Soft Edge is required. See "Selecting an anchor point", page 100.
5. Select the highest level (i.e. Level 1). See "Selecting an anchor point", page 100.
6. For each of the anchor points of the selected level, adjust the position. See "Selecting an anchor point", page 100, "Moving an anchor point in small steps", page 100 and "Moving an anchor point in large steps", page 101.
7. If you need to further shape the Soft Edge area on the selected side, proceed to the next lower level. See "Selecting an anchor point", page 100.
8. Repeat step 6 to step 7 until the Soft Edge shape on the selected edge meets the specifications.  
**Note:** *If you need a lower level than selected in step 2, you can return to the Soft Edge Selection dialog and change to a lower Hierarchy level at any time. See "The Soft Edge selection dialog", page 96.*
9. Repeat step 4 to step 8 to create the correct Soft Edge shape for each of the other edges.

### Creating a blanked area

1. In the OSD, browse to *Display setup > Soft-edge and alpha beta planes > Edit...* and press **ENTER** to open the *Soft Edge Selection* dialog.

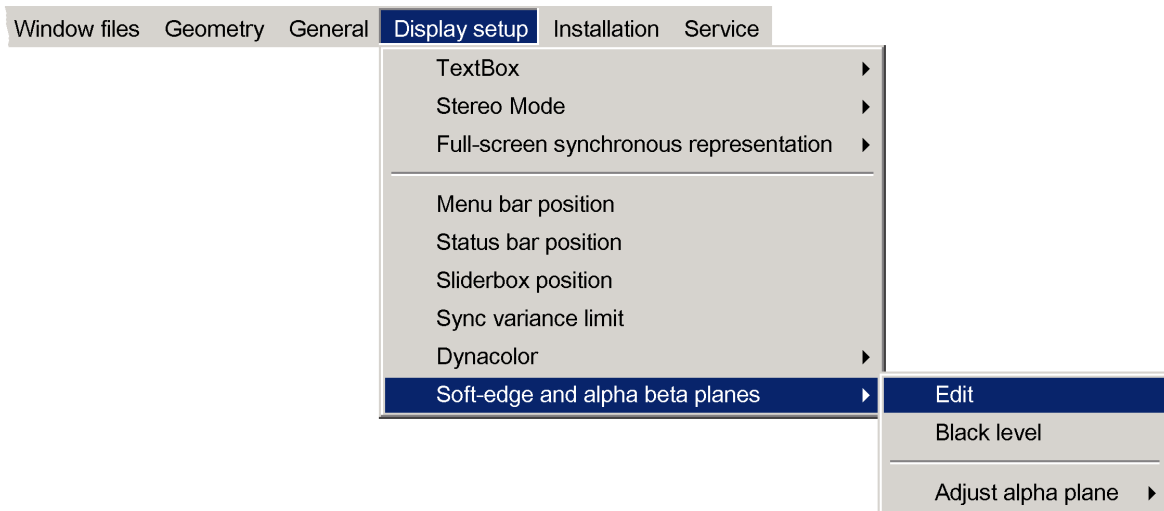


Image 11-34

2. In the *Soft Edge Selection* dialog, enter the following selections:
  - Plane: set checkbox *Internal*;
  - Source: click either *Image* (in case of blanking only) or *Full white* (in case of blanking + Soft Edge);
  - Edges: set the check boxes of the edges where you want to create not only a blanked area but also a Soft Edge; clear the check boxes of the edges where you only want to introduce some blanking (i.e. hard edge blanking);
  - Adjustment guide: click *On* (in case of blanking + Soft Edge) or *Off* (in case of blanking only);
  - Hierarchy levels: select the lowest level you expect to need: no need to select a level lower than four, since only anchor points zero to four can be used to shape the blanked area.



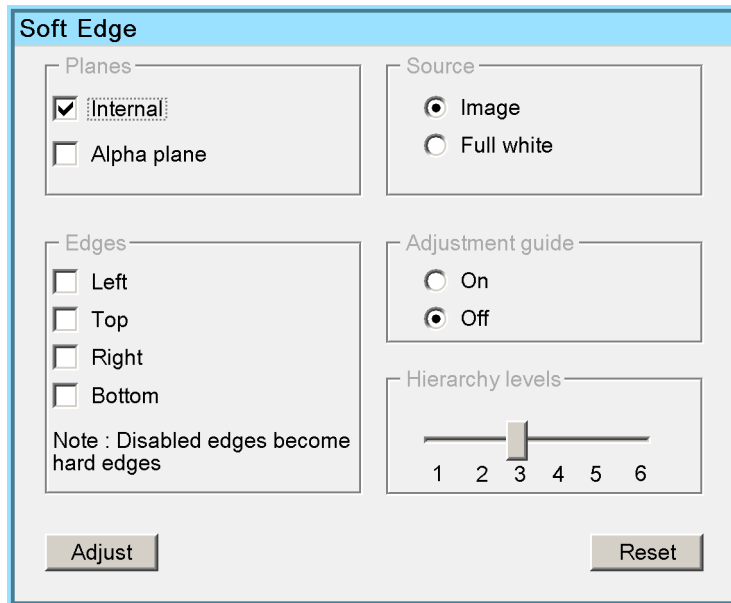


Image 11-35

- Click **Adjust** to open the *Soft Edge Edit* dialog.

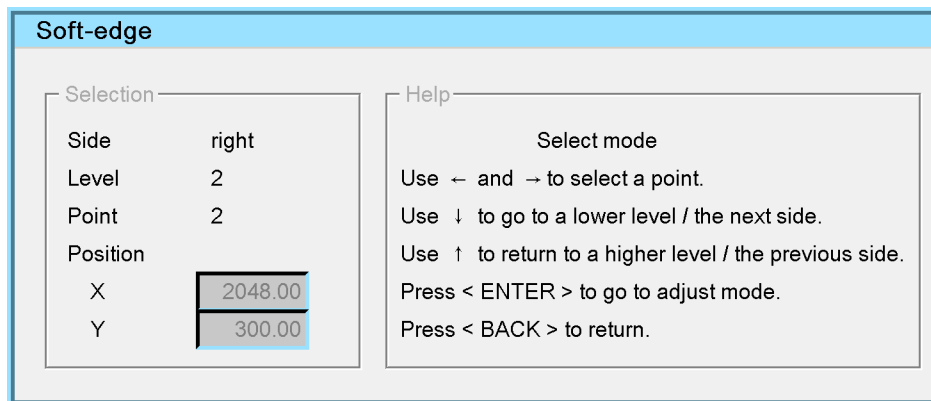


Image 11-36

- Select one of the edges where blanking is required. See "Selecting an anchor point", page 100.
- Select Level 1. See "Selecting an anchor point", page 100.
- Adjust the position of anchor points zero and four. See "Selecting an anchor point", page 100, "Moving an anchor point in small steps", page 100 and "Moving an anchor point in large steps", page 101.
- If you need to further shape the blanking area on the selected side, proceed to Level 2. See "Selecting an anchor point", page 100.
- Adjust the position of anchor point two if required. See "Selecting an anchor point", page 100, "Moving an anchor point in small steps", page 100 and "Moving an anchor point in large steps", page 101.
- If you need to further shape the blanking area on the selected side, proceed to Level 3. See "Selecting an anchor point", page 100.
- Adjust the position of anchor points one and three if required. See "Selecting an anchor point", page 100, "Moving an anchor point in small steps", page 100 and "Moving an anchor point in large steps", page 101.
- Exit the menu.

### Adjusting Black Level

- Project a full black image.
- Activate the created Soft Edge. See "The Soft Edge selection dialog", page 96: set checkbox *Internal*.
- Browse to *Display setup > Soft-edge and alpha beta planes > Black level...* and press **ENTER** to open the *Black level* dialog.

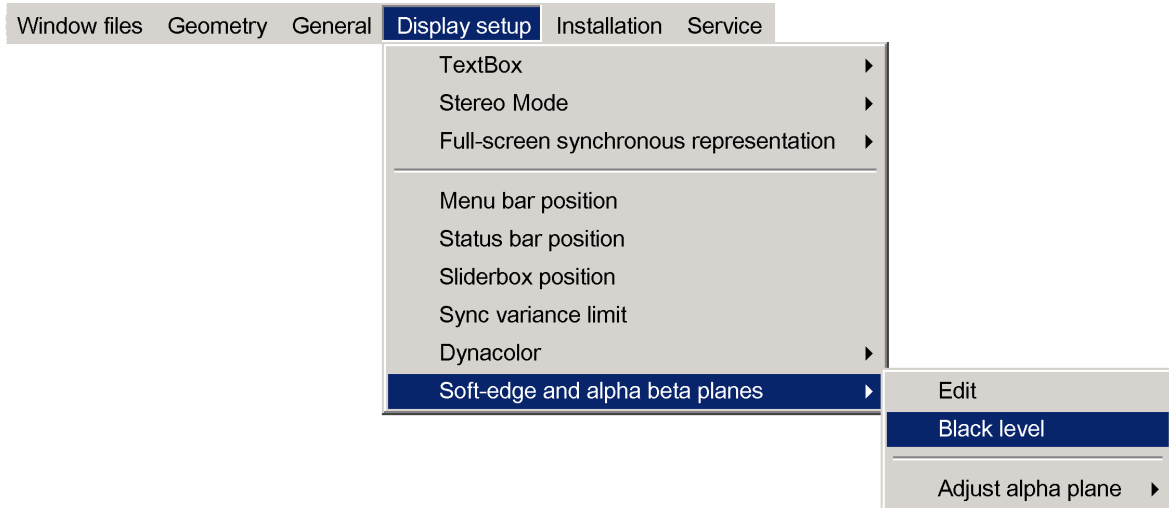


Image 11-37

4. In section *Planes*, set check box *Internal*.



Image 11-38

5. Use the arrow buttons or the edit box to match the black level in the non overlap areas to the black level of the overlap area.
- ◀ or ▶: small step;
  - ◀◀ or ▶▶: bigger step;
  - ◀◀◀ or ▶▶▶: jump the limit of the range.

**Note:** The value can be set in the range 0 to 255. Default value is 0.

## 11.2.4 Alpha planes

### Uploading an alpha plane file

Use an FTP Client (e.g. Filezilla) to upload the Alpha plane to the following directory on the MCM-50:

**/D/Display/Softedge**

The file must be named as follows :

**alpha.tiff**

The free storage capacity on the D-drive is about 8 MB. it is needed to store the image files, geometry files, factory backup, Alpha plane and Beta plane. In practice, about **6 MB** is available for the Alpha + Beta plane.

### Uploading and activating an external Alpha Plane

1. Make sure that the computer from where you want to upload the external Alpha Plane is in the same network as the device.
2. Open your Internet Browser and browse to the device using FTP: e.g. `ftp://<Hostname>`.
3. Copy and paste the external Alpha Plane in the following folder on the device's flash: `D:/Display/Softedge`.
4. Browse to *Display setup* > *Soft-edge and alpha beta planes* > *Edit...* and press **ENTER** to open the *Soft Edge Selection* dialog.

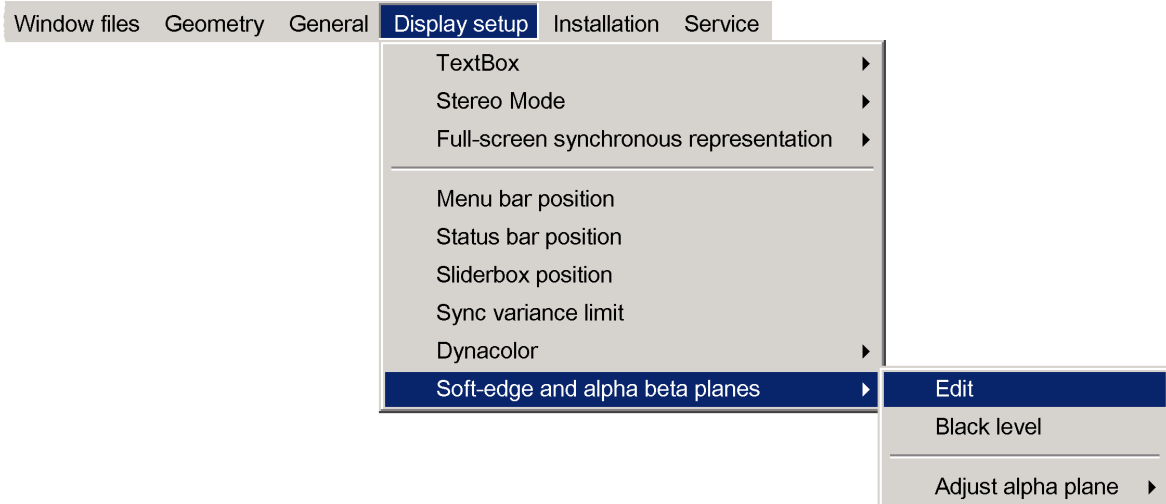


Image 11-39

5. In the *Planes* section of the *Soft Edge Selection* dialog, set checkbox *Alpha plane*.

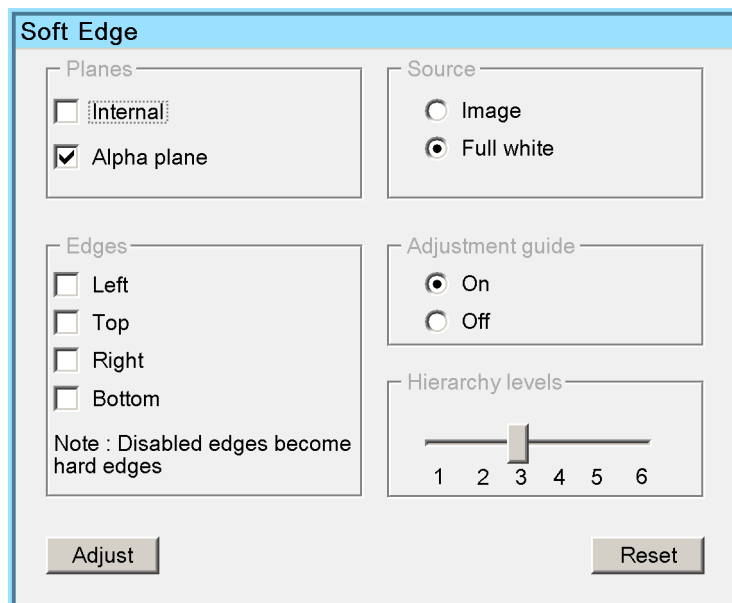


Image 11-40

6. Exit the menu.

### 11.2.5 Beta planes

#### Uploading a Beta plane file

Use an FTP Client (e.g. Filezilla) to upload the Beta plane to the following directory on the MCM-50:

**/D/Display/Softedge**

The file must be named as follows :

**beta.tiff**

The free storage capacity on the D-drive is about 8 MB. It is needed to store the image files, geometry files, factory backup, Alpha planes and Beta planes. In practice, about **6 MB** is available for the Alpha + Beta plane.

#### Uploading and activating an external Beta Plane

1. Make sure that the computer from where you want to upload the external Beta Plane is in the same network as the device.
2. Open your Internet Browser and browse to the device using FTP: e.g. `ftp://<Hostname>`.
3. Copy and paste the external Beta Plane in the following folder on the device's flash: `D:/Display/Softedge`.
4. Browse to *Display setup* > *Soft-edge and alpha beta planes* > *Black level...* and press **ENTER** to open the *Black level* dialog.

