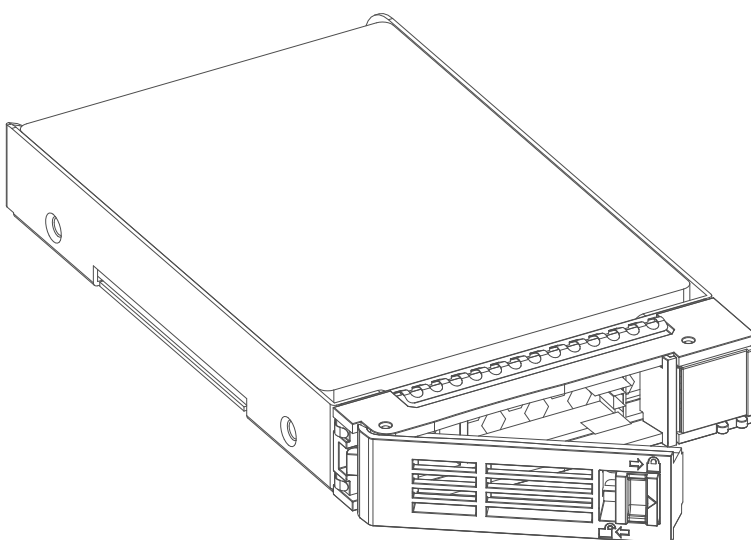


ICMP/ICMP-X HDD



Installation manual

Barco NV

Beneluxpark 21, 8500 Kortrijk, Belgium
www.barco.com/en/support
www.barco.com

Registered office: Barco NV

President Kennedypark 35, 8500 Kortrijk, Belgium
www.barco.com/en/support
www.barco.com

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Warning : This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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Warning : This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

FCC responsible: Barco Inc.
3059 Premiere Parkway Suite 400
30097 Duluth GA, United States
Tel: +1 678 475 8000

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Table of contents

1 HDD(s) on ICMP	7
1.1 General.....	8
1.2 ICMP HDD	9
1.3 What are the possible HDD swaps	11
1.4 HDD status LEDs.....	12
1.5 Removing a HDD from the ICMP.....	14
1.6 Installing a HDD into the ICMP.....	15

HDD(s) on ICMP

1

About this document

This installation manual explains how to replace malfunction HDD(s) of the Barco ICMP (Integrated Cinema Media Processor) installed in the field.

Clarification of term “ICMP” used in this document

When referring in this document to the term “ICMP” means that the content is applicable for following Barco products:

- ICMP
- ICMP-X



CAUTION: Notwithstanding the HDDs are technical hot swappable it is strongly advised to switch off the projector prior to replace the HDD. Removing a HDD while power is on will degrade the RAID configuration, inserting a HDD will cause a performance drop in case of a playout, putting a set of HDD's in the projector one by one when power is on might trigger an unnecessary rebuild, ...



In case only one HDD is replaced (RAID degraded mode) the ICMP automatically starts with the RAID recovery process after the malfunction HDD is replaced. The red LED of the HDD which has to be rebuilt is blinking. Rebuild process takes about 3 to 4 hours for 1TB HDD and could takes about 13 to 14 hours for 4TB HDD. Once the RAID is completed the red LED turns off.



CAUTION: It's strongly recommended to complete the RAID recovery process prior to starting a show. This to ensure that the content integrity is preserved and that the show is not interrupted.



In case more than one HDD must be replaced, the RAID is 'broken'. All content will be lost. Once the HDDs are replaced, when the projector restarts, the ICMP automatically creates a new (empty) RAID 5 configuration.

Overview

- General
- ICMP HDD
- What are the possible HDD swaps
- HDD status LEDs
- Removing a HDD from the ICMP
- Installing a HDD into the ICMP

1.1 General

Document overview

This document gives a brief introduction into the ICMP HDD, provides in a table a summary of all types of HDD swaps available, describes the LED status of the HDD and describes the HDD removal and installation instructions.

