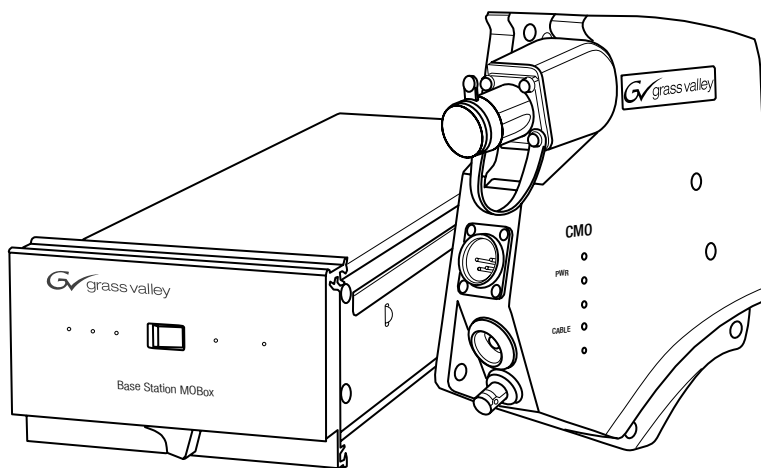


User's Guide



Mixed Operation

HDTV Fiber and Triax transmission system

Declaration of Conformity

We, Grass Valley Nederland B.V., Kapittelweg 10, 4827 HG Breda, The Netherlands, declare under our sole responsibility that this product is in compliance with the following standards:

- EN60065 : Safety
- EN55103-1 : EMC (Emission)
- EN55103-2 : EMC (Immunity)

following the provisions of:

- a. the Safety Directives 73/23/EEC and 93/68/EEC
- b. the EMC Directives 89/336/EEC and 93/68/EEC

FCC Class A Statement

This product generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications.

It has been tested and found to comply with the limits for a class A digital device pursuant to part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this product in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Important information

Read this information carefully before installing or servicing this equipment and retain them for future reference.

Read and comply with the warning and caution notices that appear in the manual

Any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Safety Summary

This information is intended as a guide for trained and qualified personnel who are aware of the dangers involved in handling potentially hazardous electrical/electronic equipment. It is not intended to contain a complete list of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation of this equipment involves risks both to personnel and equipment and must be performed only by qualified personnel exercising due care.

Personnel engaged in the installation, operation or maintenance of this equipment are urged to become familiar with First Aid theory and practices.

During installation and operation of this equipment, local building safety and fire protection standards must be observed.

Before connecting the equipment to the power supply of the installation, the proper functioning of the protective earth lead of the installation needs to be verified.

Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against any unintended operation. The appropriate servicing authority must then be informed. For example, safety is likely to be impaired if the apparatus fails to perform the intended function or shows visible damage.

Warnings

Warnings indicate danger that requires correct procedures or practices to prevent death or injury to personnel.

- Do not modify this equipment.
 - Installation of this equipment must only be performed by qualified personnel.
 - To prevent risk of overheating, ventilate the units correctly.
 - Do not use any accessories other than those recommended by the manufacturer.
 - In case of an emergency ensure that the power is disconnected.
 - Mount equipment so that power lead can be accessed to disconnect power.
 - Any interruption of the protection conductor inside or outside the apparatus, or disconnection of the protective earth terminal, is likely to make the apparatus dangerous. Intentional interruption is prohibited.
 - Use only fuses of the type and rating specified.
-

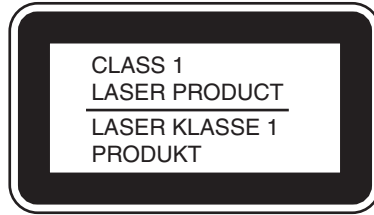
- To prevent fire or shock hazard, do not expose the unit to rain or moisture.
- There are no user servicable parts inside. Refer servicing to qualified personnel only or contact your local Grass Valley representative.
- Observe local building safety, fire protection and electrical installation standards during installation and operation of this equipment.
- Before connecting the equipment to the power supply of the installation, verify the proper functioning of the protective earth lead.
- Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against any unintended operation.

Cautions

Cautions indicate procedures or practices that should be followed to prevent damage or destruction to equipment or property.