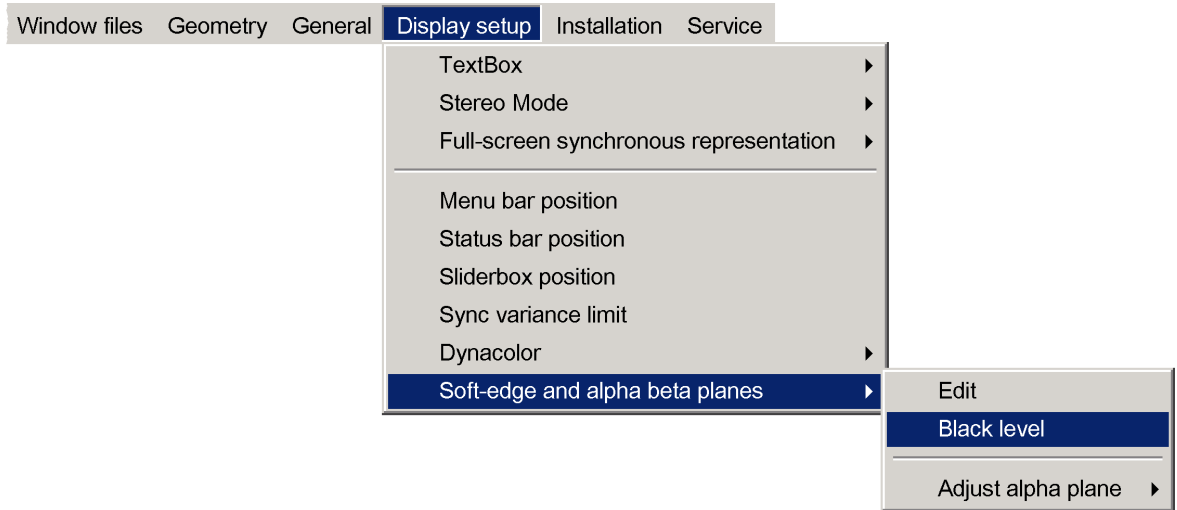


Image 11-41

5. In the *Planes* section of the *Black level* dialog, set checkbox *Beta plane*.



Image 11-42

6. Exit the menu.

### 11.2.6 The Soft Edge selection dialog

#### Description

The Soft Edge selection dialog acts as a platform enabling you to give various inputs to the device to perform soft edge adjustment. It consists of the following sections:

- Planes
- Source
- Edges
- Adjustment guide
- Hierarchy level
- Action buttons

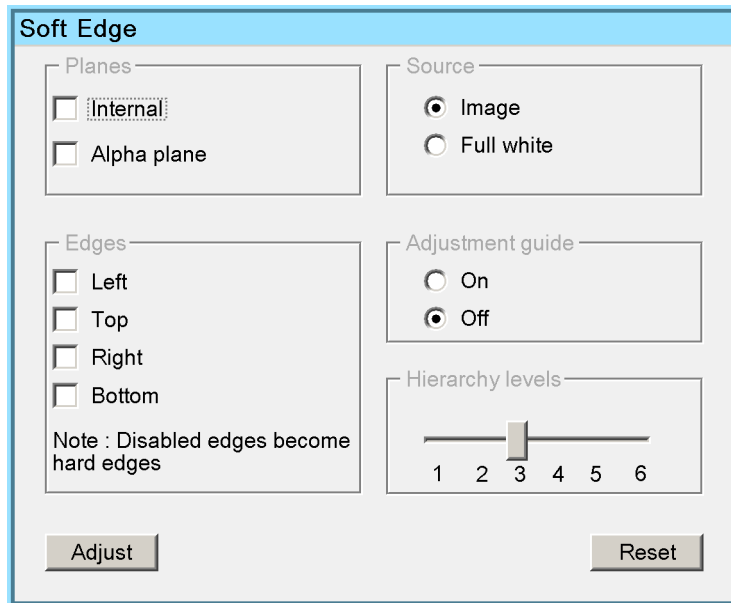


Image 11-43

The following table describes the fields in the Soft Edge selection dialog.

Field / button	Description	Notes
<i>Planes</i>	<ul style="list-style-type: none"> <li><i>Internal</i> soft edge: to enable the Soft Edge or Blanking area created through the OSD;</li> <li><i>Alpha plane</i>: to enable an external Alpha plane that has been uploaded to the device.</li> </ul>	Both <i>Internal</i> and <i>Alpha plane</i> can be selected at the same time.
<i>Source</i>	<ul style="list-style-type: none"> <li><i>Image</i>: to display the image of the selected source(s) while adjusting the Soft Edge;</li> <li><i>Full white</i>: to display full white while adjusting the Soft Edge.</li> </ul>	The procedures in this manual are explained using a full white background.
<i>Edges</i>	In this section the edges of the total image where Soft Edge blending needs to be applied must be selected: <i>Left</i> , <i>Top</i> , <i>Right</i> , <i>Bottom</i> .	Disabled edges are hard edges. Adjusting a hard edge results in creating a blanked area without Soft Edge blending on that edge.
<i>Adjustment guide</i>	The adjustment guide consists of a four brightness graduated bars applied on the selected edge(s).	The four bars coincide with the grid as explained in "Soft Edge area shape", page 88.
<i>Hierarchy level</i>	The Soft Edge adjustment level can be set in a range from one to six.	For more details, see "Soft Edge area shape", page 88.
<b>Reset</b>	Click this button to return to the default Soft Edge settings, i.e. on the selected edges, the Soft Edge shape follows the active geometry settings and the width is set to 12.5%.	If starting to adjust Soft Edge from scratch, it is a good practice to click <b>Reset</b> before clicking <b>Adjust</b> . Then you are sure that the Soft Edge follows the active geometry settings.
<b>Adjust</b>	Click this button to display the Soft Edge edit dialog and start defining/adjusting Soft Edge or Blanking.	

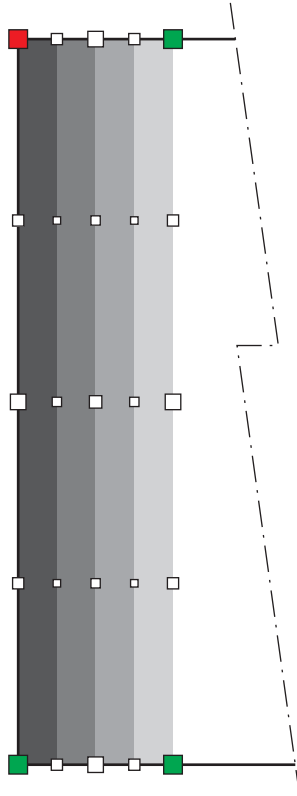


Image 11-44  
Soft Edge Adjustment guide ON

### 11.2.7 The Soft Edge edit dialog

#### The Soft Edge edit dialog

In the *Soft Edge selection* menu, click **Adjust** to display the semitransparent *Soft Edge edit* dialog.

This *Soft Edge edit* dialog acts as an intuitive user interface to perform all Soft Edge adjustments on the fly. Each individual anchor point can be selected and moved to the desired location in real time.

The table below explains every item in the *Soft Edge edit* dialog.

Field/item	Description	Notes
Selection / Side	Indicates the edge of the active anchor point.	
Selection / Level	Indicates the level of the active anchor point.	
Selection / Point	Indicates the active anchor point.	The active anchor point is indicates by a red square.
Selection / Position X and Y	Indicate the X and Y coordinate of the active anchor point.	In table front mode, the left top corner of the image is the coordinate system origin. Positive values are right and down.
Help / Select mode	Explains the controls in Select mode.	In Select mode, you can select an edge (or side), a level or an anchor point. The levels that can be selected are limited by the <i>Hierarchy level</i> setting in the <i>Soft Edge selection</i> dialog.
Help / Adjust mode	Explains the controls in Adjust mode.	In Adjust mode, the selected anchor point can be moved using the arrow keys on the RCU.
Help / Edit mode	Explains the controls in Edit mode.	In Edit mode, the edit box of Position X or Position Y can be enabled.
Help / Change mode	Explains the controls in Change mode.	In Change mode, the value in the enabled Position edit box can be changed.

Soft-edge	
Selection	
Side	right
Level	2
Point	2
Position	
X	2048.00
Y	300.00
Help	
Select mode	
Use ← and → to select a point.	
Use ↓ to go to a lower level / the next side.	
Use ↑ to return to a higher level / the previous side.	
Press < ENTER > to go to adjust mode.	
Press < BACK > to return.	

Image 11-45

Soft-edge	
Selection	
Side	left
Level	1
Point	4
Position	
X	0.000
Y	1200.000
Help	
Adjust mode	
Use ← and → to move a point horizontally.	
Use ↑ and ↓ to move a point vertically.	
Press < ENTER > to go to edit mode.	
Press < BACK > to return to select mode.	

Image 11-46

Soft-edge	
Selection	
Side	left
Level	1
Point	4
Position	
X	7.000
Y	1404.000
Help	
Edit mode	
Use ↑ and ↓ to select a position field.	
Press < ENTER > to edit the position field.	
Press < BACK > to return to adjust mode.	

Image 11-47

Soft-edge	
Selection	
Side	left
Level	1
Point	4
Position	
X	+0007.000
Y	1404.000
Help	
Change mode	
Use ← and → to select a digit.	
Use ↑ and ↓ to scroll a digit.	
Press any number key to change a digit.	
Press < ENTER > to confirm.	
Press < BACK > to cancel.	

Image 11-48

As soon as the *Soft Edge edit* dialog is displayed, the first anchor point of Level 1 is by default selected.

### 11.2.8 Selecting an anchor point

#### Description

In **Select mode**, you can select any of the anchor points. You cannot adjust or edit the selected anchor point in this mode. All actions that can be performed in Select mode are explained in the *Help* section of the *Soft Edge edit* dialog.

#### Selecting an anchor point

1. Open the *Soft Edge edit* dialog by clicking **Adjust** in the *Soft Edge selection* dialog.

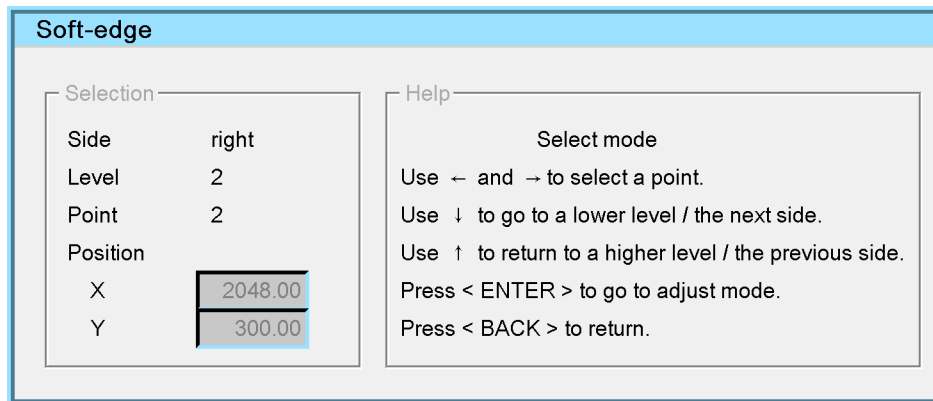


Image 11-49

2. Use the arrow keys ◀ and ▶ on the RCU to select another anchor point in the same level.
3. Use the arrow key ▲ on the RCU to go to a higher level. If you are at Level 1, pressing ▲ activates the first anchor point on the next edge of the image.
4. Use the arrow key ▼ on the RCU to go to a lower level. If you are at the lowest level in your selection (see the setting in the *Soft Edge selection* dialog), pressing ▼ activates the first anchor point on the previous edge of the image.
5. If the correct anchor point is selected (indicated by a red square around it), press **ENTER** to go to Adjust mode or press **BACK** to return to the *Soft Edge selection* dialog.

### 11.2.9 Moving an anchor point in small steps

#### Description

**Adjust mode** is used to do small Soft Edge adjustments using the arrow keys on the RCU. Each step is only one pixel. The actions that can be performed in Adjust mode are explained in the *Help* section of the *Soft Edge edit* dialog.

For larger adjustments the **Adjust mode** is not ideal. In this case the use of the **Edit mode** and **Change mode** is more appropriate.

#### Using the arrow keys to move an anchor point

1. From the *Soft Edge edit* dialog, press **ENTER** or **BACK** to navigate to **Adjust mode**.

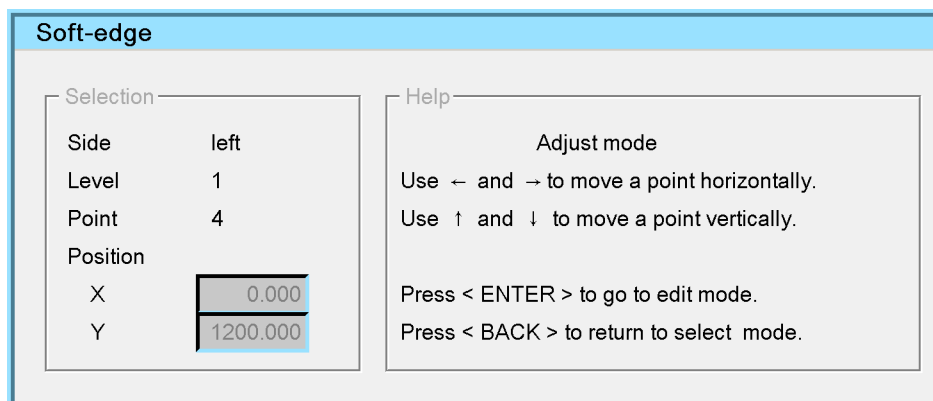


Image 11-50

2. On the RCU, press ◀ or ▶ multiple times or keep the arrow pressed to move the selected anchor point in the direction of the X-axis.
3. Press ▲ or ▼ multiple times or keep the arrow pressed to move the selected anchor point in the direction of the Y-axis.



## 11.2.10 Moving an anchor point in large steps

### Description

**Edit Mode** enables you to select the *Position X* or *Position Y* edit box whereas in **Change Mode** you can edit the value of the selected *Position X* (i.e. relative movement along the X-axis; can be negative) or *Position Y* (i.e. relative movement along the Y-axis; can be negative). The actions that can be performed in Edit mode and in Change mode are explained in the *Help* section of the *Soft Edge edit* dialog.

### Editing the values of Position X or Position Y

1. From the *Soft Edge edit* dialog, press **ENTER** or **BACK** to navigate to **Edit mode**.

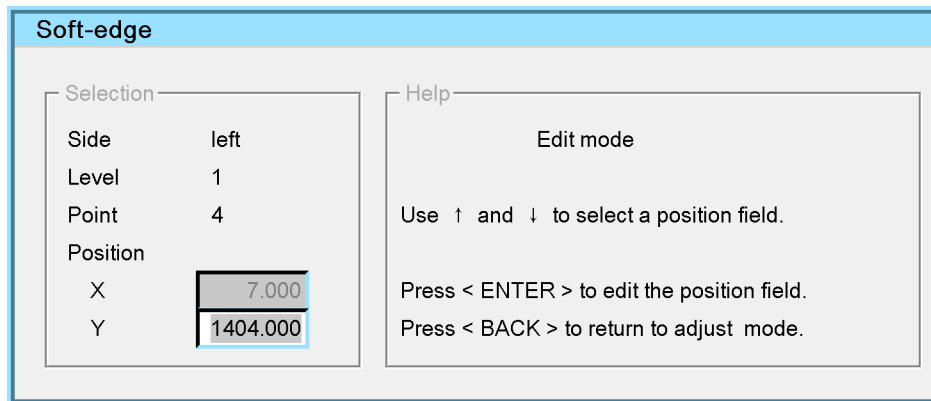


Image 11-51

2. Use the arrows ▲ or ▼ to select the *Position X* or *Position Y* edit box.
3. Press **ENTER** to navigate to **Change mode**.

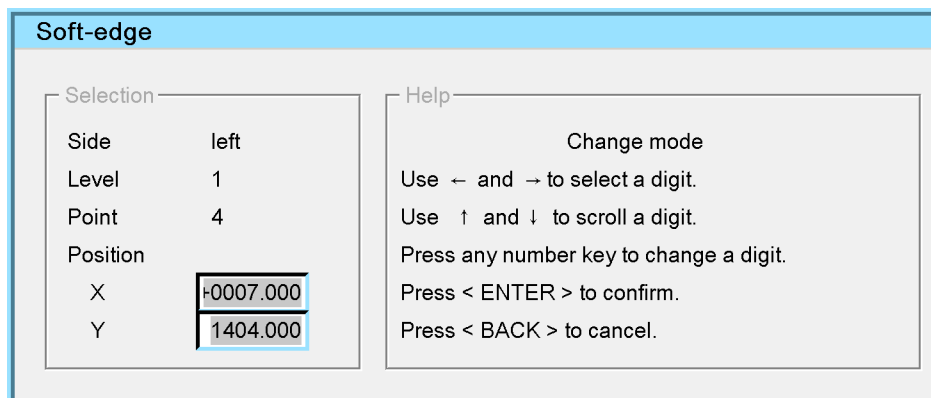


Image 11-52

The selected (*Position X* or *Position Y*) edit box is highlighted.

4. Enter a new value.

## 11.3 Dynacolor

### About this section

This section explains how Dynacolor can be used to fine tune the colors of the displayed image and to match the colors of multiple devices in a display system.

### Overview

- Dynacolor concept and expert use
- The Dynacolor dialog
- Enabling Dynacolor
- Color fine tuning
- Color calibration
- Dynacolor for Infitec

### 11.3.1 Dynacolor concept and expert use

#### Concept

Dynacolor allows setting a desired color reproduction - within the limits of the device - by digitally changing the primary and secondary color coordinates. In multiple channel display systems, it is used to fine tune the colors of all devices to create color uniformity all over the full image.

If Dynacolor is disabled, the device can display any combination of its native primary colors R (red), G (green) and B (blue). A set of all combinations of the device's primary colors is called the **color gamut** of that device. It can be presented as a **color triangle** in the CIE chromaticity diagram where each vertex is defined by the x and y coordinate of the **primary colors**. The **white point W** can be moved within the color triangle by changing its x and y coordinates, resulting in different color temperatures.

Due to the tolerance on optical components the X, Y value of the primary colors of different devices is slightly different.