The latest version of this document can be downloaded from the Barco website www.barco.com or from the secured Barco website <https://my.barco.com>.

About ICMP

The ICMP is a removable electronic assembly situated in the Card Cage of the projector. The ICMP stores, decrypts and decodes DCI cinema content and delivers it to the projector in a usable format, all integrated into a single assembly placed directly in the projector.

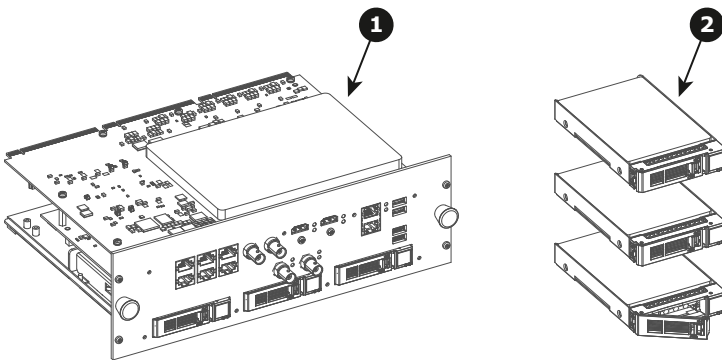


Image 1-1

- 1 ICMP
- 2 HDDs for ICMP

There are several ICMP types (ICMP with Displayport, ICMP with HDMI 2.0, ICMP-X,...). For detail information about the ICMP or Barco digital cinema projector refer to the manual of the projector which is also available on the Barco website.

GEN1 and GEN2 storage controller

The ICMP-X is equipped with a GEN2 storage controller while the legacy ICMP has an GEN1 storage controller.

The GEN2 storage controller supports SSD and uses another disk initialization type. This implies that HDDs initialized for the legacy ICMP (with GEN1 storage controller) are not interchangeable with the ICMP-X without re-initialization. Note that a re-initialization process result in lost of content. See "What are the possible HDD swaps", page 11.

It's possible to upgrade an ICMP with a GEN2 storage controller. For more info about the upgrade kit and instructions see Barco website.

How to recognize an ICMP-X or an upgraded ICMP with GEN2 storage controller

At the first glance ICMP-X is very similar to ICMP (the previous generation device) however both devices are not fully compatible and not interchangeable.

Unlike the previous versions the name of ICMP-X appears on the upper left side of the front face (under the Barco logo).

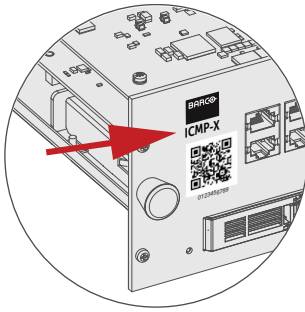


Image 1-2

An upgraded ICMP with GEN 2 storage controller has a label “SSD READY - RAID GEN2” applied under the Barco logo). This sticker comes with the upgrade kit; it will only be there when the “upgrader” applied it.

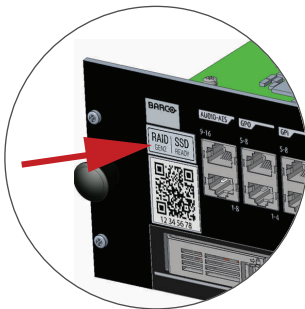


Image 1-3



It's useful to recognize an ICMP from an ICMP-X or upgraded ICMP to know which HDDs can be used without re-initialization.

1.2 ICMP HDD

About ICMP HDD

The three HDDs (local storage) in the ICMP, are set up in a RAID 5 configuration. This storage technique, that combines multiple HDD components into a logical unit, manages enough redundancy information to continue to operate properly after the loss of one HDD.