- To prevent risk of overheating, ventilate the product correctly.
 - Connect the product only to a power source with the specified voltage rating.
 - Always switch off the camera before changing the power supply.
 - Connection panel position in the rack should ensure that the plug and power cord are within easy reach for switching off purposes.
 - Be extremely careful with the connectors between the camera head and the adapter. Do not allow the guide pins to damage the pins of the connector. Follow these steps in the order given. Tightening the screws in the wrong order could result in mechanical damage to the camera. Loosening the screws in the wrong order could result in mechanical damage to the camera.
 - Avoid very damp places. If the environment is wet or damp a rain cover must be used to protect the unit.
 - Do not subject the unit to severe shocks or vibration.
 - Do not expose the unit to extremes of temperature.
 - Do not leave the unit in direct sunlight or close to heating appliances for extended periods.
-

fiber optic transmission units



Label positions

On the CMO adapter the CLASS 1 LASER PRODUCT label is located above the fiber optic connector on the rear of the adapter housing. On the BMO box the CLASS 1 LASER PRODUCT label is located at the rear of the case of the box.

Laser safety statement (Europe)

fiber optic transmission units are classified as a "CLASS 1 Laser Product" according to EN 60825-1, Safety of Laser products. Class 1 laser products are considered safe and do not result in biological hazard if used according to the instructions.

Laser safety statement (US)

fiber optic transmission units are classified as a "CLASS 1 Laser Product" according to 21CFR 1040.10 of the US Food and Drug Administration (FDA) Center for Devices and Radiological Health.



WARNING

Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

To ensure proper use of this product, please read this instruction manual carefully and retain for future reference. Should the unit ever require maintenance, contact an authorized service location.

fiber optic cable precautions

fiber optic cables and connectors are easily damaged; take the following precautions into account:

- Do not bend the cable beyond the minimum permissible bend range specified for the cable.
 - Avoid kinks in the cable.
 - Avoid subjecting the cable to a high tension force (even momentarily).
 - Do not twist the cable when connecting it to equipment.
 - Insert connectors straight and fully into their corresponding sockets.
 - In fiber optic cable systems always put the dust caps on cable and panel connectors immediately after disconnecting a cable. Keep the dust caps clean.
-

Triax cable systems

**WARNING**

Only connect a Triax cable from the same LDK camera family to the unit.



Do not allow system earth currents to exceed 1.5A in the outer shield of the Triax cable or 0.2A in other cable shields.



To avoid excessive earth currents in a Triax system, galvanically separate the power earth connection of equipment connected to the camera from the camera earth.



It is strictly prohibited to short circuit the inner and outer shields of a Triax cable used to connect a camera to a base station.

Galvanic separation

Because of the nature of Triax systems, with long distances between camera and Base Station, the risk of earth currents flowing is greater. These earth currents can result in damage to the equipment.

For example, a monitor connected directly to the CVBS output of the camera is powered locally. The earthing point of the monitor's power supply can be at a different potential with respect to the earthing point of the Base Station. If the power earth of the monitor is also the video earth, then this earth potential is transferred to the camera via the shield of the BNC connector. The difference in earth potential between the camera and the Base Station results in an earth current in the Triax system.

- To prevent earth currents from flowing in the Triax system, we recommend galvanic separation of earthed equipment connected to the camera. This separation can be achieved by using an isolation transformer between the local power outlet and the equipment connected to the camera. Alternatively, use equipment that has a double insulation and therefore does not require an earth connection.
-



1 System overview

1.1 Introduction

This upgrade changes your HD/HDHS Triax camera system so that it can be used with fiber cables as well as Triax cables. The transmission quality is equally good, regardless of the cable system used to connect the camera to the base station. When the upgrade is completed you will be able to switch between Triax and fiber cable systems by simply exchanging cables. With Triax operation you continue to use your normal Triax cables; with fiber operation you can choose either hybrid or dual-strand cables.

This mixed operation provides great flexibility so that you can work within different cabling infrastructures. As an addition to Triax infrastructure repeater systems can be used to extend cable lengths.