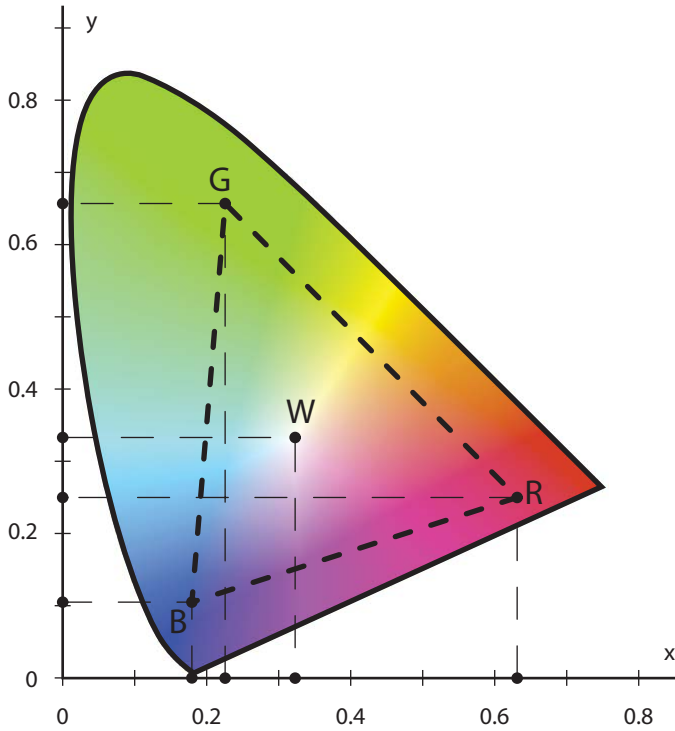


Image 11-53  
Color triangle: native color gamut of a device

Dynacolor can be used to create a color triangle which is slightly different from the original color triangle of the device. The coordinates of the desired color triangle (R, G, B and W) are stored in Dynacolor sets. Activating a Dynacolor Set enables the corresponding color triangle, resulting in a different color reproduction.

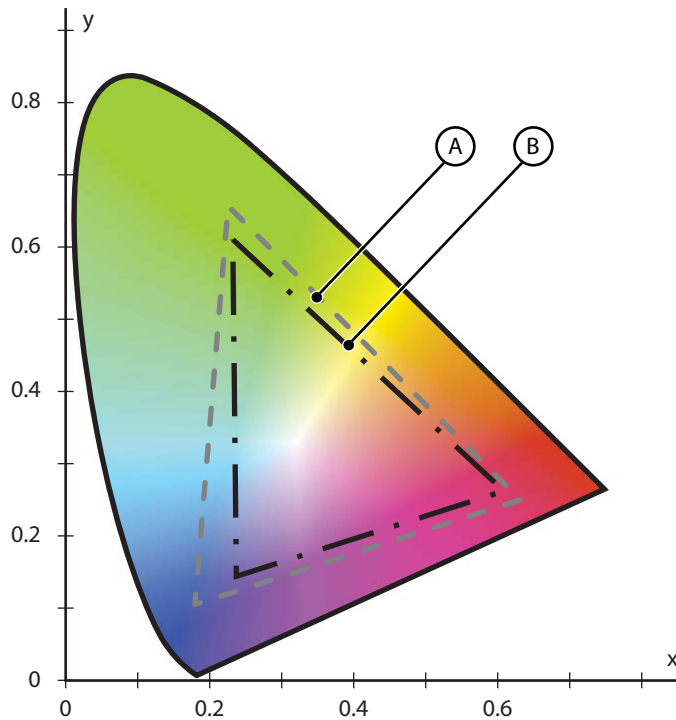


Image 11-54  
Color triangle: Dynacolor set of a device

- A Native color triangle
- B Dynacolor set

### Expert use: fine tuning colors

If the color impression amongst different devices in a multiple channel display system is slightly different, you can manually fine tune the desired X and Y value of the white point in the active Dynacolor set to match the colors. Always keep the CIE chromaticity diagram in mind while changing the white point position:

- Increasing the desired X value of the white point makes the image look more reddish;
- Decreasing the desired X value of the white point makes the image look more cyanish;
- Increasing the desired Y value of the white point makes the image look more greenish;
- Decreasing the desired Y value of the white point makes the image look more magenta-ish;
- Etcetera.

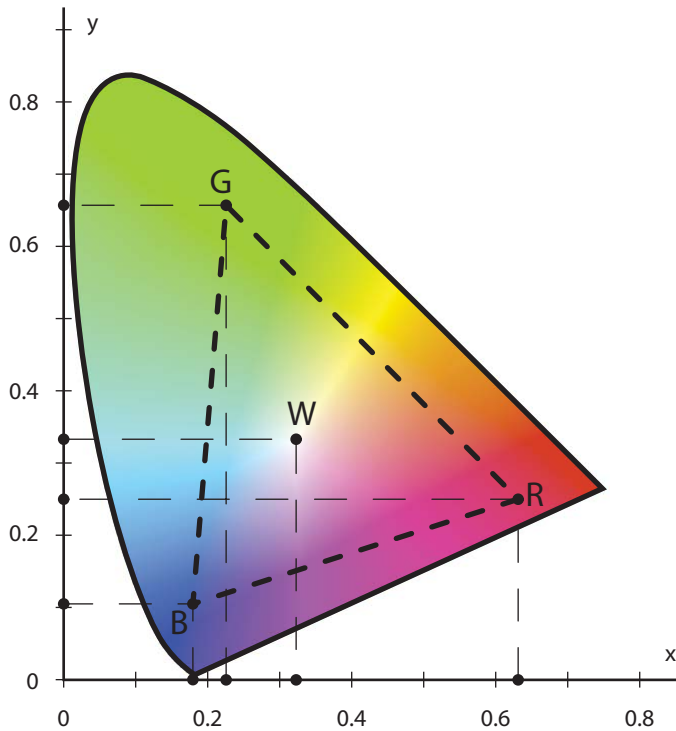


Image 11-55  
Moving the desired white point

**Expert use: manually calculating a common Dynacolor set**

Starting from the **Measured values** (i.e. the values of the native primary colors of a projector as measured in ideal conditions in the factory) of each device in a multiple channel display system, we can mathematically calculate a **common color triangle**. If we enter the values of the common triangle as **desired values** in the active Dynacolor set of each device, we closely come to a color matched system. Only fine tuning might still be required.

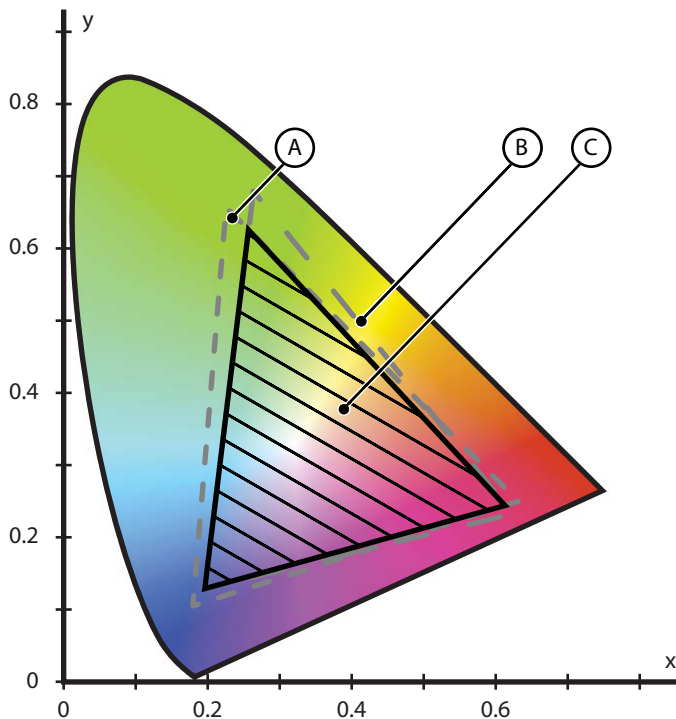


Image 11-56  
Common color triangle

- A Native color triangle of device 1
- B Native color triangle of device 2
- C Common color triangle

Barco can provide calculation tools where the Measured Dynacolor values of multiple devices can be entered to obtain the X and Y coordinates of the primary colors of the common triangle. Calculating and entering a common Dynacolor set can only be performed by Barco trained and qualified engineers.

**Expert use: automatically determining the common color values**

1. Start up the *Linked devices* menu of the Master projector.
2. In the Linked devices menu press the **Link Set 1** button.

The screenshot shows the 'Linked devices' configuration screen. At the top, the 'Master' checkbox is checked. Below it, the 'Slaves' section contains a list of 10 hosts. 'Host 1' is selected with a checked checkbox and has the IP address '010.192.000.054' entered in its field. To the right of the host list is a 'Dynacolor' section with a checked checkbox. At the bottom of the screen, there are three buttons: 'Save', 'Previous', and 'Next'. Below these buttons is a 'Dynacolor options' section with three buttons: 'Link set 1', 'Link set 2', and 'Link Infitec Stereo'. The 'Link set 1' button is highlighted with a blue border.

Image 11-57

The common color values are automatically calculated based on the measured values of both devices and these calculated values are put in the *Desired values* of both devices. Both devices will now operate within the same color gamut.

**Dynacolor sets**

If you use your device(s) in different sceneries where different Dynacolor sets are used, like Set 1 or Set 2 or Infitec Set, you need to perform the Dynacolor adjustment (i.e. Color fine tuning, Calculating common triangles) for each of the Sets.

Activate a scenery and align the colors. Then activate another scenery for which another Dynacolor set is used and again align the colors.

**Selecting a Dynacolor set**

1. In the OSD, navigate to *Display setup > Dynacolor > Active Set* and select the Dynacolor set you want to become active (*Set 1, Set 2 or Infitec set*).

## 11. Expert operation

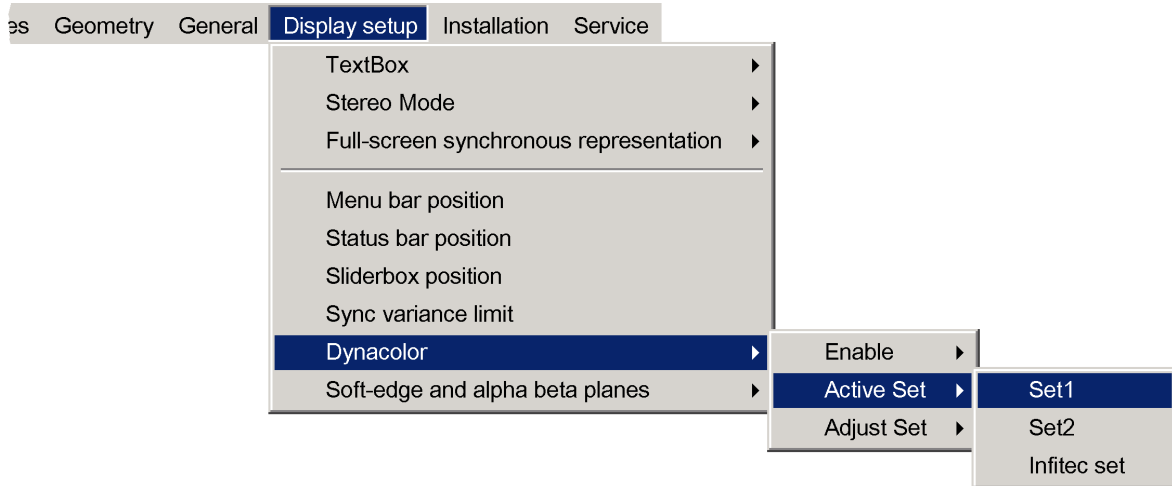


Image 11-58

2. Press ENTER.

A bullet indicates the active setting.

### 11.3.2 The Dynacolor dialog

#### Description

In the OSD, browse to *Display setup > Dynacolor > Edit...* and press **ENTER** to display the *Dynacolor dialog*. The tables below explain all items of this dialog.

Field / item	Description
Measured values	The coordinates in the CIE Chromaticity diagram and luminance of the <b>native primary colors</b> of the device as they have been measured in ideal conditions in the factory. <b>Only Barco engineers may change these values.</b>
X and Y coordinates	Coordinates in the CIE Chromaticity diagram
Red, Green, Blue, White	Native primary colors and native white of the device
L value	Luminance (relative value)
White L	White luminance = Red + Blue + Green luminance (relative value)

Desired values	Description
Desired values	The coordinates in the CIE Chromaticity diagram and luminance of the <b>desired primary and secondary colors</b> of the device. <b>Only Barco engineers may change these values to force a common color triangle; Barco trained and qualified engineers may also change the X and Y coordinates of the white point to fine tune the colors.</b>
X and Y coordinates	Coordinates in the CIE Chromaticity diagram
Red, Green, Blue, White	Desired primary colors and desired white of the device
Cyan, Yellow, Magenta	Desired secondary colors of the device
L value	Luminance (relative value)
Lmax value	Maximum available luminance (relative value)

Button	Description
Default desired	Resets the desired parameters to the measured values.
Factory Preset	Sets the measured parameters back to the factory preset values.
Calibration	Starts the native primary color calibration procedure. <b>Only Barco engineers may perform a calibration.</b> A professional spectrometer and ideal measurement conditions are required to achieve a good calibration. Improper calibration seriously affects the performance of the device. See procedure "Color calibration", page 110.

**Dynacolor Set1**

MEASURED

	x	y	L
Red	0.6654	0.3338	0.2772
Green	0.2790	0.6756	0.6694
Blue	0.1442	0.0423	0.0495
White	0.3337	0.3333	1.0000

DESIRED

	x	y	L	Lmax
Red	0.6644	0.3332	0.2527	0.2772
Green	0.2956	0.6609	0.6842	0.6843
Blue	0.1452	0.0470	0.0554	0.0554
Cyan	0.2145	0.3339	0.7316	0.7316
Yellow	0.4526	0.5215	0.9291	0.9399
Magenta	0.3500	0.1574	0.2997	0.3044
White	0.3260	0.3337	0.9583	0.9723

< ENTER > to edit/confirm  
or  
< EXIT > to return

Default Desired

Factory preset

Calibration

Image 11-59

### 11.3.3 Enabling Dynacolor

#### Starting up Dynacolor

1. In the OSD, navigate to *Display setup > Dynacolor > Enable > On or Off.*

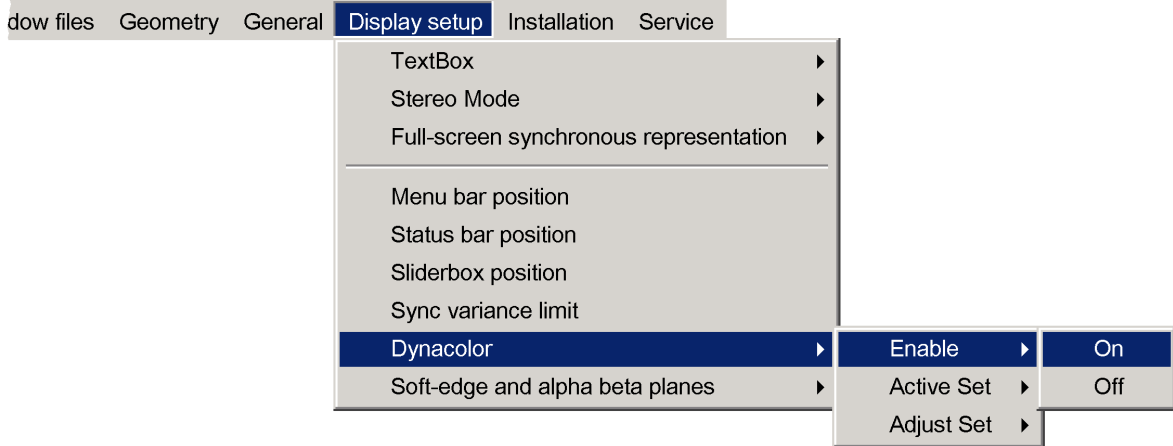


Image 11-60

2. Press **ENTER**.

A bullet indicates the active setting.

### 11.3.4 Color fine tuning



**CAUTION:** Color fine tuning may only be done by Barco trained and qualified engineers.

#### Single channel setup

Each device is color calibrated during production. This means that devices in single channel setup need no color fine tuning. However to switch to a different color reproduction or color temperature, the color coordinates of the white point (W) can be changed in the active Dynacolor set.

#### Multiple channel setup

In a multiple channel setup, it might be needed to match the colors amongst all devices. To do so, the color coordinates for a common color triangle are calculated from the native (i.e. measured) color coordinates for R, G, B and W of each projector and entered as desired coordinates in the appropriate Dynacolor set. After applying a common triangle, some final color fine tuning might be required to come to a fully color matched overall image.