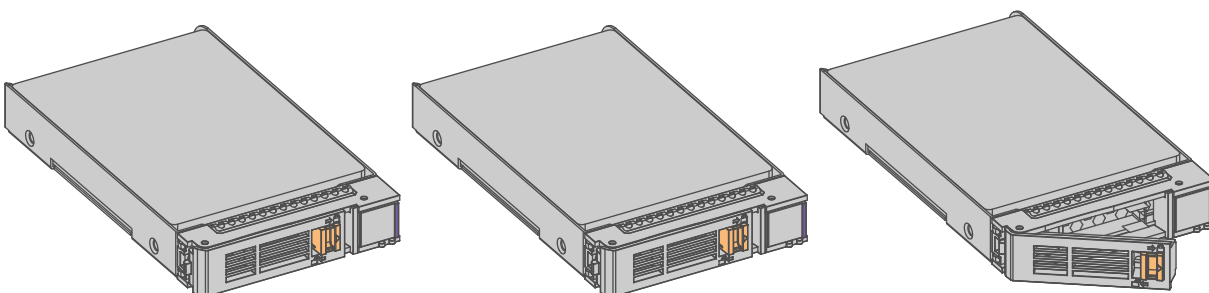


Image 1-4



CAUTION: A RAID 5 configuration with three HDDs allows a maximum loss of one disk. With the simultaneous loss of more than one HDDs, data is lost and the RAID must be completely initialized again after replacement of the defect HDDs with new HDDs!

About degraded mode

When a RAID array experiences the failure of one disk, it enters in degraded mode. Content storage and playback remains available on the ICMP.



CAUTION: The loss of one disk causes no serious consequences on the ICMP. But action must be taken quickly because the loss of a second disk will make the RAID system broken. The main cause of the total loss of RAID is due in most cases to the loss of the second disk while the first has not been rebuilt!



A failed drive should be replaced as soon as possible.

About “RAID recovery” process

The restoration from degraded to normal condition of the RAID 5 system is done automatically. When the RAID controller detects a new HDD to replace the failed disk the recovery procedure starts automatically.



CAUTION: The automatic process does not work if more than one disk is lost. In that case the RAID must be completely initialized again!

About RAID broken

When more than one HDD is out of order, the RAID is considered as 'broken' and the content is lost. The failed HDDs must be changed and a new RAID must be created.

Exchange or re-use of a disk set

It's possible to have several sets of disks with one ICMP or to reuse a complete set of disks coming from another projector with ICMP.

How to exchange:

- **Exchange of HDD set between two ICMPs with the same storage controller:**
It is sufficient to insert the three HDDs, from a valid RAID array, and let the system explore the new RAID. The mounting order of the HDDs and the HDD slots do not matter. Of course, when using HDDs from another ICMP it is necessary to retrieve from the content distributor the KDMs corresponding to the content and the new ICMP.
- **Exchange of HDD set between two ICMPs with a different storage controller:**
After inserting the three HDDs it is necessary to perform a manual RAID initialization with (Web Communicator, the Barco projectors configuration software. The *RAID initialization* command (e.g. in Web Communicator: *Maintenance > Raid Storage*) erases any data present on the HDDs and the old content will be lost. This will only take a short while and after this process, the projector will reboot. You can start immediately after booting with the ingest of your content.



The problem of non-compatibility between the two generations of storage controllers is also encountered when installing a new set of hard drives on an ICMP-X. The HDD spare part kits provided by Barco are configured by default to work with a GEN1 storage controller and it is necessary to perform a manual RAID initialization when they are deployed on a GEN2 storage controller.



Label the HDDs with the initialization type (GEN1 or GEN2) to make it visible for which type of storage controller the disks can be used without requiring a re-initialization and lost of content

HDD storage capacity

Make sure that all HDDs in the ICMP HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

HDD storage

The maximum recommended storage period for the drive in a non-operational environment is 90 days. Drives should be stored in the original unopened shipping packaging whenever possible. Once the drive is removed from the original packaging the recommended maximum period between drive operation cycles is 30 days. During any storage period the drive non-operational temperature, humidity, wet bulb, atmospheric conditions, shock, vibration, magnetic and electrical field specifications should be followed.