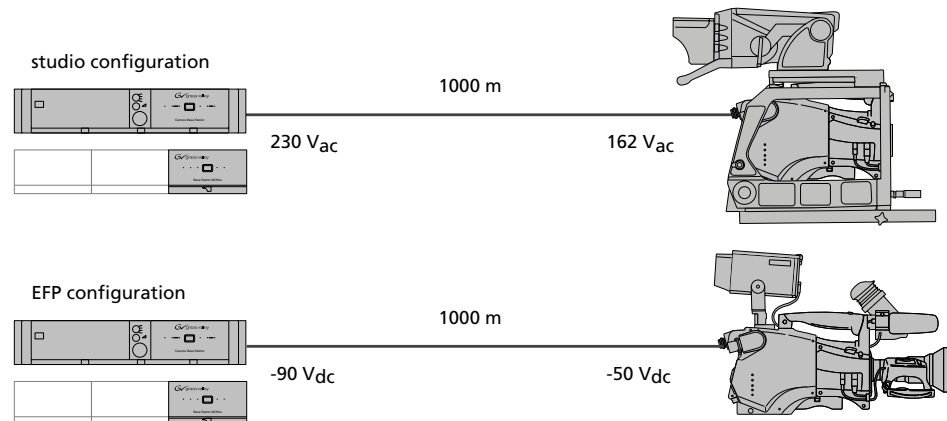
This upgrade applies to HD Triax systems (LDK 6000 and LDK 4000) and HDHS Triax systems (LDK 6200) and their associated base stations. The upgrade also allows a SuperXpander to be used within these systems without additional modifications.

The upgrade kit is available for six different types of Triax connector and six different types of fiber connector. When ordering, you specify the type of connectors that you are using.

1.2 Typical mixed operations configurations

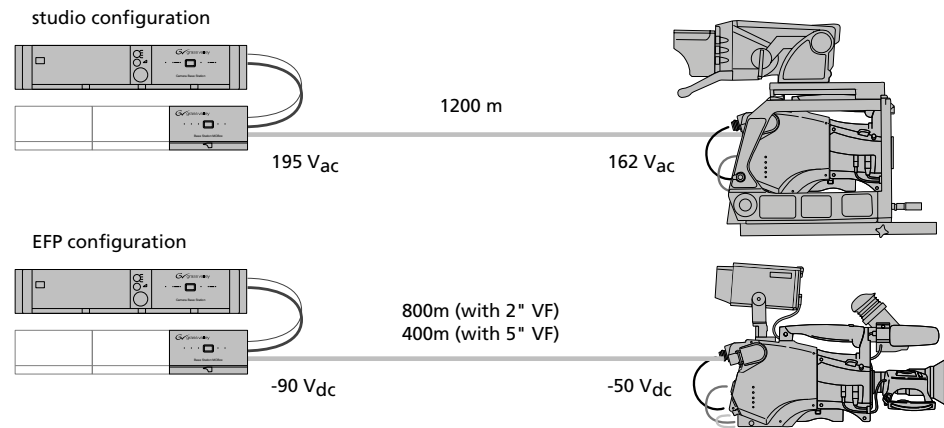
1.2.1 Triax configuration

Figure 1. Configuration



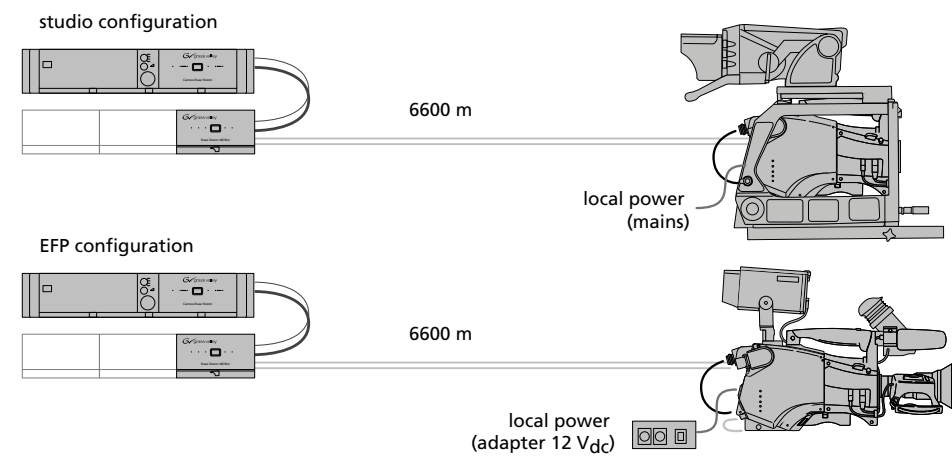
1.2.2 Hybrid fiber configuration

Figure 2. Configuration



1.2.3 Single mode/dual window fiber configuration

Figure 3. Configuration



2 LDK 4900 CMO adapter

2.1 Installation

2.1.1 Preparation

**Note**

Before installing and using the LDK 4900 CMO adapter your HD Triax camera system must be modified for Mixed Operation. Contact your Grass Valley representative for questions about the modification procedure.