#### Fine tuning the color of the projected image

1. Check to see what Dynacolor Set is currently active: *Display setup > Dynacolor > Active set*: the set that has the radio button is the active set.
2. In the OSD, navigate to the active Dynacolor set: *Display setup > Dynacolor > Adjust set > Set 1... or Set 2... or .....*

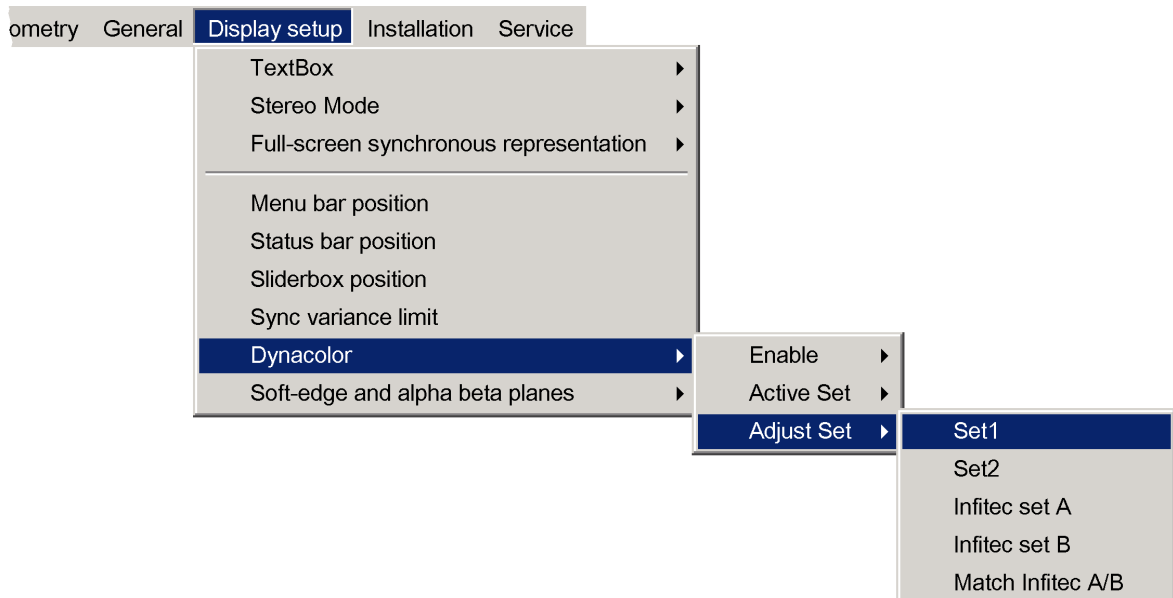


Image 11-61



3. Press **ENTER** to confirm your selection.  
In this case, we have used *Set 1*.
4. In the *Dynacolor Set 1* dialog, enter a well-considered new value for *X* and/or *Y* of *White*.

**Dynacolor Set1**

MEASURED

	x	y	L
Red	0.6654	0.3338	0.2772
Green	0.2790	0.6756	0.6694
Blue	0.1442	0.0423	0.0495
White	0.3337	0.3333	1.0000

DESIRED

	x	y	L	Lmax
Red	0.6644	0.3332	0.2527	0.2772
Green	0.2956	0.6609	0.6842	0.6843
Blue	0.1452	0.0470	0.0554	0.0554
Cyan	0.2145	0.3339	0.7316	0.7316
Yellow	0.4526	0.5215	0.9291	0.9399
Magenta	0.3500	0.1574	0.2997	0.3044
White	0.3260	0.3337	0.9583	0.9723

<ENTER> to edit/confirm  
or  
<EXIT> to return

Image 11-62

**Note:** Make sure that the new [X, Y]-position is within the desired color triangle.

For example, if you increase the x-value of the white point in the *Desired* field from 0.3260 to 0.3560, the white point will shift towards the red region and the overall look of the image will be more reddish.

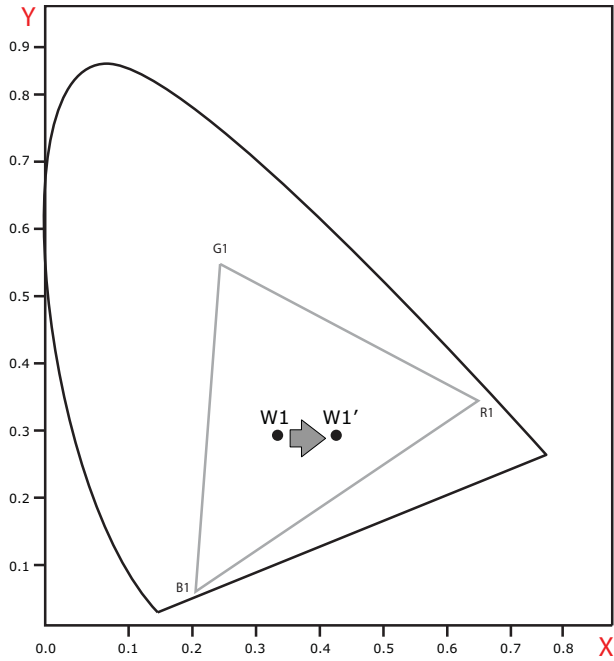


Image 11-63  
Adjusting the X and Y coordinate of White

5. The same procedure applies for the other sets.

### 11.3.5 Color calibration



**CAUTION:** Color calibration may only be done by Barco trained and qualified engineers.

#### Description

In a multiple channel setup, it might be needed to match the colors amongst all display channels. If the colors are nearly matched amongst the channels, try using the color fine tuning procedure to fully match them.

If not successful, it might be required to measure the native colors of the display per channel and enter them as measured values in the according MCM-50. This is color calibration. After that, the color coordinates for a common color triangle can be calculated.

#### Necessary tools

Spectrometer

#### Calibrating the colors of a display channel

1. Check to see which Dynacolor set is currently active: *Display setup > Dynacolor > Active set*: the set that has the radio button is the active set.
2. In the OSD, navigate to the active Dynacolor set: *Display setup > Dynacolor > Adjust Set 1...* or *Adjust Set 2...* and press **ENTER** to select.

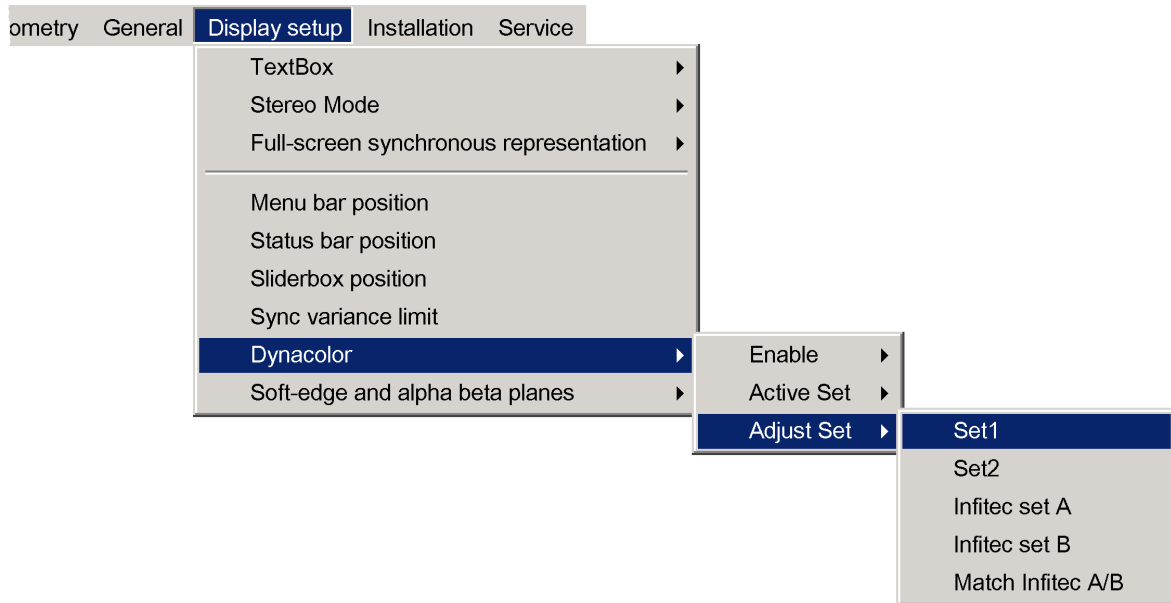


Image 11-64

3. In the *Dynacolor Set* dialog box, click **Calibration**.

A red full screen test pattern is displayed.

4. Use a spectrometer to measure the exact x and y value and brightness of the displayed color and press **ENTER** to proceed.
5. In the *Calibration* dialog box, fill in the measured x and y coordinates and the Y (i.e. brightness) value.

Image 11-65

**Note:** The Y value is transformed to a relative L value, which implies that the physical unit is irrelevant.

6. Click **Proceed**.

A Green test pattern is displayed

7. Proceed in the same way for Green, Blue and White as for Red.
8. The values are finally updated in the Measured values of the Dynacolor set.
9. Click **Default desired** to copy the Measured values for Red, Green and Blue and White to the Desired values and to calculate the secondary colors Cyan, Yellow and Magenta.

**Dynacolor Set1**

MEASURED

	x	y	L
Red	0.6664	0.3328	0.2837
Green	0.2747	0.6754	0.6707
Blue	0.1437	0.0430	0.0547
White	0.3279	0.3234	1.0000

DESIRED

	x	y	L	Lmax
Red	0.6664	0.3328	0.2837	0.2837
Green	0.2747	0.6754	0.6707	0.6707
Blue	0.1437	0.0430	0.0547	0.0547
Cyan	0.2011	0.3202	0.7252	0.7252
Yellow	0.4556	0.5171	0.9544	0.9544
Magenta	0.3534	0.1593	0.3384	0.3384
White	0.3279	0.3234	1.0000	1.0060

< ENTER > to edit/confirm  
 or  
 < EXIT > to return

Default Desired

Factory preset

Calibration

Image 11-66

### 11.3.6 Dynacolor for Infitec

#### Calibrating the Dynacolor for Infitec

The projector uses different color filters when operating in active stereo mode.

#### Calibrating the Dynacolor for Infitec set A

1. In the OSD, navigate to *Display setup > Dynacolor > Adjust Set > Infitec set A*.

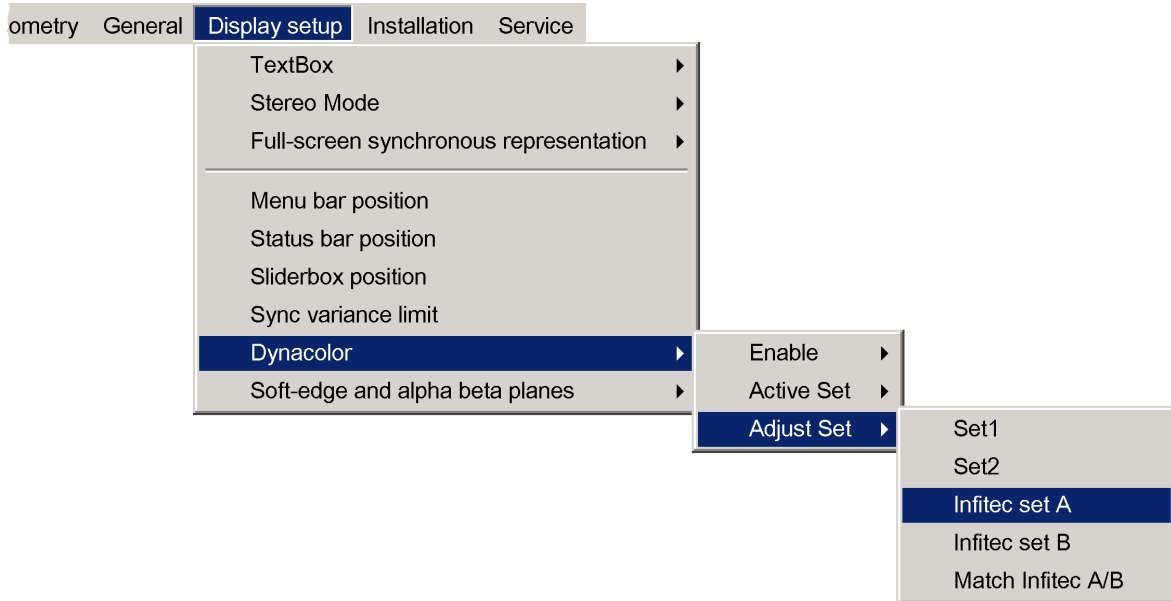


Image 11-67

2. Press ENTER to confirm your selection.
3. Change the values if needed.
4. Repeat from step 1 but now for the Infitec set B.

**Matching Infitec set A and Infitec set B**

1. In the OSD, navigate to *Display setup > Dynacolor > Adjust Set > Match Infitec A/B*.

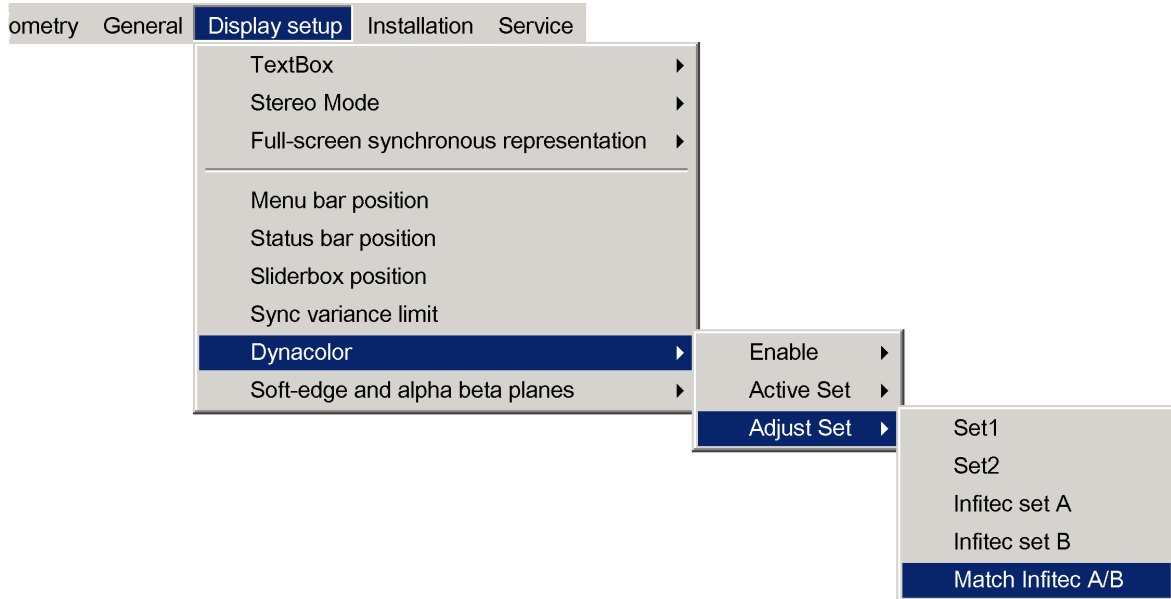


Image 11-68

2. Press ENTER.
- Common color coordinates are calculated and filled in as the desired values.



## 12. MAINTENANCE

### About this chapter

This chapter contains information about the timing of maintenance tasks and it includes details about the maintenance procedures that can be performed by the operator or by qualified technical service personnel.

This chapter also lists the basic troubleshooting tips to be followed in case of an irregularity.

### Overview

- Maintenance: general overview
- Cleaning housing and mechanical structure
- Firmware upgrade
- Diagnostics through the OSD
- Diagnostic LEDs
- Identification
- Internal and scaled patterns
- Troubleshooting checklist

### 12.1 Maintenance: general overview

#### Introduction

This section lists the maintenance tasks and when they should be performed. Details on how these tasks must be performed can be found in the following sections.

#### Condition based maintenance

The table below lists the maintenance tasks that must be performed on certain conditions.

Condition	Maintenance task description	To be performed by
New version of device software	Upgrade the device software depending on the necessity	Barco trained and qualified engineer
Changes in device settings	Make a backup of the device using Support tool	Barco trained and qualified engineer

### 12.2 Cleaning housing and mechanical structure

#### Cleaning the housing and mechanical structure

1. Power down the unit and unplug the power cord.
2. Clean with a damp cloth.
3. Remove stubborn stains with a cloth lightly dampened with a mild detergent solution.

### 12.3 Firmware upgrade

#### Upgrade tool

The name of the upgrade tool is according to this format:

Two main parts can be seen:

- device: this is the device type
  - MCM-50
- version: indicates the version
  - two first digit (e.g. 01): major revision;
  - second pair of digits (e.g. 20): minor revision;
  - last four digits (e.g. 0005): build number.

### Necessary tools

Ethernet connection to the MCM-50

### Upgrading the firmware

1. Download the latest MCM-50 software version from My.barco.com (<https://my.barco.com>).
2. Save this upgrade file on a computer which is connected to the same (local) network as the MCM-50.
3. Make sure that the MCM-50 is powered.
4. On the computer, double click the upgrade tool.
5. Enter the **IP address** or **hostname** of the MCM-50 and click **OK**.



Image 12-1  
Upgrading device

6. Carefully follow the instructions to proceed.
7. During the upload of the upgrade files to the device, a progress bar is displayed.  
**Caution:** *Do not switch off the MCM-50, nor the computer during the upgrade procedure!*  
**Note:** *In case of problems during the upgrade procedure, the following two buttons can be used for diagnostics reasons:*
  - Save text** will save the text inside the Barco Networked Projector Upgrade Tool in a file;
  - Screen shot** will save a screen shot of the displayed screen at that particular time.
8. When the upgrade is successful, a green ellipse appears at the bottom of the window and an information window pops up.
9. Click **OK** to finish the upgrade.
10. Reboot the MCM-50 external warp box by doing the following:
  - a) Switch the MCM-50 to standby;
  - b) Unplug the power supply;
  - c) Plug in the power supply.