HDD models validated by Barco

Only the original HDD spare parts provided by Barco or models validated by Barco (see list below) can be used in the ICMP. All deviations from this rule void warranty.

HDD model	ICMP-X	ICMP
1TB: HGST – Western Digital (order code: HCC541010A9E630 or HCC541010B9E660)	Yes	Yes
1TB: Western Digital black drives (order code: WD10JQLX-22JFGT0)	Yes	Yes
2TB: Seagate (order code : ST2000NX0253)	Yes	Yes
4TB: Seagate SSD (order code: XA3840ME10063)	Yes	Yes, only if the GEN1 storage controller is replaced by a GEN2 storage controller. Software version 1.4.2 or higher is needed.

1.3 What are the possible HDD swaps

General

There are several possible scenarios for replacing (exchange) hard drives on the ICMP. The situation is different depending on the device type (ICMP or ICMP-X) and whether to replace one or more disks.

Continuity of data present on the disks is also impacted depending on the type of exchange. Degraded operation or RAID initialization may be required.

List of available actions

The following table exposes all possible swaps available concerning HDDs on ICMP:



Replacing drives should always be done while the power is off.

Type of HDD swap	On ICMP	On ICMP-X
1 HDD replaced.	<ul style="list-style-type: none"> Content is preserved. ICMP automatically starts rebuild. Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD. 	<ul style="list-style-type: none"> Content is preserved. ICMP-X automatically starts rebuild. Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD.
3 HDDs replaced separately (previous kit of one disk used three times).	<ul style="list-style-type: none"> All content will be lost. RAID initialization need to be perform with Communicator. immediately usable after RAID initialization + restart (content can be ingested). 	<ul style="list-style-type: none"> All content will be lost. RAID initialization need to be perform with Web Communicator. immediately usable after RAID initialization + restart (content can be ingested).
Barco HDD replacement kit (Spare part kit provided by Barco with a set of 3 hard disks configured to GEN1 storage controller).	<ul style="list-style-type: none"> RAID initialization does not need to be performed. Content can be ingested immediately. 	<ul style="list-style-type: none"> RAID initialization needs to be perform with Web Communicator. immediately usable after RAID initialization + restart (content can be ingested).

Type of HDD swap	On ICMP	On ICMP-X
Set of 3 HDDs with content reused from an ICMP with GEN1 storage controller.	<p>On an ICMP with GEN1 storage controller:</p> <ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested. <p>On an ICMP with GEN2 storage controller:</p> <ul style="list-style-type: none"> All content will be lost. Only usable after RAID initialization + restart (content can then be ingested immediately). 	<ul style="list-style-type: none"> All content will be lost. Only usable after RAID initialization + restart (content can then be ingested immediately).
Set of 3 HDDs with content reused from an ICMP-X.	<ul style="list-style-type: none"> Unit is equipped with an GEN1 storage controller (default configuration): <ul style="list-style-type: none"> All content will be lost. RAID initialization needs to be performed with Communicator. Unit has been upgraded with a GEN2 storage controller (+ ICMP software 1.4.2 or higher is installed): <ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested. 	<ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested.

1.4 HDD status LEDs

HDD status LEDs

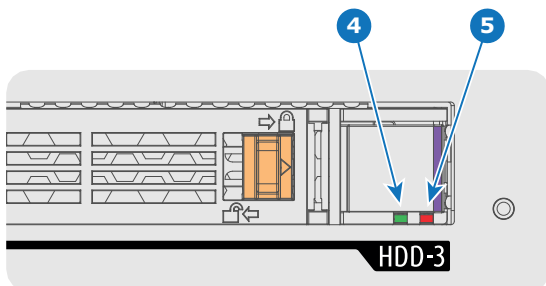


Image 1-5

- 4 HDD I/O LED
- 5 RAID LED

Status LEDs on ICMP

HDD I/O	RAID	HDD Status
Off	Off	HDD idle / disk in RAID OK.
Blinking green	Off	HDD I/O activity / disk in RAID OK.
Blinking green	Slow blinking red	HDD disks not (yet) initialized (not supported on ICMP with GEN1 storage controller).