The contents of the LDK 4900 CMO adapter package are:

- CMO adapter unit.
- LDK 4903 Triax cable (0.4 m) for use in EFP configurations or LDK 4907 Triax cable (1.2 m) for use with the SuperXpander with Triax module.
- DC power cable (0.25 m)

For the installation you need some additional items (not included in the package):

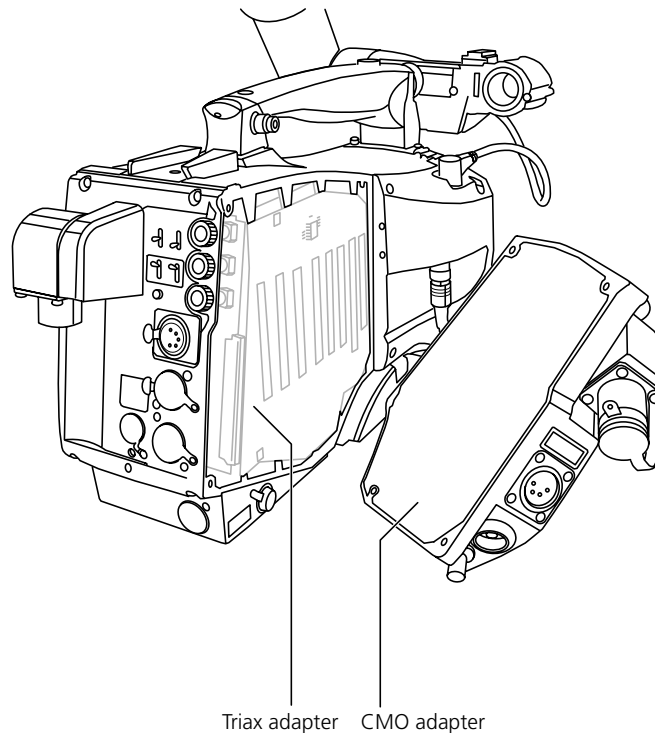
- A short coaxial cable with the following specifications: fitted with BNC connectors (minimum length 0.25 m) with Superscreen shielding.
 - Screwdriver Torx T-10.
-


2.1.2 Mounting the CMO adapter

To mount the CMO adapter unit proceed as follows:

1. Switch off the power of the camera and remove all cables.
2. Unscrew the five screws securing the right side panel of the HD Triax adapter and carefully open.
3. Remove the side panel and store it in a safe place.
4. Attach the CMO adapter unit to the HD Triax adapter and tighten the five screws.

Figure 4. Mounting the CMO adapter



 **Note**

Never operate the CMO adapter **without** mounting it to an HD Triax adapter.

2.1.3 Connecting the CMO adapter

Connect the cables between the HD Triax and the CMO adapter:

- DC power cable
- HD-SDI cable

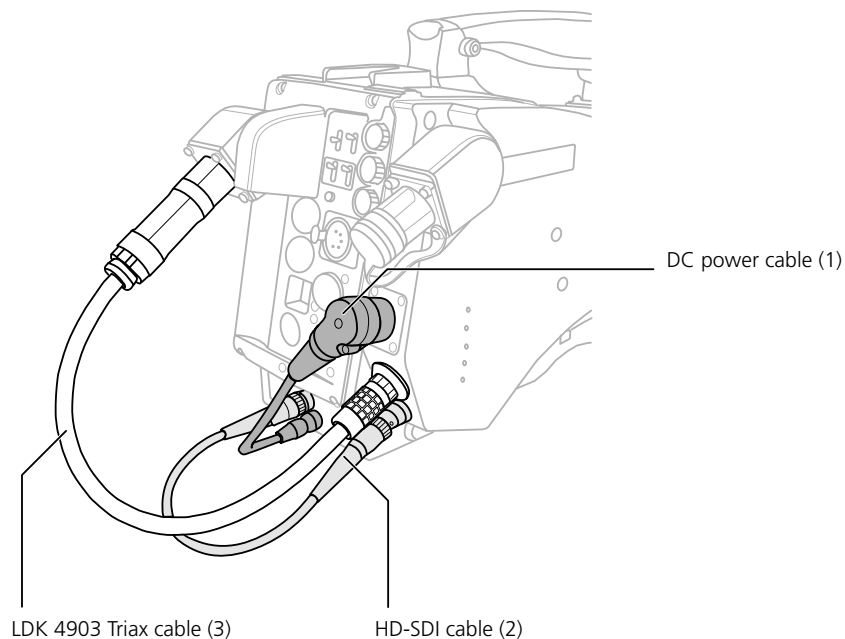
When you are using the camera in EFP mode:

- LDK 4903 Triax cable (0.4 m) from the mini Triax connector of the CMO adapter to the Triax connector on the camera.