**If the upgrade fails, a red ellipse appears at the bottom of the window and a message pops up. Restart the procedure.**

---



**On startup of the MCM-50 after an upgrade of its software, the controller checks the software of the different boards and modules in the MCM-50. If an old software version in one of these parts is detected, it is replaced by the new version. During this upgrading sequence, power may be switched automatically!**

---

## 12.4 Diagnostics through the OSD

---

### Description

In the OSD, several menu items can be helpful to troubleshoot the MCM-50 or to collect some information that can be sent to Barco's helpdesk in case of a problem.



## Overview

- I2C
- Board identification

### 12.4.1 I2C

#### Description

A communication bus allows diagnostics of different hardware components. A graphical interface shows the current status.

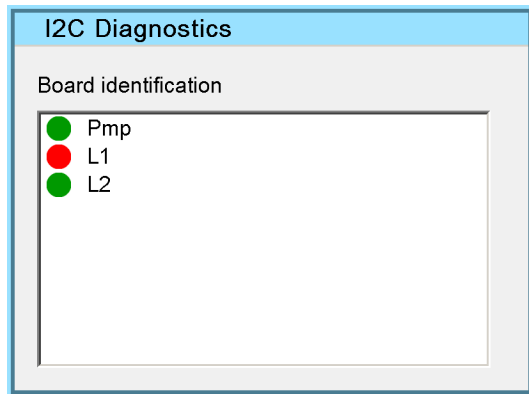


Image 12-2

If a board is not mentioned in the list of the *I2C Diagnostics* window, it is not recognized and needs to be replaced. If the board is in the list, showing a red bullet in front of it, instead of a green bullet, something is wrong and the board needs to be replaced as well.

#### Displaying the I2C Diagnostics window

1. In the OSD, navigate to *Service > Diagnostics > I2C...* and press **ENTER** to select.



Image 12-3

A dialog box pops up, showing some information.

2. Exit the menu.

### 12.4.2 Board identification

#### Description

The Board identification window lists the boards in the MCM-50, together with their article number. Some examples of existing boards:

- PMP (Pixel Map Processor): image processing board;
- Layer 1 TwinDisplayPort board
- Layer 2 TwinDisplayPort board
- Layer 4 DisplayPortOutput board

#### Displaying the Board identification window

1. In the OSD, navigate to *Service > Board identification...* and press **ENTER** to select.

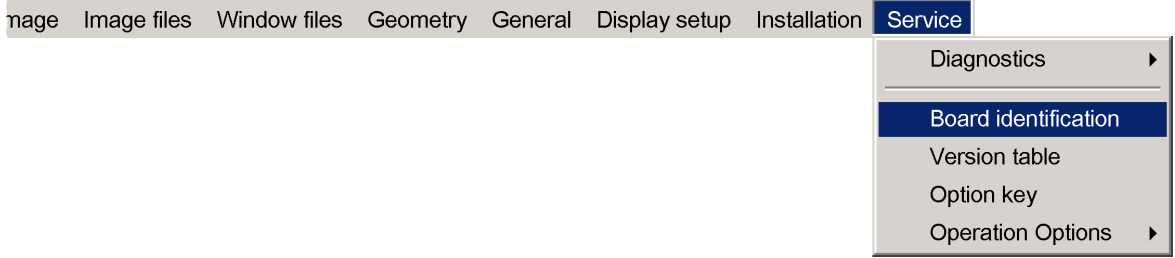


Image 12-4

A dialog box pops up, showing some information.

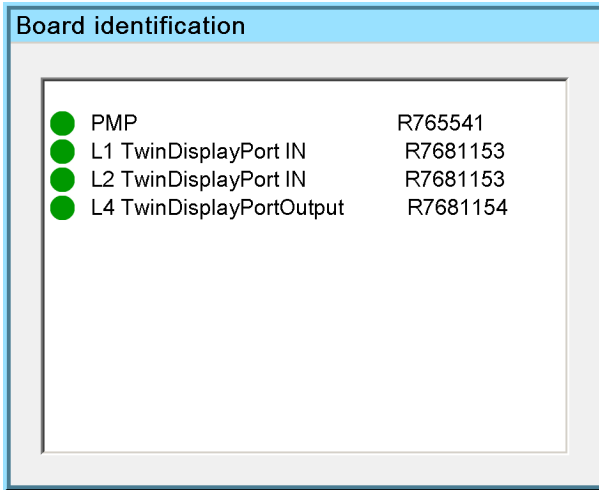


Image 12-5

2. Exit the menu.

## 12.5 Diagnostic LEDs

### Description

At the front side of the MCM-50, four LEDs indicate its status.

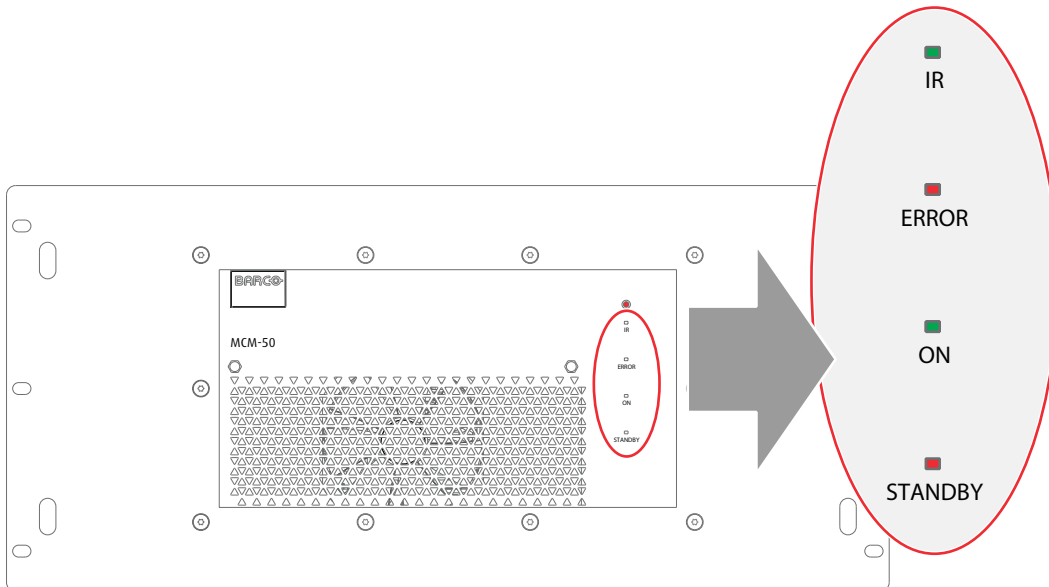


Image 12-6

LED / Status	Not powered	Standby	Configuring (standby → active)	Active	IR activity	Hardware error
STANDBY LED (red)	OFF	ON	ON	OFF	NA	NA
ON LED (green)	OFF	OFF	ON	ON	NA	NA
ERROR LED (red)	OFF	OFF	OFF	OFF	NA	ON
IR LED (green)	OFF	ON (in case of network connection) OFF (no network connection)	ON	ON (in case of network connection) OFF (no network connection)	BLINKING	NA

## 12.6 Identification

### Description

The identification screen displays the device's name, device's address, software version used in the device, serial number of the device and device runtime.



This data should always be known when contacting Barco's Helpdesk.

### Viewing the MCM-50 identification

1. In the OSD, navigate to *General > Identification* and press **ENTER** to select.

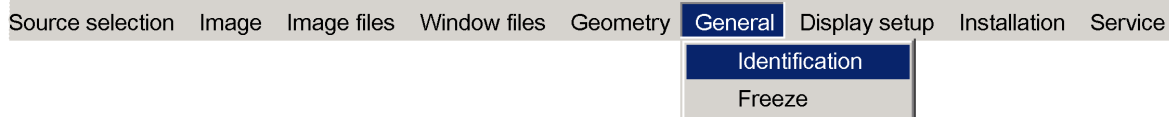


Image 12-7

2. In the text box that appears, you can view the identification data.

Identification	
Type	MCM-50
Address	: 5
Software	: 0.12
Serial no	: 1391428357
Runtime	: 699 Hrs

Image 12-8

3. Exit the menu.

## 12.7 Internal and scaled patterns

### Introduction

The MCM-50 can be used to generate a list of patterns. The **Scaled patterns** are generated right after the input boards of the MCM-50, whereas the **Internal patterns** are generated at the end of the image processing board, just before the signal is transferred to the output board.

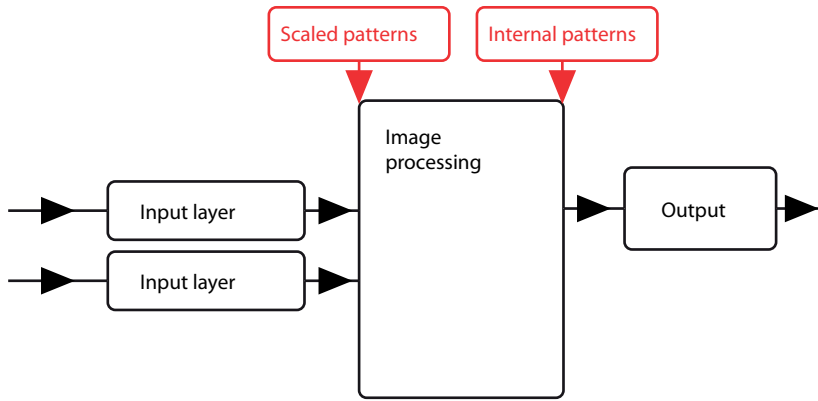


Image 12-9

The patterns can be used for alignment or adjustment or they can be used for troubleshooting.

### Scaled patterns

Scaled patterns are generated just behind the input boards and have the same timings of the selected source signal, which means that **they can only be displayed if a source sync signal is available.**

If a source image shows some artefacts, but the scaled patterns look fine, the cause for the artefacts must be looked for in the input board, the wires or the image generator.

If a source image shows some artefacts and the scaled pattern shows the same artefacts, the cause should be looked for in the image processing board.

The scaled patterns are distorted according to the geometry distortion defined in the active Geometry file.

### Internal patterns

Internal patterns are generated just before the output board and are seen full screen. If the desktop image shows artefacts, but the internal patterns look fine, then the issue will be found before the output board.

The internal patterns are not influenced by the geometry distortion of the active Geometry file.

### Displaying a Scaled pattern

1. In the OSD, navigate to *Installation > Scaled patterns.*

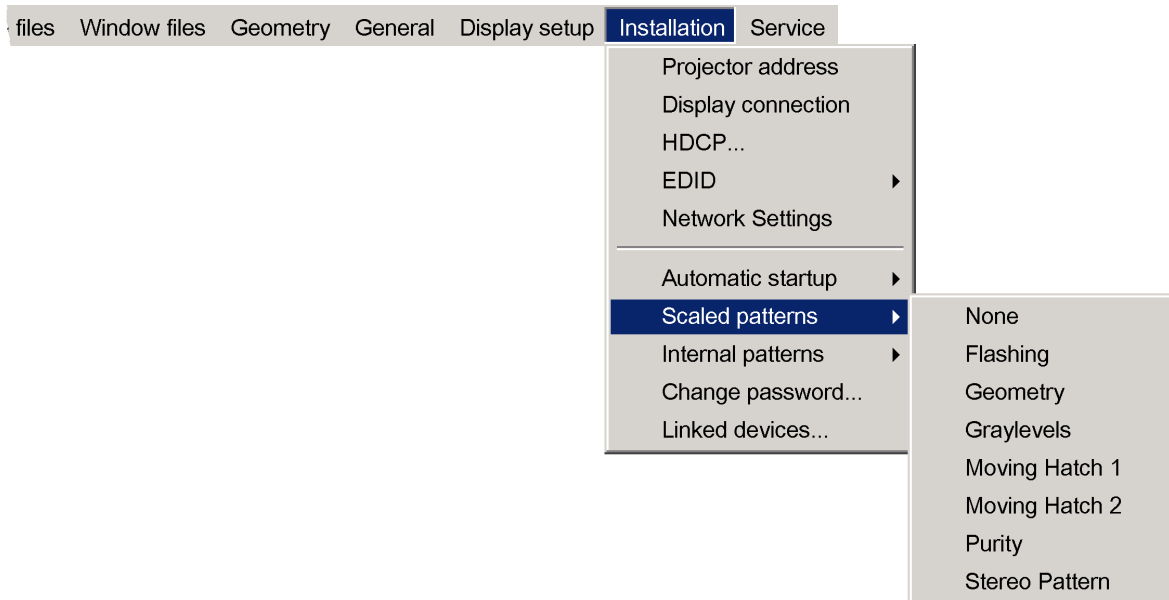


Image 12-10

2. Open the drop-down menu and select the pattern of your choice.



**If you want to remove the scaled pattern, you need to select *None* in the *Scaled patterns* menu.**

### Displaying an internal pattern

1. In the OSD, navigate to *Installation > Internal patterns*.

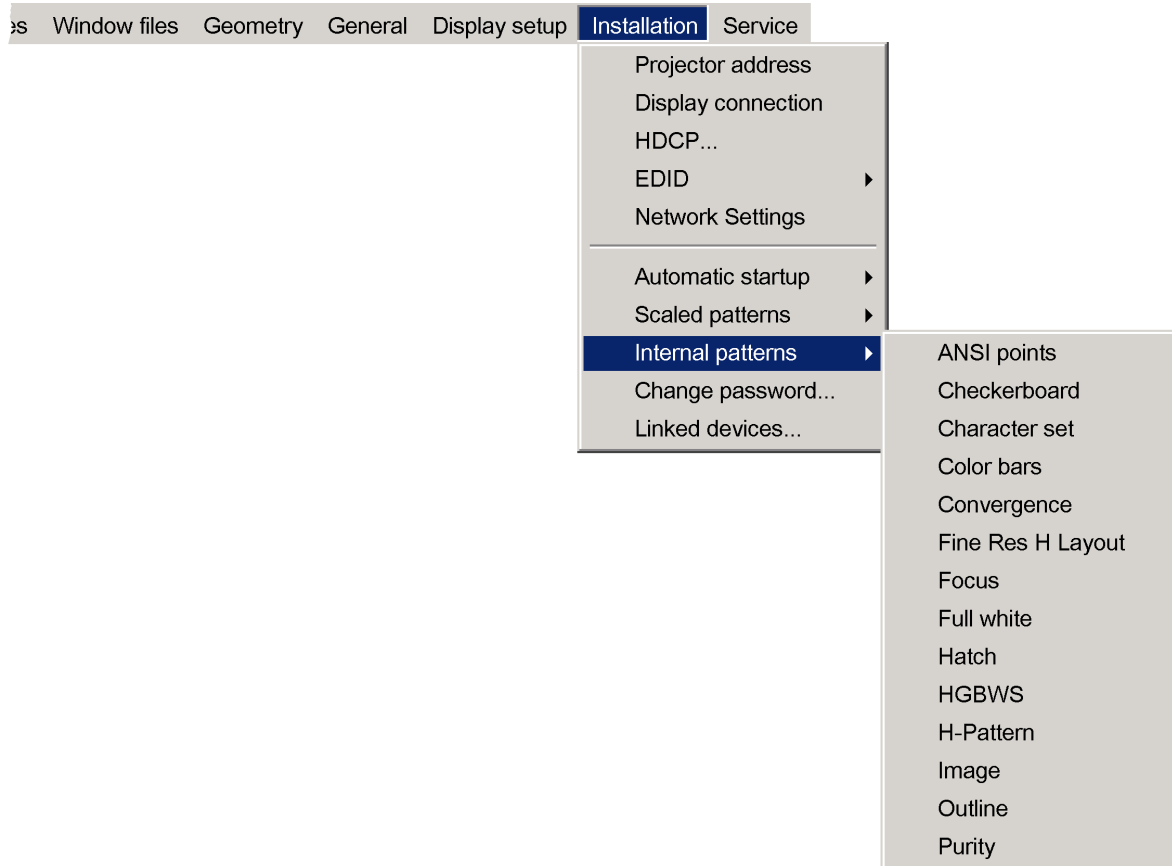


Image 12-11

2. Open the drop-down menu and select the pattern of your choice.



The selected Internal pattern disappears on exiting the *Internal patterns* menu.

## 12.8 Troubleshooting checklist

### No power on MCM-50

Situation	Solution
Power cord not plugged.	Plug in the power cord.
LED on power supply OFF.	Check power cord.
LED on power supply ON.	<ol style="list-style-type: none"> <li>1. Check the connection between the power supply and the MCM-50.</li> <li>2. Check the fuse in the device.</li> </ol>

### The MCM-50 went back to its standby state

Situation	Solution
Internal or external temperature is out of range.	<ul style="list-style-type: none"> <li>- If the internal temperature is out of range, clean the air grids.</li> <li>- If the external temperature is out of range, cool down the room.</li> </ul>
Humidity is out of range.	Decrease the humidity in the room.
The altitude is very high.	