HDD I/O	RAID	HDD Status
Blinking green	Fast blinking red	HDD I/O activity / RAID rebuilding.
Off	Red	HDD idle / Disk error. Consult the following troubleshooting table for curative actions.



When entering a new HDD in an ICMP, the HDD RAID LED will be full red for a short time. This is not an error, the HDD has not yet been “recognized” by the projector and ICMP. Once the HDD has been accepted by the ICMP, the full red LED will start blinking in accordance with the previous status table.

If the LED remains full red, an error has occurred. In this case, consult the following troubleshooting table for curative actions.

Troubleshooting

Situation	Solution
<p>One disk failed (red LED) + RAID degraded. The ongoing event is not interrupted.</p> <p>Note: The disk status (RAID degraded) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.</p>	<ol style="list-style-type: none"> 1. Switch off the power. 2. Replace the defect HDD with approved model of the same storage capacity. See procedure “Removing a HDD from the ICMP”, page 14, and “Installing a HDD into the ICMP”, page 15. Ensure to insert the HDD firmly. 3. Switch on the power. <p>Result: As soon the new HDD is detected by the ICMP the rebuild of the RAID is started (Blinking red LED).</p>
<p>One disk failed (red LED) + Error 10580 “local storage not available”.</p> <p>Note: The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.</p>	<ol style="list-style-type: none"> 1. Switch off the power. 2. Replace the defect HDD with approved model of the same storage capacity. See procedure “Removing a HDD from the ICMP”, page 14, and “Installing a HDD into the ICMP”, page 15. Ensure to insert the HDD firmly. 3. Switch on the power. <p>Result: As soon the new HDD is detected by the ICMP the rebuild of the RAID is started (Blinking red LED).</p>
<p>Multiple disks failed (multiple red LEDs) + Error 10573 “The RAID is broken”.</p> <p>Note: The disk status (RAID broken) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.</p>	<ol style="list-style-type: none"> 1. Switch off the power. 2. Replace all defect HDDs with approved models of the same storage capacity. See procedure “Removing a HDD from the ICMP”, page 14, and “Installing a HDD into the ICMP”, page 15. Ensure to insert the HDDs firmly. 3. Switch on the power. 4. Start “RAID Initialize”. See user guide of the (Web) Communicator. <p>Result: a new empty RAID is created.</p>

Situation

A set of HDDs initialized for a GEN 2 storage controller is installed on a GEN 1 storage controller (All red LEDs remain off) + Combination of three errors (10580 “**local storage not available**”, 10585 “**storage mount failed**”, 10573 “**the RAID is broken**”)

Note: The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.

All HDD LEDs remain off + Error 10580 “**local storage not available**”.

Note: The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.

Solution

1. To avoid any misidentification, double check ICMP model and if HDD model is compatible with installed storage controller (see list of HDD models validated by Barco).
2. Start “RAID Initialize”. See user guide of the (Web) Communicator. Note that all content will be lost!

Result: a new empty RAID is created.

1. Switch off the power.
2. Reseat all HDDs. See procedure “Removing a HDD from the ICMP”, page 14, and “Installing a HDD into the ICMP”, page 15. Ensure to insert the HDDs firmly.
3. If problem remains try “RAID Initialize”. See user guide of the (Web) Communicator. Note that all content will be lost!
4. If problem remains contact Service for further instructions.



In case the ICMP has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

1.5 Removing a HDD from the ICMP



In case the ICMP has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

How to remove a HDD ?