When you are using the camera with a SuperXpander with Triax module:

- LDK 4907 Triax cable (1.2 m) from the mini Triax connector of the CMO adapter to the Triax connector at the left side of the SuperXpander. Use the cable clamp at the front right side of the SuperXpander to guide the Triax cable.

Figure 5. Connecting cables between Triax adapter and CMO adapter



Note

When the camera is powered locally by a DC power supply both the camera and the CMO adapter have to be powered individually. In this case the DC power cable is not used. Refer to your camera user's guide for more information about local power.

2.2 Specifications

Table 1. CMO adapter specifications

Item	Value
Power requirements	12 Vdc
Fiber connection	SMPTE 304 hybrid fiber (other systems available)
HD-SDI Input	SMPTE 292
Triax connection	Mini Triax
Operating temperatures	-20 to +45°C (-4 to +113°F)
Storage temperatures	-20 to +60°C (-4 to +140°F)
Weight (approx.)	0.85 kg
Dimensions	45 (D) x 205 (W) x 195 (H) mm

2.3 Indicators

Figure 6. CMO adapter indicators

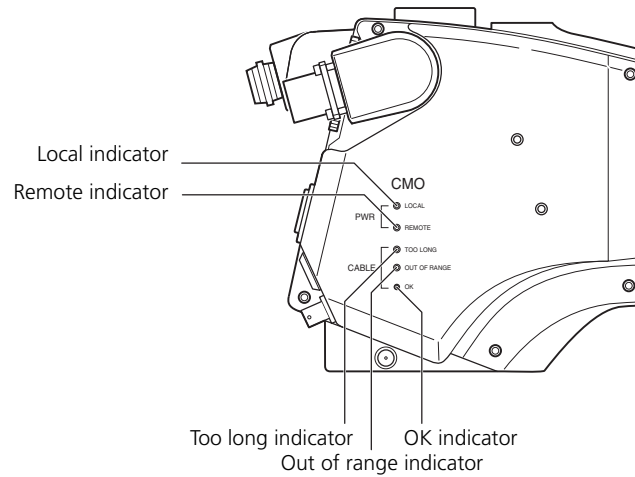


Table 1-1. Power indicators

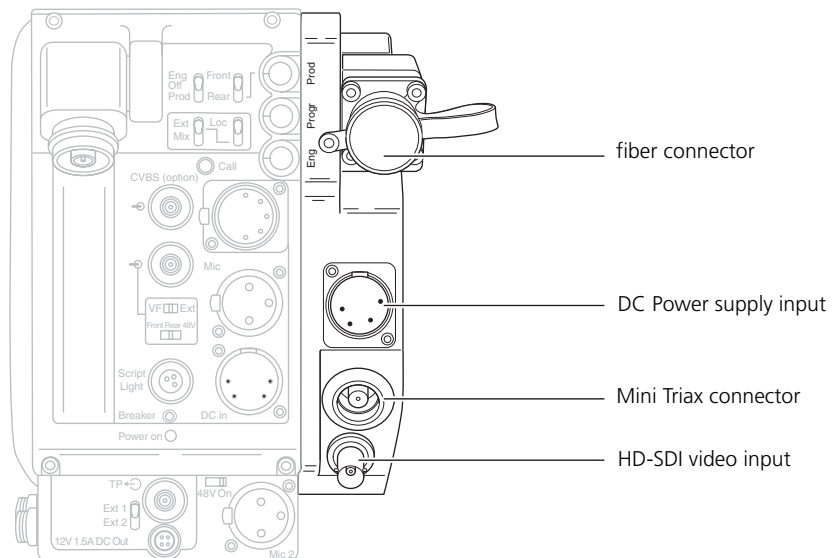
indicator	description	label
GREEN	Lights when the CMO adapter is powered.	LOCAL
GREEN	Lights when cable power is detected.	REMOTE

Table 1-2. Cable indicators

indicator	description	label
GREEN	Lights when cable is attenuation is within range (normal operation).	OK
YELLOW	Lights when cable attenuation is on or near maximum level.	OUT OF RANGE
RED	Lights when cable attenuation is too high.	TOO LONG