**No image appears on the display.**

Situation	Solution
No source is selected.	Select a source via the OSD.
No source signal can be found.	<ol style="list-style-type: none"> <li>1. Check if the projector is operational.</li> <li>2. Check if the MCM-50 output mode and the projector input mode are matching.</li> </ol>
MCM-50 is in standby state.	Switch to active state.

**Artefacts are visible on the display.**

Situation	Solution
Noise	<ol style="list-style-type: none"> <li>1. Check the IG.</li> <li>2. Check the cabling and connections.</li> </ol>

**The image on the display is poor.**

Situation	Solution
Bad soft edge	In case of electronic soft edge, switch ON the soft edge.
Bad brightness or contrast	Adjust the brightness/contrast.

**No control**

Situation	Solution
No RCU control	<ol style="list-style-type: none"> <li>1. Remove blocking objects.</li> <li>2. Program the correct address.</li> <li>3. Insert new batteries.</li> </ol>

# 13. MCM-50 TOOLS

## About this chapter

This chapter describes the set of tools available to perform a wide range of actions and to customize the device for your application.

- Configuration of the EDID to make sure that the source device sends out the desired image timings;
- Using internal and external patterns for image adjustment;
- Enabling full screen synchronous representation of a source signal;
- Hiding text boxes to avoid pop-ups during a mission or session.
- Positioning the menu bar, status bar and slider boxes.

## Overview

- High Bandwidth Digital Protection
- EDID
- Patterns
- Textboxes
- Menu bar position
- Status bar position
- Positioning the slider box
- Sync Variance Limit
- Full-screen synchronous representation

## 13.1 High Bandwidth Digital Protection



### HDPC

High-bandwidth Digital Content Protection is a form of digital copy protection developed by Intel Corporation to prevent copying of digital audio and video content as it travels across DisplayPort, Digital Visual Interface (DVI), High-Definition Multimedia Interface (HDMI), Gigabit Video Interface (GVIF), or Unified Display Interface (UDI) connections, even if such copying would be permitted by fair use laws. The specification is proprietary, and implementing HDPC requires a license.

### About HDPC

HDPC can be enabled or disabled and that for both, input and output.

### Activate or deactivate the HDPC

1. In the OSD, navigate to *Installation > HDPC...* and press **ENTER** to select.

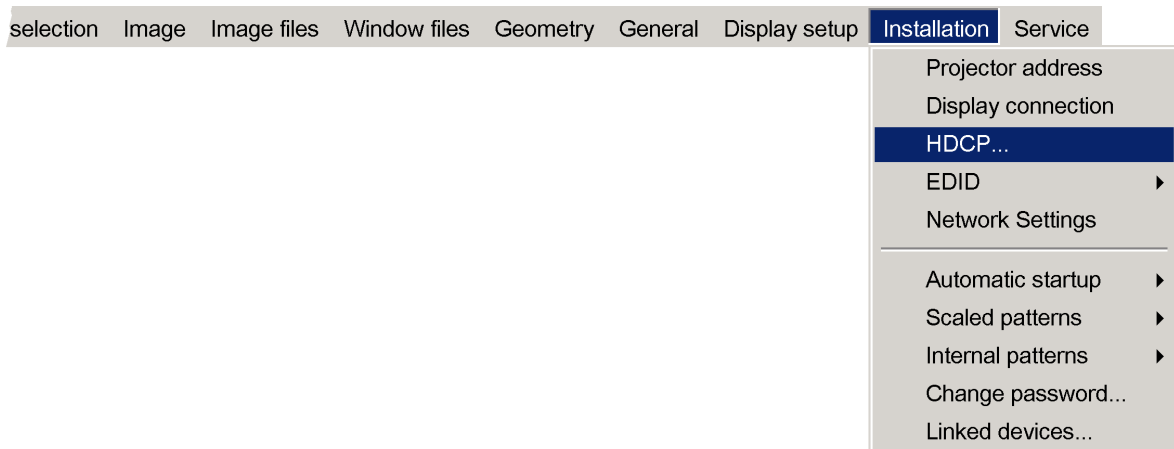


Image 13-1

2. In the *High Bandwidth Digital Protection* dialog box that appears, check the check box in front of *Enable High Bandwidth Digital Protection* to apply HDPC on the input and output after restarting the device.

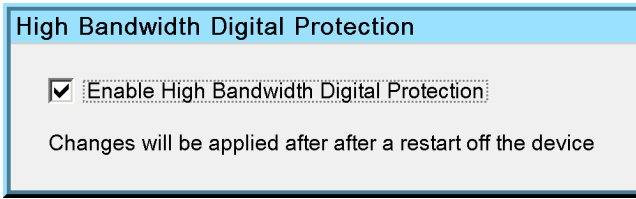


Image 13-2

Default settings: unchecked.

## 13.2 EDID



### EDID

Extended Display Identification Data

### About this section

The EDID file available for each input connector includes timings supported by the device; display size and other information about the display. It is the set of information that is used by digital sources connected to the device to generate a suitable image signal.

From the OSD, you can for each input connector choose to use the Standard EDID file or create and force your custom made EDID file. The selection of the EDID file to be used is made in the *Edid Configuration* dialog. Making your own custom EDID file(s) is done through the *Create EDID* dialog. Custom EDID files can be deleted at any time.



The Standard EDID includes two timings: **1280x1600@60Hz** and **1280x1600@120Hz**.

### Overview

- Selecting an EDID file
- Creating Custom EDID files
- Deleting Custom EDID files

### 13.2.1 Selecting an EDID file

#### Description

In configuring EDID, you can choose to select the Standard EDID file or you can make your selection from the list of Custom EDID files for each input.

#### Selecting an EDID file

1. In the OSD, navigate to *Installation > Edid > Configure...* and press **ENTER** to select.

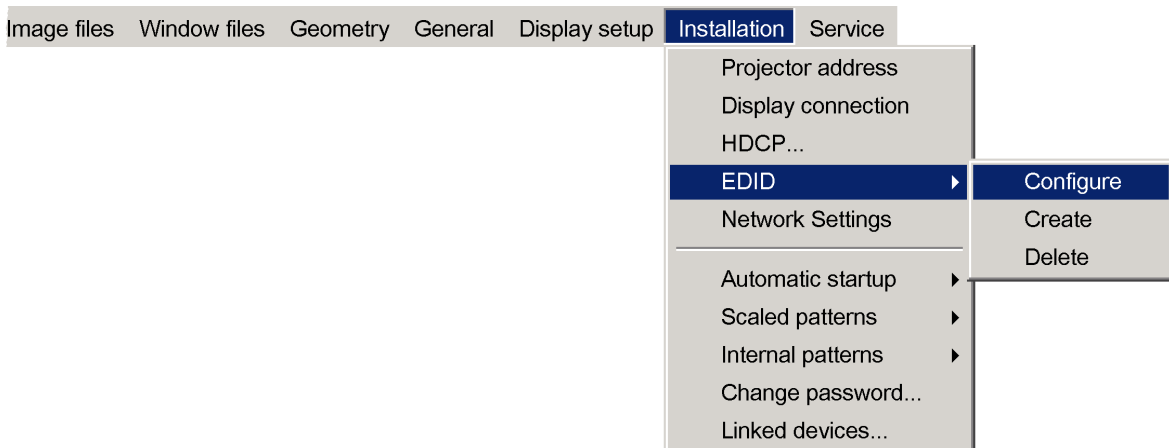


Image 13-3

2. In the *Edid Configuration* dialog box that appears, select *Standard* or *Custom* timings for one of the inputs.



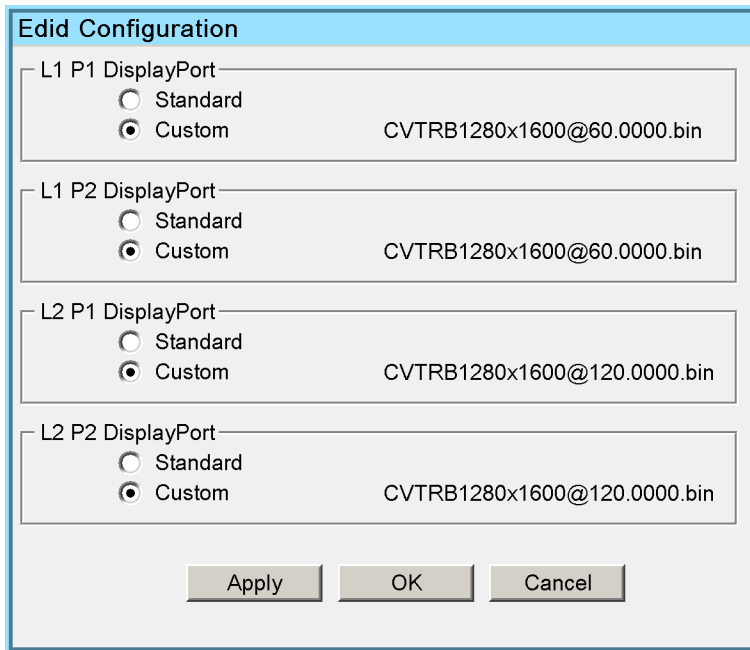


Image 13-4

3. In case you select Custom, a list of Custom EDID files appears from which you can make your selection.

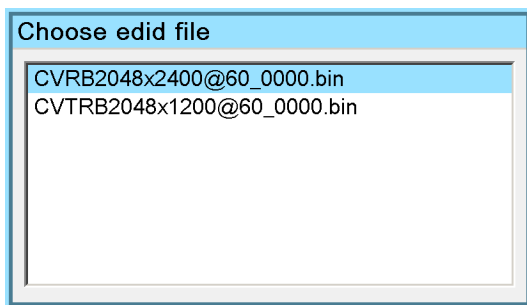


Image 13-5

4. Press **ENTER** to return to the *Edid Configuration* dialog.
5. Repeat step 2 to step 4 until you have selected the correct EDID for all inputs.
6. Press **Apply** to confirm and store the new settings.
7. Exit the menu.

## 13.2.2 Creating Custom EDID files

### Description

You can create new custom EDID files and enter the desired input timings.

### Creating custom EDID files

1. In the OSD, navigate to *Installation > EDID > Create...* and press **ENTER** to select.

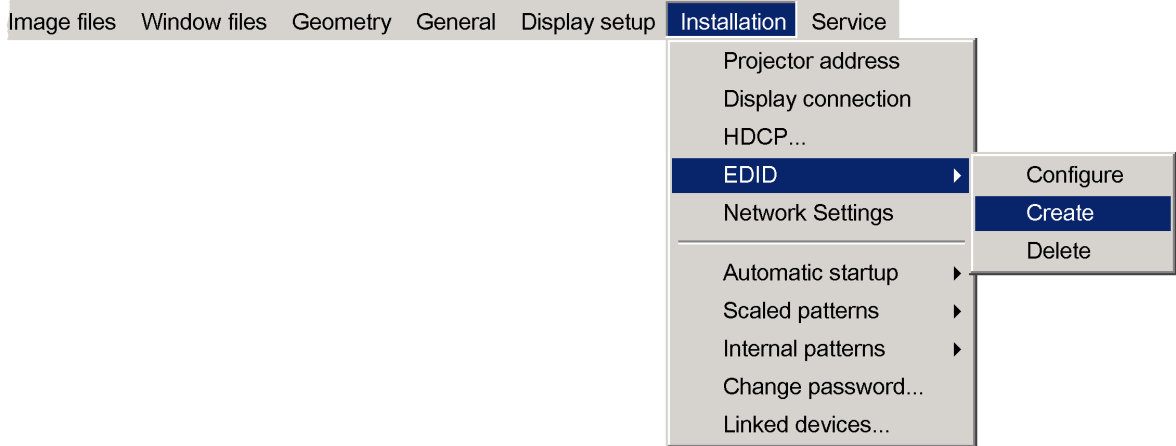


Image 13-6

2. In the *Create Edid* dialog box that appears, enter the desired data.
  - Section **Timings**, enter the correct timings:
    - o Active Pixels: horizontal resolution;
    - o Active Lines: vertical resolution;
    - o Frequency (Hz): amount of frames per second;
    - o Calculation: select the correct (standard) video timings:
      - o CVT: Coordinated Video Timings
      - o CVT RB: Coordinated Video Timings Reduced Blanking
      - o CVT MB: Coordinated Video Timings Minimum Blanking (not a standard)
      - o GTF: Generalized Timing Formula
  - Section **Options**, :
    - o set or clear the check box Stereo. You can leave it unchecked.
    - o select the correct interface:
      - o Interface Undefined (standard)
      - o Interface DVI 8 bit
      - o Interface DVI 12 bit
      - o Interface DisplayPort 8 bit
      - o Interface DisplayPort 10 bit
      - o Interface DisplayPort 12 bit
  - **Filename** edit box: enter the name for the Custom EDID file.

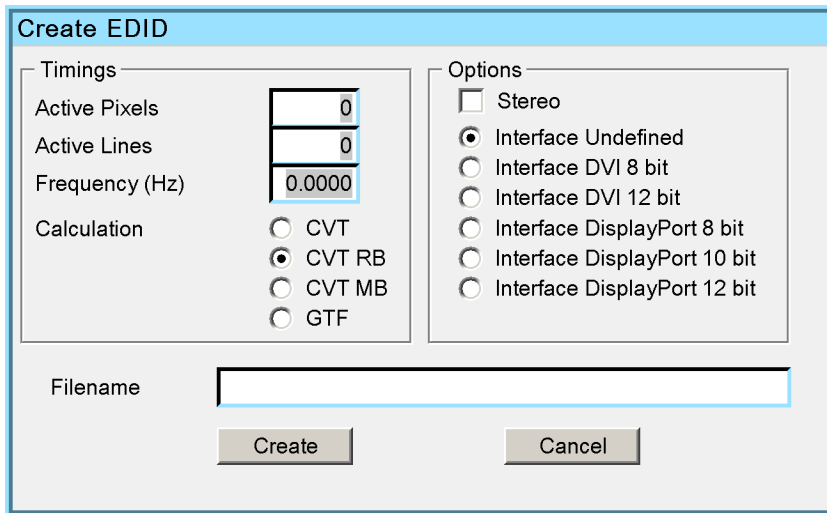


Image 13-7

3. Click **Create** and press **ENTER** to confirm and save the new Custom EDID file.
4. Exit the menu.

### 13.2.3 Deleting Custom EDID files

#### Description

You can delete one Custom EDID file or all Custom EDID files at once.

#### Deleting a Custom EDID file

1. In the OSD, navigate to *Installation > EDID > Delete...* and press **ENTER** to select.

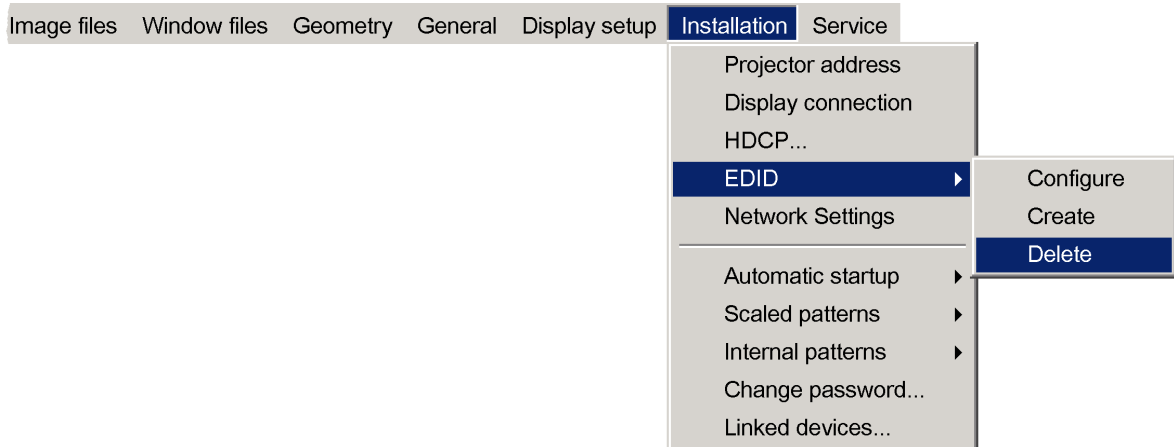


Image 13-8

2. In the *Delete EDID file* dialog box, navigate to the EDID file to be deleted.

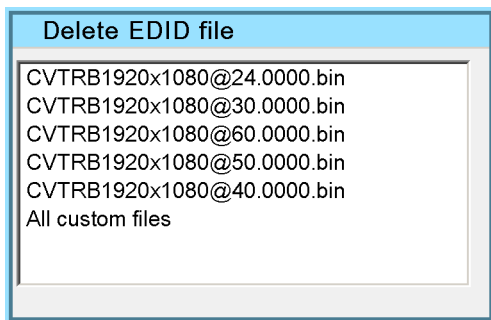


Image 13-9

Or,  
navigate to *All EDID files* to delete all the custom EDID files.