1. Switch off the projector.
2. Moving the latch towards the left.

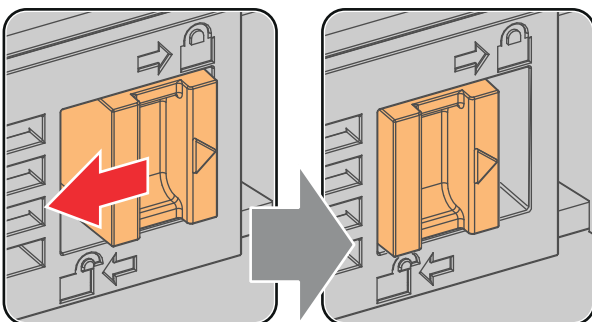


Image 1-6

3. Push the unlock button to open the handle.

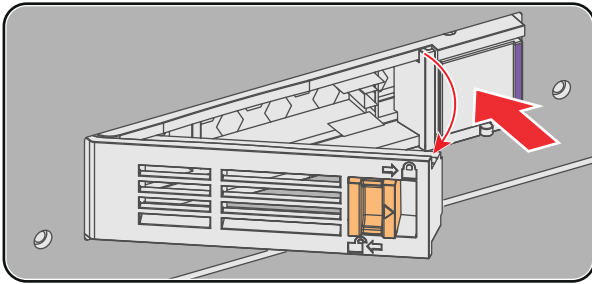


Image 1-7

4. Pull the HDD out of its slot.

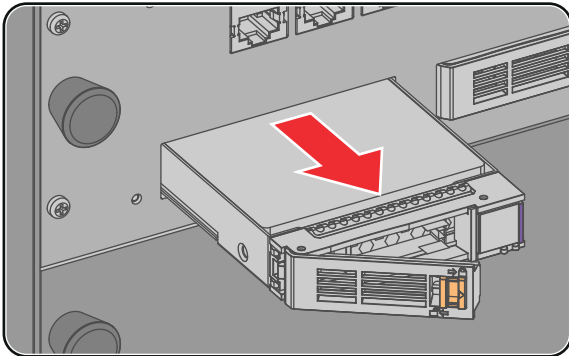


Image 1-8



To install an HDD, see the following procedure: “Installing a HDD into the ICMP”, page 15.

1.6 Installing a HDD into the ICMP



This procedure assumes that the HDD slot of the ICMP is empty. If not, see procedure “Removing a HDD from the ICMP”, page 14.



CAUTION: Always use a new empty spare part HDD approved by Barco to replace a malfunction HDD. Do not use a HDD from another ICMP HDD set.



CAUTION: Always make sure that all HDDs in the ICMP HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

Re-initialization or rebuild of RAID

Installing or exchange one or several HDDs into ICMP has an impact on data presents on the already inserted drives. RAID integrity depends on the type of HDD swap. Refer to the chapter “What are the possible HDD swaps”, page 11.

How to install a HDD ?

1. Ensure that the projector is switched off.
2. Prepare the HDD for insertion by moving the latch towards the left and push the unlock button to open the handle.

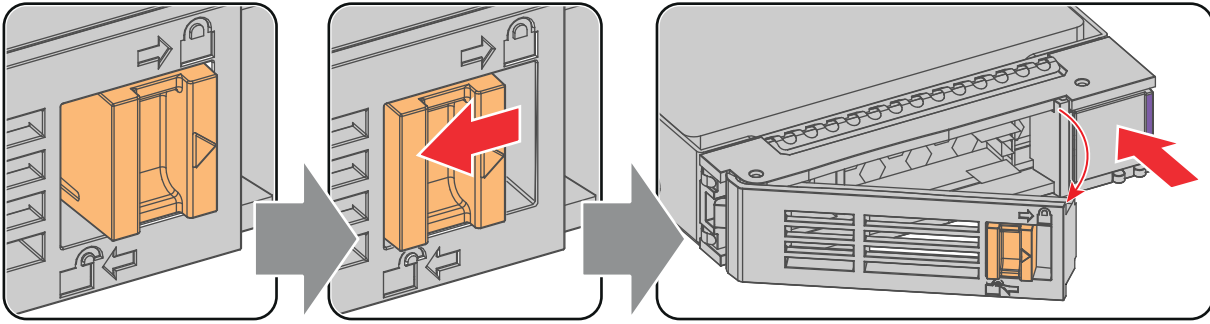


Image 1-9

3. Insert the HDD into the HDD slot. Ensure that the handle is sufficiently open so that the hook (reference 1) of the handle can pass the front plate of the ICMP.