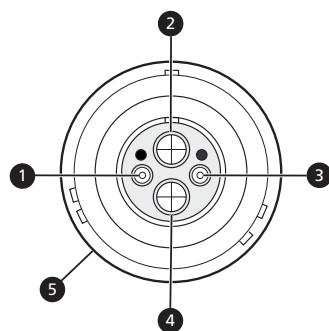
2.4 CMO adapter connectors

Figure 7. LDK 4900 CMO adapter connector location



2.4.1 Fiber connector

Figure 8. Fiber connector (LEMO)



1. Power
2. Fiber A
3. Return
4. Fiber B
5. Shield

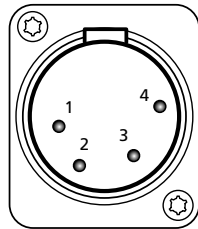
Shield of cable directly to the connector housing.

NOTE: actual fiber connector type depending on the CMO adapter version.

SMPTTE 304M compliant type LEMO EDW.3K.93C; panel view

2.4.2 DC Power supply input

Figure 9. DC Power supply input

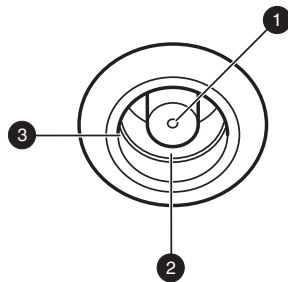


XLR 4-pin male: panel view

1. Ground (power return)
2. nc
3. nc
4. Power input (+11..17 Vdc) from external power supply

2.4.3 Mini Triax connector

Figure 10. Mini Triax connector



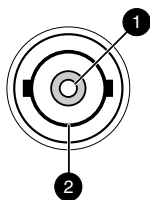
LEMO Mini Triax ERA.2E.675; panel view

1. Inner conductor (HF signal + power)
2. Inner screen (return HF signal + power)
3. Outer screen (screening/safety)

Type: LEMO Mini Triax ERA.2E.675

2.4.4 HD-SDI input connector

Figure 11. HD-SDI input connector



BNC connector 75 Ohm; panel view

1. HD-SDI input
2. Return

3 LDK 4901 BMO box

3.1 Installation

3.1.1 Preparation

**Note**

Before installing and using the LDK 4901 BMO box your HD base station must be modified for Mixed Operation. Contact your Grass Valley representative for questions about the modification procedure.

The contents of the LDK 4901 BMO box package are:

- BMO box with a mounted LDK 4904 Fiber connection option for the specified type of fiber connection.

For the installation you need these cables (not included in the package):

- Coaxial HD-SDI cable with the following specifications: fitted with BNC connectors, maximum length of 80 m, with Superscreen shielding.
 - Triax cable fitted with Triax connectors depending on the Triax system used.
 - Mains power cable.
-

3.1.2 Connecting the BMO box to the base station

- Switch off power of the base station.
- Connect the HD-SDI cable from the HD-SDI output on the BMO box to the HD-SDI input of the base station.
- Connect the Triax cable from the Triax connector on the BMO box to the connector of the base station.
- Connect the mains power cables of the base station and the BMO box.

Figure 12. Connecting the BMObox to an LDK 4502 Base Station

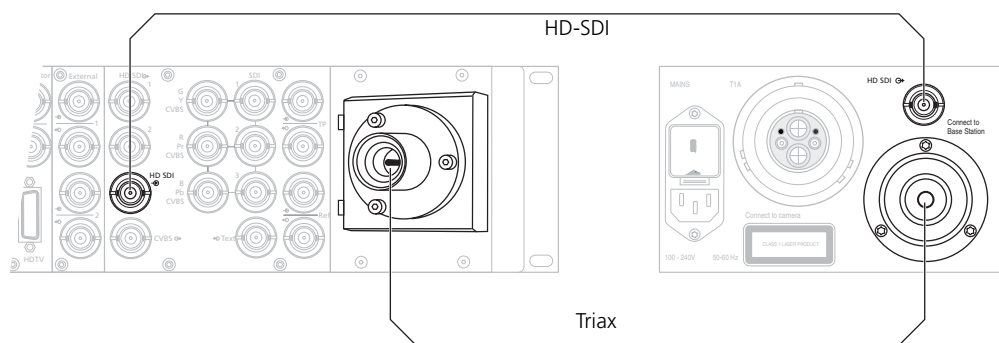
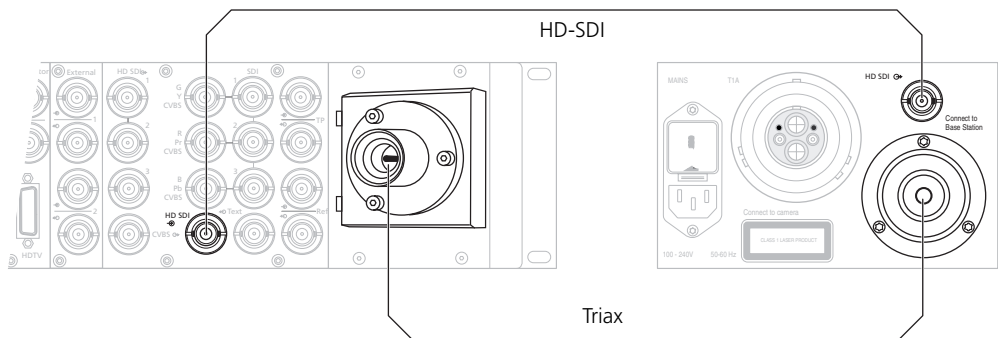