3. Press **ENTER** to delete.
4. Exit the menu.

## 13.3 Patterns

### Internal versus scaled patterns

The device can generate built-in patterns called *internal* and *scaled* patterns that can be used for adjustment, measurement and diagnostic purposes. See "Internal and scaled patterns", page 119.

## 13.4 Textboxes

### Description

If the Textbox option is enabled, a text box is displayed while using the direct keys on the RCU to control Brightness, Contrast, etc.. When this option is disabled, no text box is displayed on these actions.

### Enabling or disabling the Textbox

1. In the OSD, navigate to *Display setup > TextBox > On or Off*.

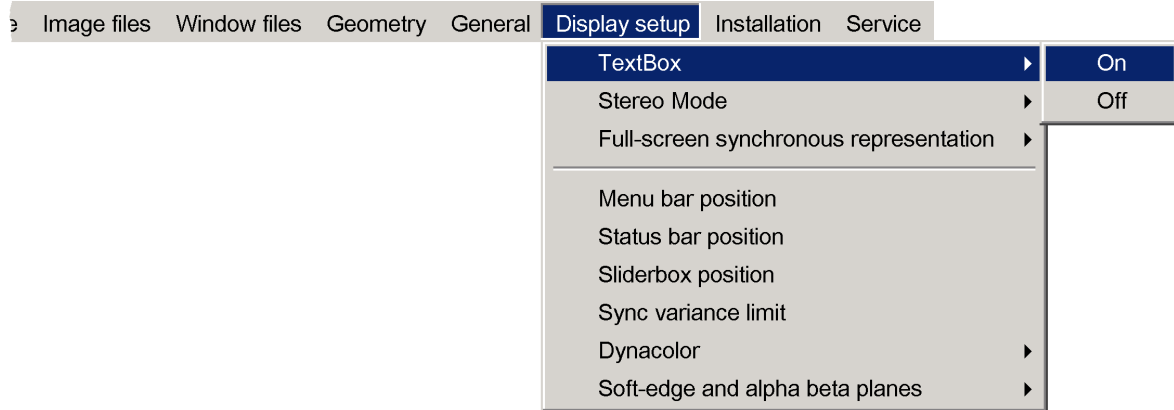


Image 13-10

2. Press **ENTER** to select your option.

### 13.5 Menu bar position

#### Description

The menu bar can be moved vertically, the range being from top of the screen to the middle of the screen in table mode. This can be useful in applications where the top image content is not visible on the screen (e.g. Soft Edge region).

#### Moving the Menu bar

1. In the OSD, navigate to *Display setup > Menu bar position...* and press **ENTER** to select.

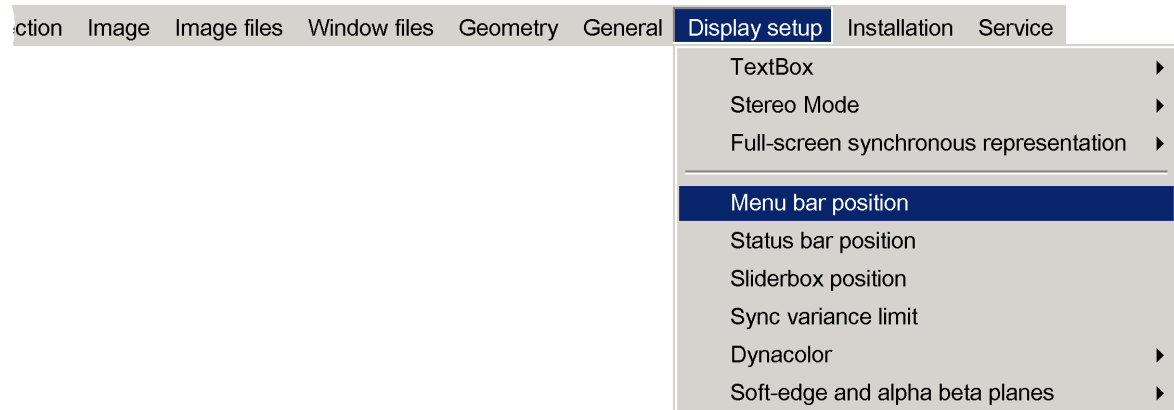


Image 13-11

2. Use **▲** and **▼** to position the menu bar.
3. Exit the menu.

### 13.6 Status bar position

#### Description

The Status bar can be moved vertically, the range being from the bottom of the screen to the middle of the screen. This can be useful in applications where the bottom image content is not visible on the screen (e.g. Soft Edge region).

#### Moving the Status bar

1. In the OSD, navigate to *Display setup > Status bar position...* and press **ENTER** to select.

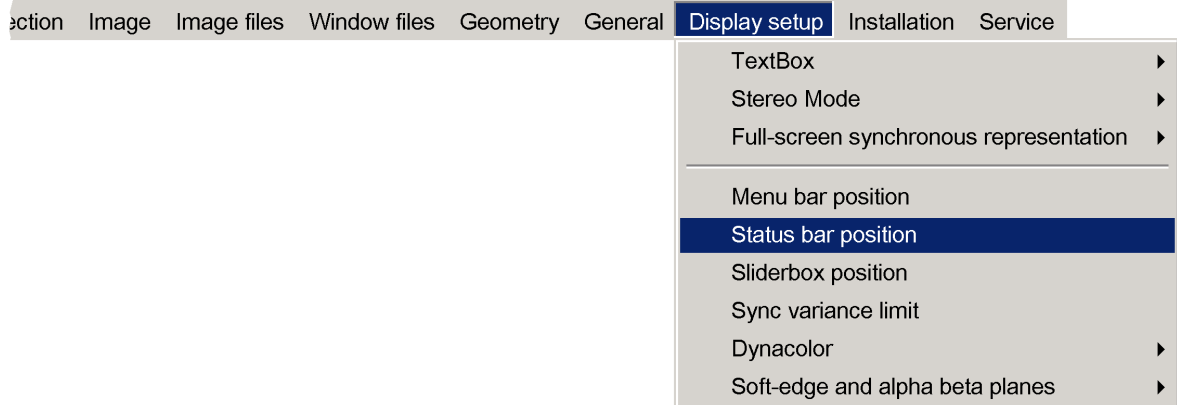


Image 13-12

- Use ▲ and ▼ to position the status bar.

## 13.7 Positioning the slider box

### Description

The Slider box (for e.g. *Contrast...*) can be moved around the full image in random steps and in small steps. This can be useful in applications where part of the image is not visible on screen (e.g. Soft Edge area).

### Moving the Slider box

- In the OSD, navigate to *Display setup > Sliderbox position...* and press **ENTER** to select.

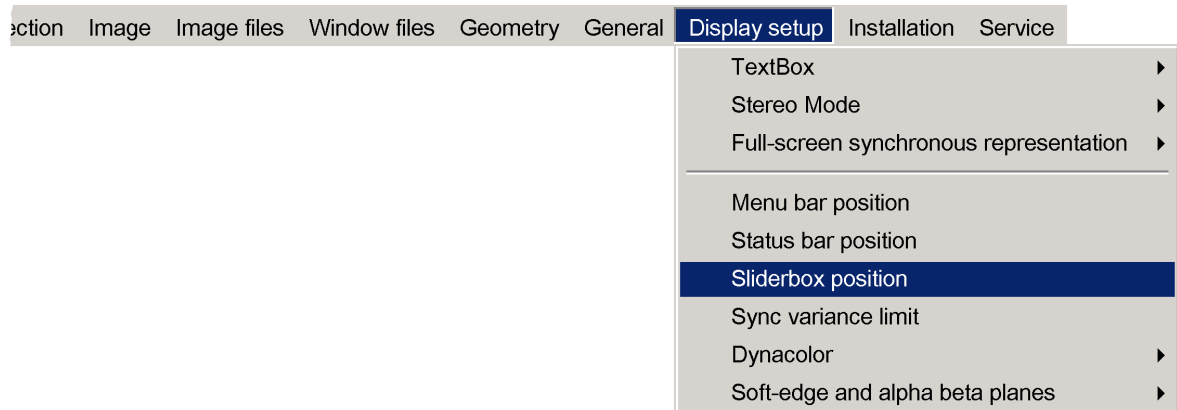


Image 13-13

- A slider box is displayed.
- Use the arrow keys on the RCU to position the slider box.



You can toggle between standard or small steps to move the slider box position by pressing **ENTER** when slider box is displayed.

## 13.8 Sync Variance Limit

### Description

The Sync Variance Limit allows to generate a certain delay between the incoming signal and the processing of it. It is expressed in source lines.

The reason why this delay is needed is because the signal processing in the device is faster than the source signal itself.

If the Sync Variance Limit value is set too low, the previous frame will be processed. This implies that the delay between incoming signal and display of it will be large (16 ms). No image distortion will occur however.

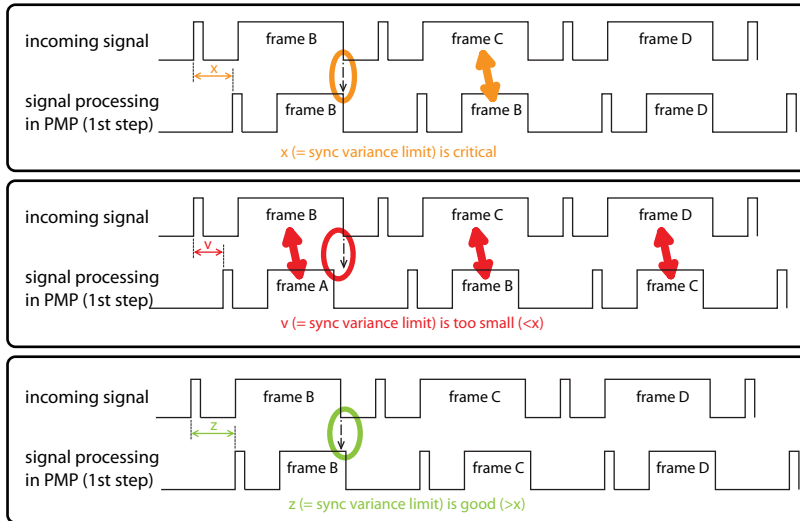


Image 13-14

If the Sync Variance Limit value is only just high enough (= critical value), it might be possible that sometimes the actual frame is processed and sometimes the previous frame is processed. This will lead to a jumping image or frame tearing (= image distortion).

The best value for the Sync Variance Limit is about 50 microseconds higher than the critical range. This guarantees the display of the actual frame without distortion and with minimum delay.

### Adjusting the Sync Variance Limit

1. Make sure the required geometry file is active and select the scaled pattern Moving hatch.  
To select the pattern, in the OSD, navigate to *Installation > Scaled patterns > Moving hatch...* and press **ENTER** to select.
2. Navigate to *Display setup > Sync variance limit...* and press **ENTER** to select.

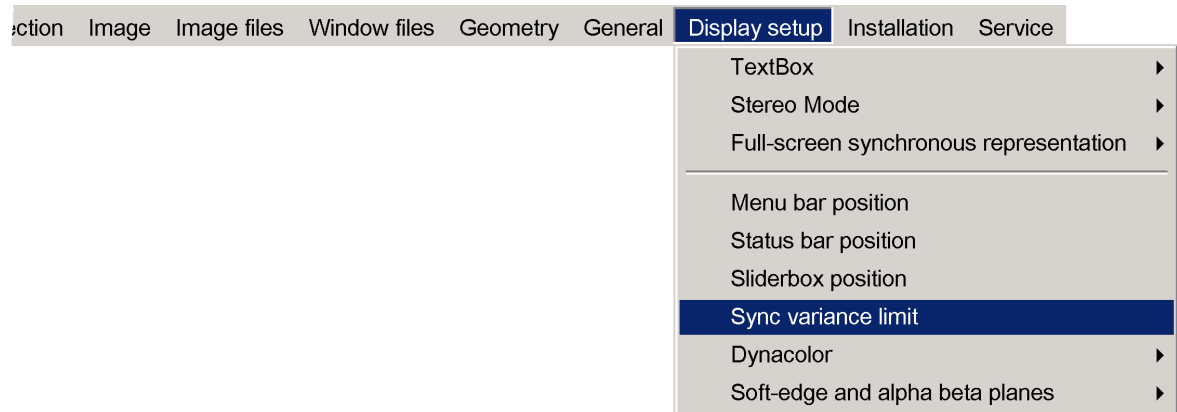


Image 13-15

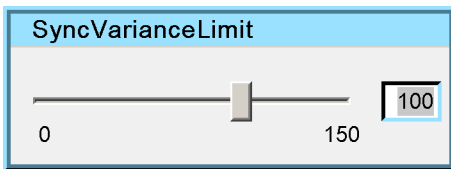


Image 13-16

3. In the dialog box that appears, starting at the lowest value, increase the value in steps of 25 until you get to the range where frame tearing is clearly visible.
4. Further increase the value until this frame tearing disappears again.
5. Increase the actual value by 25 or 50.
6. Exit the menu.

## 13.9 Full-screen synchronous representation

### Description

- Display setup — Stereo mode — Mono / Active stereo:  
The input will be displayed synchronously when its vertical refresh is between 48 Hz and 120 Hz. When the vertical refresh is not within this range, the input will be displayed asynchronously at 60 Hz. This applies only if Full-sceen synchronous representation is set to On.

### Enabling or disabling full-screen synchronous representation

1. In the OSD, navigate to *Display setup > Full-screen synchronous representation...> On or Off.*

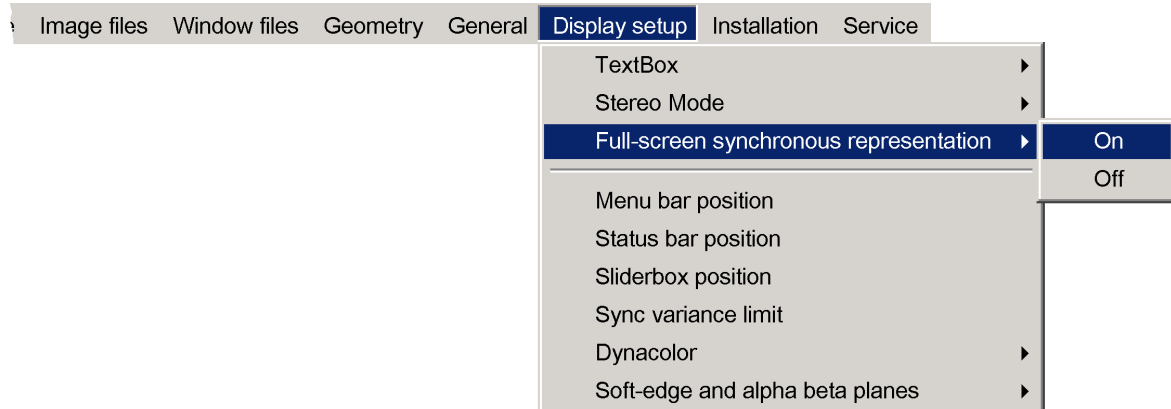


Image 13-17

2. Press **ENTER** to select to select your option.





# 14. SPECIFICATIONS

## Overview

- General specifications
- Dimensions
- Technical Regulations

## 14.1 General specifications

### Overview

<b>Input frequency</b>	From 48-120 Hz
<b>Compatibility</b>	F50 WQXGA series
<b>Outputs</b>	2 times DisplayPort 1.1a to drive WQXGA F50 projector native in two columns 2 x 1280 x 1600
<b>Control</b>	Through IR remote control or IP
<b>Power</b>	External power supply: 100-250V 50/60 Hz
<b>Mechanics</b>	Rack mount kit included
<b>Heat dissipation</b>	264 BTU/h
<b>Network connection</b>	Ethernet 10/100 RJ45
<b>WARP</b>	Hardware based real-time warping with easy on-screen menu
<b>Stereo support</b>	Both passive and active stereo input capabilities
<b>Electromagnetic Interference</b>	Complies with FCC rules & regulations, part 15 Class A and CE EN55022 Class A
<b>Inputs</b>	4 times DisplayPort 1.1a that allows native WQXGA up to 120Hz in : - two columns 2 x 1280 x 1600 - four columns 4 x 640 x 1600 (mono content only) - four quadrants 4 x 1280 x 800 (mono content only) - Stereo sync input on 4 mini-din connectors or embedded on DP cables.
<b>Weight</b>	6.11 kg (without packaging); 7.11 kg (with packaging)
<b>Humidity</b>	Storage: 0 to 98% rel. humidity, non-condensing Operation: 0 to 95% rel. humidity, non-condensing
<b>Features</b>	Pixel accurate alpha and beta planes - Advanced electronic blending - outstanding anti aliasing
<b>Ambient temperature</b>	Max: +40°C   104°F Min: +10°C   50°F Storage: -35°C to +65°C   -31°F to 149°F
<b>Color correction</b>	Advanced color matching (Dynacolor) with linking capability
<b>Output frequency</b>	Synchronous mode : 48-120 Hz Assynchronous : 60 Hz mono or 120 Hz stereo
<b>Dimensions</b>	4 RU 295 mm x 290 mm x 215 mm (11.6" x 11.4" x 8.46")
<b>Power consumption</b>	77.3 W