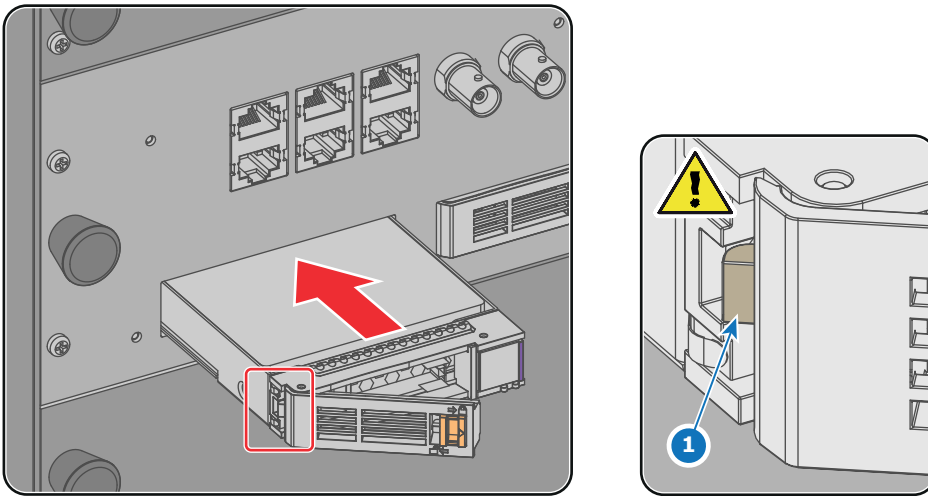


Image 1-10

4. Push the HDD completely and firmly inside its slot, close the handle, and move the latch towards the right.

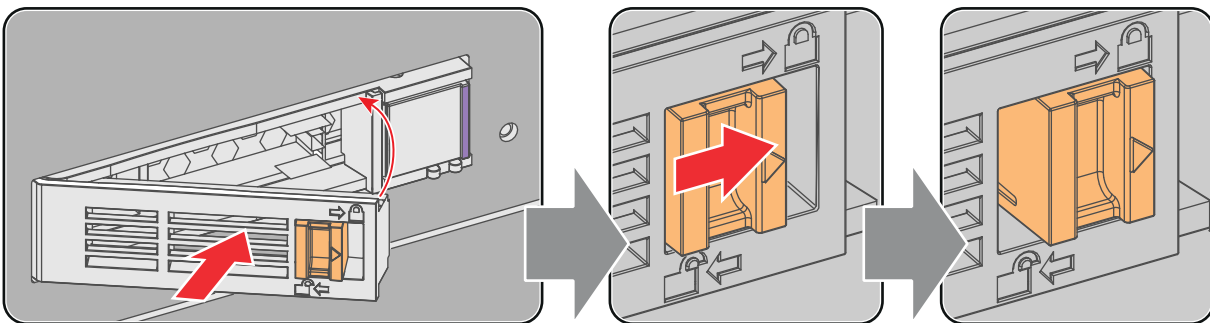


Image 1-11

5. Switch on the projector.



In case you replace one HDD (e.g. degraded mode) the ICMP automatically starts with the RAID recovery process. The red LED of the HDD which has to be rebuilt is blinking. This process takes about 200 GB per hour. Once the RAID is completed the red LED turns off.



CAUTION: It's strongly recommended to complete the RAID recovery process prior to starting a show. This to ensure that the content integrity is preserved and that the show is not interrupted.