Figure 13. Connecting the BMObox to an LDK 4506 Base Station



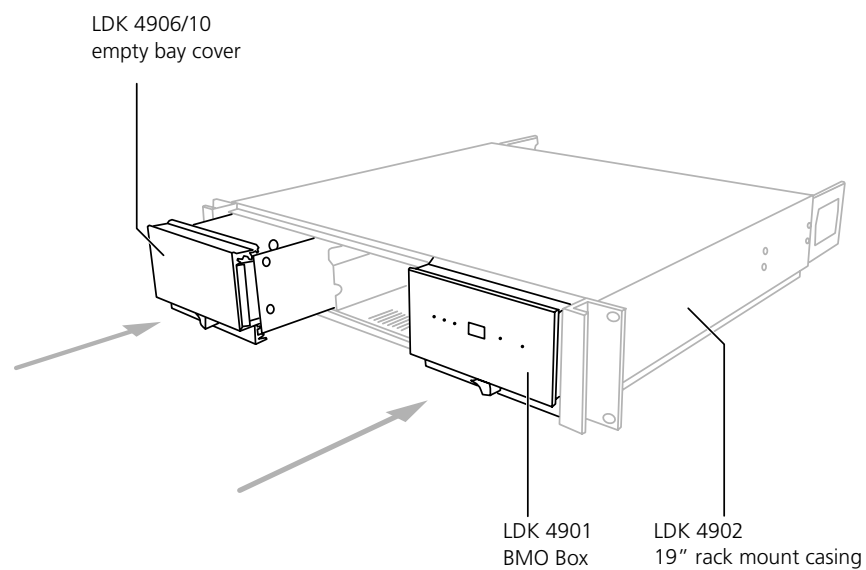
3.1.3 Rack mounting

The optional LDK 4902 19" rack mount casing can be used to mount up to three BMO boxes in a single 19-inch, 2HE rack. The unused positions in the bracket should be covered with a LDK 4906/10 empty bay cover.

Slide the BMO box into the rack mount casing until it snaps into place. To remove the BMO box push the locking lever at the bottom and pull out the unit.

Install and remove the empty bay cover in the same manner.

Figure 14. BMO box rack mounting



3.2 Specifications

Table 2. LDK 4901 BMO box specifications

Item	Value
Power requirements	100 to 240 Vac (-10% / +6%) 50 to 60 Hz
Power connection	IEC type, 3-pin male
Fiber connection	SMPTE 304 hybrid fiber (other systems are available)
HD-SDI Input	SMPTE 292
Triax connection	Triax connector
Operating temperatures	-20 to +50°C (-4 to +122°F)
Storage temperatures	-40 to +70°C (-40 to +158°F)
Weight (approx.)	2.7 kg
Dimensions	460 (D) x 140 (W) x 88 (H) mm (19" 2 HE)