## 14.2 Dimensions

### Outer dimensions of the MCM-50

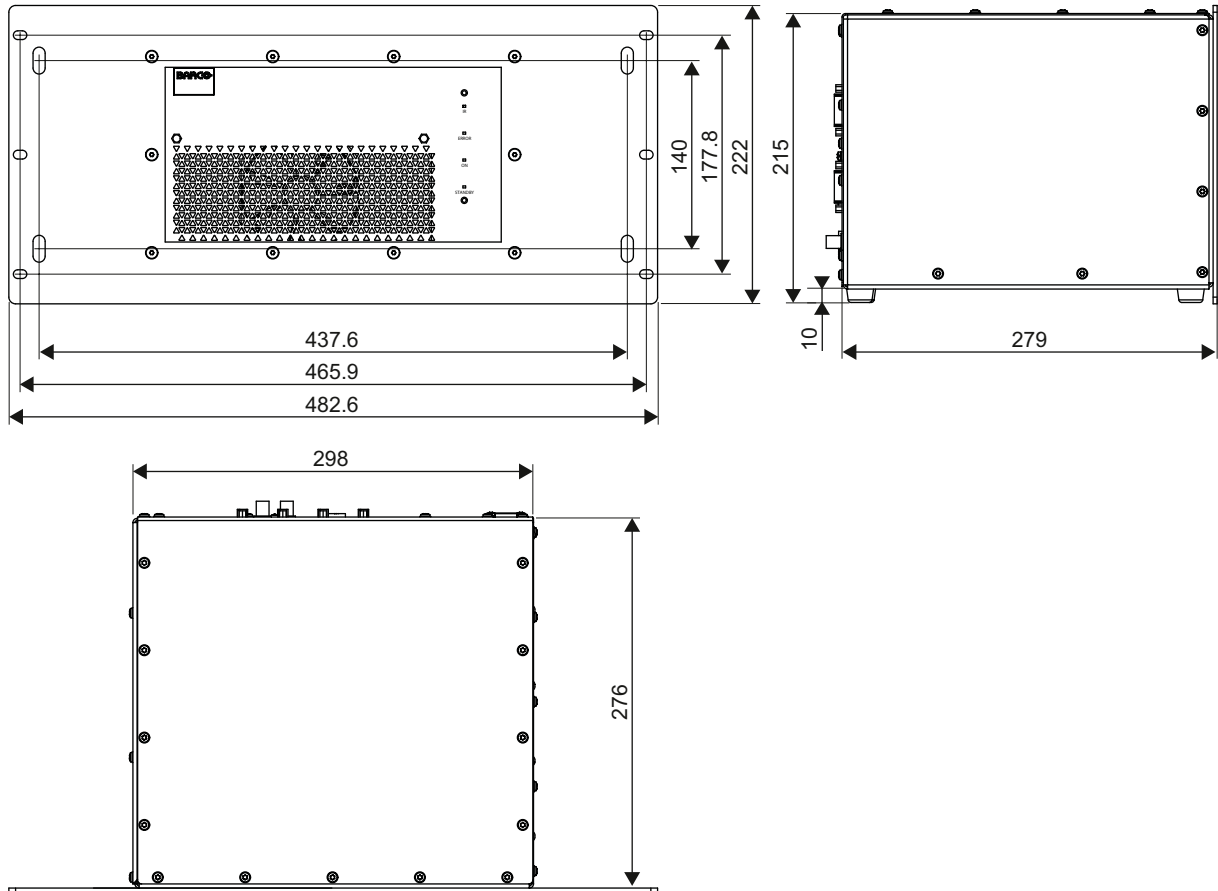


Image 14-1  
Dimensions given in millimeters.

## 14.3 Technical Regulations

### Certificates



Image 14-2  
EAC mark



Image 14-3  
RoHS



Image 14-4  
RoHS OK



Image 14-5  
CE mark

# 15. RCU CONTROL

## About this chapter

It is possible to control the MCM-50 through Remote Control Unit (RCU) and for that the RCU must be in the range of the IR receivers of the MCM-50 and vice versa. The commands are sent from the RCU through IR signals.

To enable communication between RCU and MCM-50, both must be set to the same IR address.

We can classify the RCU buttons in functional groups:

- buttons for OSD navigation and selection;
- buttons used for data input;
- buttons to control the device;
- buttons to adjust image settings.

## Overview

- Range of RCU and IR receivers
- OSD navigation and selection
- Data input
- MCM-50 control

## 15.1 Range of RCU and IR receivers

### Effective range of the RCU

When using the wireless RCU, make sure the MCM-50 to be controlled is within the effective operating distance (30 m, 100 ft in a straight line) of the RCU.

The effective range of the IR receivers is 45 degrees half angle.

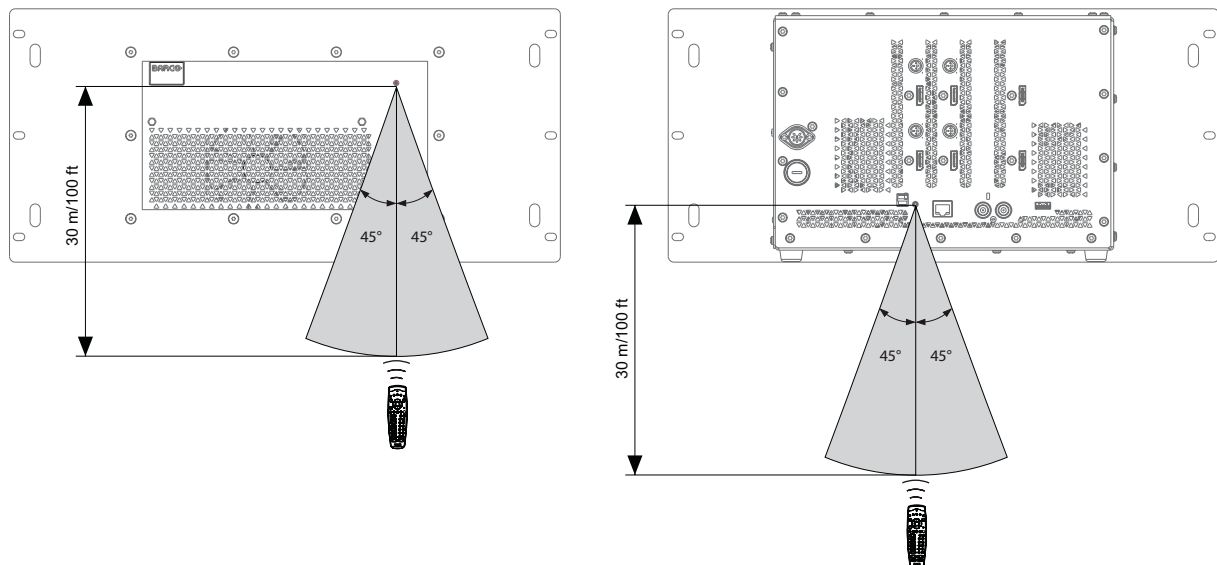


Image 15-1  
RCU receiver range

## 15.2 OSD navigation and selection

### Buttons on the RCU used to use the OSD

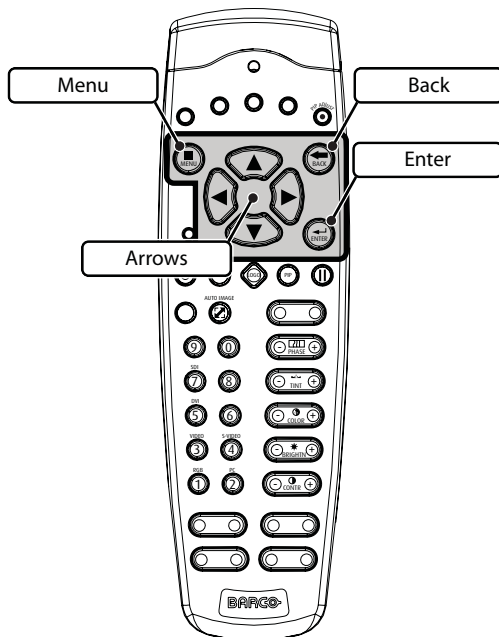


Image 15-2  
RCU: OSD navigation and selection buttons

- **MENU:** to display the OSD (On Screen Display)
- **BACK:** to return one step
- **ENTER:** to confirm or select
- Navigation buttons: ▲ (up), ▼ (down), ◀ (left), ▶ (right). Used to navigate through the OSD.

### Example: How to navigate to the IP address edit box in the Network settings dialog box?

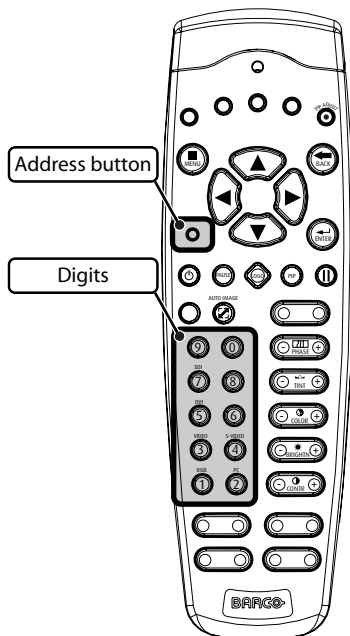
1. On the RCU, press **MENU** to display the OSD
2. Press the arrow key ▶ a multiple times until *Installation* is highlighted (dark background)
3. Press the arrow key ▼ to open the drop down menu
4. Press the arrow key ▼ a multiple times until *Network address...* is highlighted (dark background)
5. Press **ENTER** to open the dialog box

Image 15-3

6. Press the arrow key ▼ a multiple times until *IP address* is highlighted (an outline is visible around the word IP address)
7. Press **ENTER** to activate the edit box

## 15.3 Data input

### Buttons on the RCU used for input of data

Image 15-4  
RCU: data input buttons

- **Set address** button: a sunk-down button to enable address programming
- **0 .. 9**: buttons to enter a numerical value

#### Example: how to enter a new Standby timer value?

Assume that we want to change the timer value from 300 to 180 seconds.

1. In the OSD, navigate to *General > Standby timer...*

2. Press **ENTER** to select.  
A dialog box is displayed.

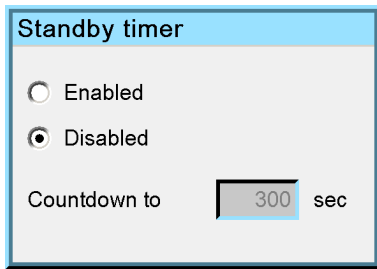


Image 15-5

3. Navigate to the edit box and press **ENTER** to activate it
4. Use the arrow **▶** to highlight the digit "3"
5. Press the arrow **▼** twice to change the digit from "3" down to "1"
6. Use the arrow **▶** to highlight the digit "0"
7. Press the arrow **▼** twice to change the digit from "0" down to "8"  
*Note: Alternatively, the arrow **▲** can be pressed 7 times to go up from "0" to "8".*

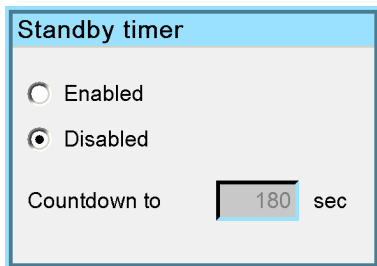


Image 15-6

8. Press **ENTER** to confirm
9. Press **BACK** to go one step back in the menu or press **MENU** to exit the menu

## 15.4 MCM-50 control

### Buttons on the RCU used to control the MCM-50

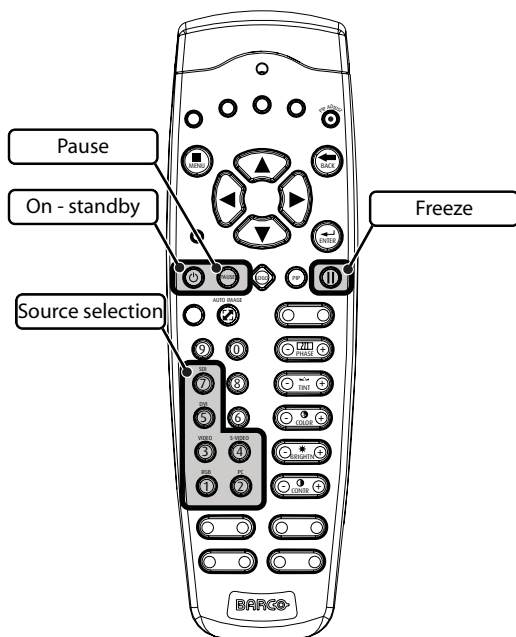



Image 15-7  
RCU: control buttons

- 
- **On / Standby** button  : to switch MCM-50 to **active state** or to switch it to **standby**
  - **Pause**: to switch MCM-50 to pause or resume from pause. If Pause is active, the display shows a full black image, although MCM-50 remains in active state (not standby!).
  - **Freeze II** : to freeze/unfreeze the image
  - Source selection buttons:
    - **1** (RGB)
    - **2** (PC)
    - **3** (VIDEO)
    - **4** (S-VIDEO)
    - **5** (DVI)
    - **7** (SDI)

These buttons can be used as shortcut keys to display a source full screen or in a window in native resolution. Pressing a multiple times cycles through the sources connected to the same type of connector:

**Example:** two DVI sources are connected to the MCM-50: one to the DVI-D connector on input layer 3, the other to the DVI-D connector on input layer 4. Pressing **5** on the RCU will launch the DVI source which is connected to the DVI-D connector of input layer 3. Pressing **5** again, will launch the DVI source which is connected to the DVI-D connector of input layer 4. Pressing **5** again will launch the DVI source of input layer 3.





# 16. ENVIRONMENTAL INFORMATION

## Overview

- Disposal information
- Rohs compliance
- Production address
- Importers contact information

## 16.1 Disposal information

### Disposal Information

Waste Electrical and Electronic Equipment



This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service.

For details, please visit the Barco website at: <http://www.barco.com/en/AboutBarco/weee>

### Disposal of batteries in the product



This product contains batteries covered by the Directive 2006/66/EC which must be collected and disposed of separately from municipal waste.

If the battery contains more than the specified values of lead (Pb), mercury (Hg) or cadmium (Cd), these chemical symbols will appear below the crossed-out wheeled bin symbol.

By participating in separate collection of batteries, you will help to ensure proper disposal and to prevent potential negative effects on the environment and human health.

## 16.2 Rohs compliance

### Turkey RoHS compliance



Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

### 中国大陆 RoHS – Chinese Mainland RoHS

根据中国大陆《电器电子产品有害物质限制使用管理办法》(也称为中国大陆RoHS), 以下部分列出了Barco产品中可能包含的有毒和/或有害物质的名称和含量。中国大陆RoHS指令包含在中国信息产业部MCV标准:“电子信息产品中有毒物质的限量要求”中。

According to the “Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products” (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco’s product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section “Limit Requirements of toxic substances in Electronic Information Products”.

16. Environmental information

零件项目(名称) Component Name	有毒有害物质或元素 Hazardous Substances or Elements					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印制电路配件 Printed Circuit Assemblies	x	0	x	0	0	0
电(线)缆 Cables	x	0	x	0	0	0
底架 Chassis	x	0	x	0	0	0
电源供应器 Power Supply Unit	x	0	x	0	0	0
文件说明书 Paper Manuals	0	0	0	0	0	0
光盘说明书 CD Manual	0	0	0	0	0	0

本表格依据SJ/T 11364的规定编制

This table is prepared in accordance with the provisions of SJ/T 11364.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下.

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

在中国大陆销售的相应电子信息产品(EIP)都必须遵照中国大陆《电子电气产品有害物质限制使用标识要求》标准贴上环保使用期限(EFUP)标签。Barco产品所采用的EFUP标签(请参阅实例, 徽标内部的编号使用于指定产品)基于中国大陆的《电子信息产品环保使用期限通则》标准。

All Electronic Information Products (EIP) that are sold within Chinese Mainland must comply with the "Marking for the restriction of the use of hazardous substances in electrical and electronic product" of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (please refer to the photo) is based on the "General guidelines of environment-friendly use period of electronic information products" of Chinese Mainland.



Image 16-1

### 16.3 Production address

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#### **Factory location:**

##### **Barco nv Projection Division**

Noordlaan 5,

B-8520 Kuurne

Phone: +32 56.36.82.11

Fax: +32 56.36.883.86

Support: [www.barco.com/esupport](http://www.barco.com/esupport)

Visit us at the web: [www.barco.com](http://www.barco.com)

#### **Made in information**

The made in country is indicated on the product ID label on the product itself.

#### **Production date**

The month and year of production is indicated on the product ID label on the product itself.

### 16.4 Importers contact information

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#### **Contact**

To find your local importer, contact Barco directly or one of Barco's regional offices via the contact information given on Barco's web site, [www.barco.com](http://www.barco.com).