3.3 Indicators

Figure 15. BMO box controls and indicators

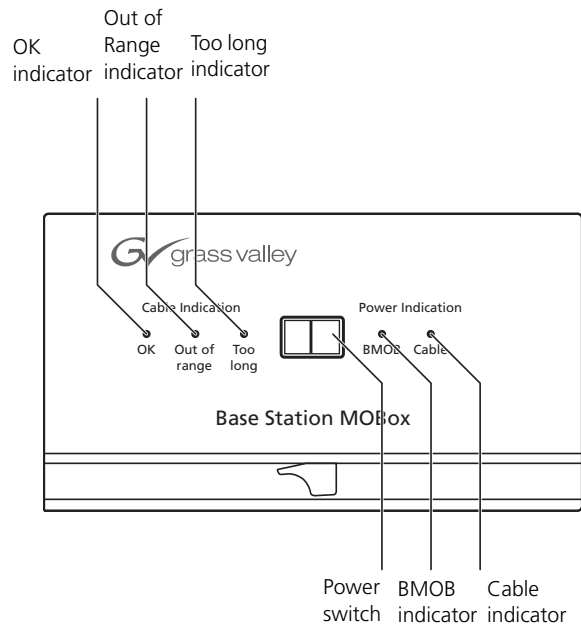


Table 1-1. Functional description

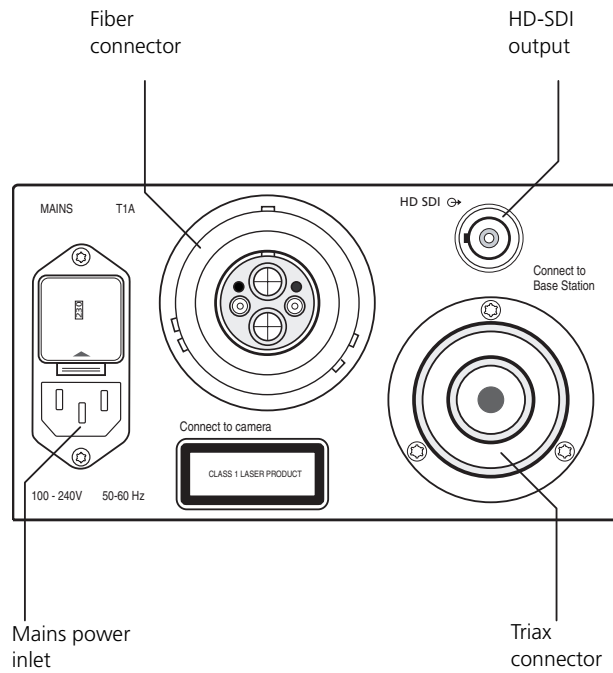
indicator	description	label
GREEN	Lights when the BMO box is powered and active.	BMOB
GREEN	Lights when cable power is active.	Cable

Table 1-2. Cable indicators

indicator	description	label
GREEN	Lights when cable is attenuation is within range (normal operation).	OK
YELLOW	Lights when cable attenuation is on or near maximum level.	TOO LONG
RED	Lights when cable attenuation is too high.	OUT OF RANGE

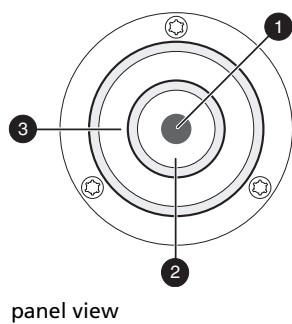
3.4 BMO box connectors

Figure 16. BMO Box connector location



3.4.1 Triax connector

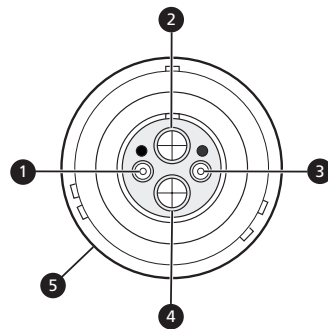
Figure 17. Triax connector



1. Inner pin (signals + power)
2. Inner shield (return)
3. Outer shield (housing)

3.4.2 Fiber connector

Figure 18. Fiber connector (LEMO)



1. Power
2. Fiber A
3. Return
4. Fiber B
5. Shield

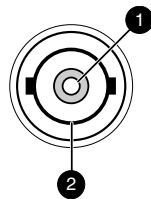
Shield of cable directly to the connector housing.

NOTE: actual fiber connector type depending on the CMO adapter version.

SMPTE 304M compliant type LEMO EDW.3K.93C; panel view

3.4.3 HD-SDI output connector

Figure 19. HD-SDI output connector

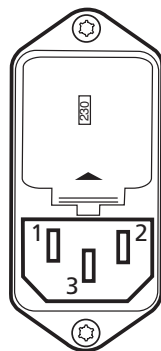


1. HD-SDI output
2. Return

BNC connector 75 Ohm; panel view

3.4.4 Power connector

Figure 20. Power connector



1. Neutral
2. Line
3. Earth

Fuse: 1AT

IEC style 3-pin male; panel view

