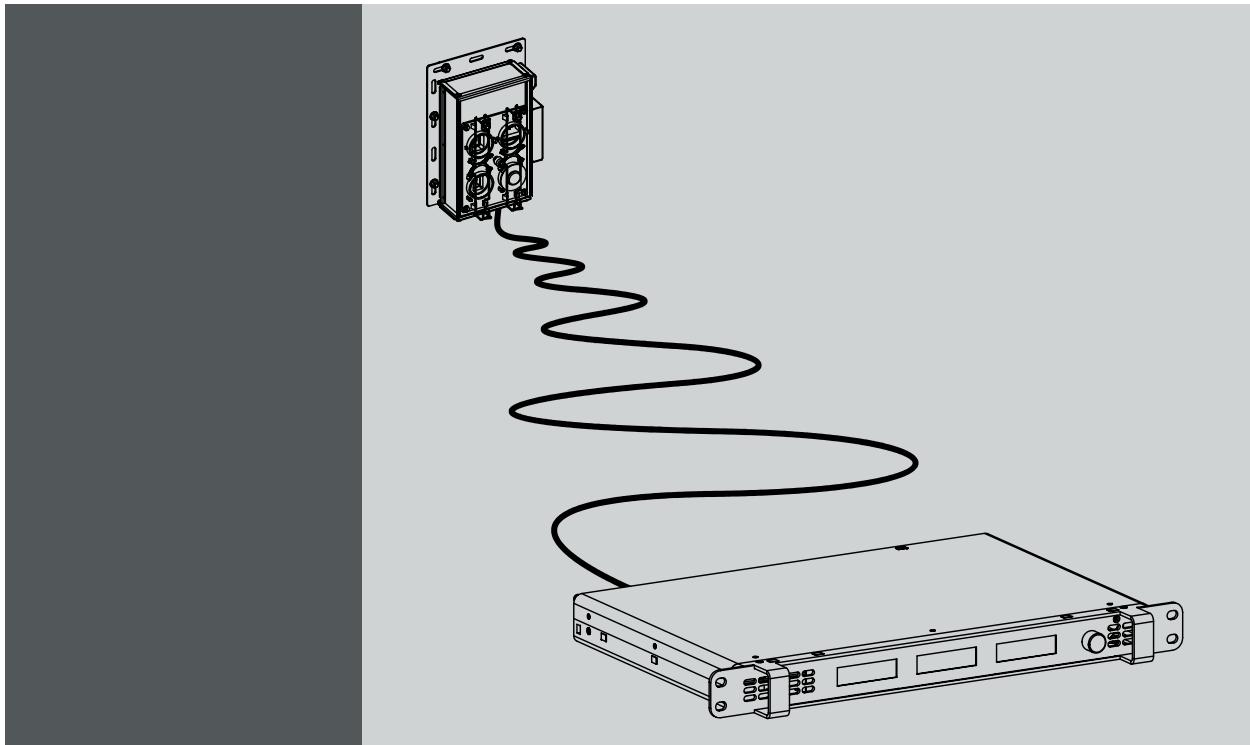


# Fiberlink 2



Owners manual

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# 1. SAFETY

## About this chapter

Read this chapter attentively. It contains important safety information concerning product installation and usage. Furthermore, it includes several cautions to prevent damage to the Fiberlink 2. Ensure you understand and follow all the safety guidelines, safety instructions and warnings mentioned in this chapter before installing and using the Fiberlink 2 system. After this chapter additional "warnings" and "cautions" are given depending on the installation or other procedures. Read and follow this "warnings" and "cautions" as well.

## Overview

- Important safety instructions
- Important warnings

## 1.1 Important safety instructions

---

### Instructions:

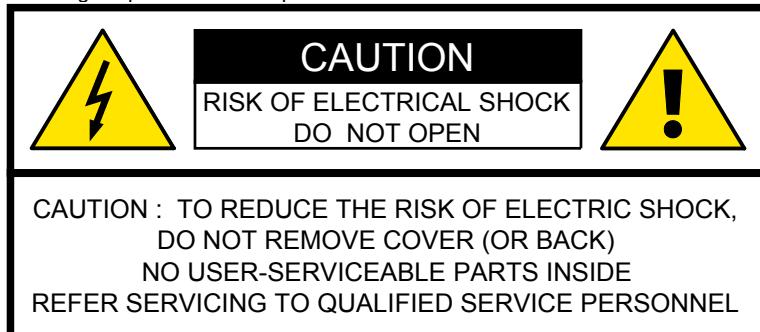
- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Clean only with materials or chemicals that are inert, nonabrasive, noncorrosive and non-marking. Consult the manufacturer for further advice should any doubts exist regarding any cleaning procedure.
- Do not block ventilation openings. Install in accordance with the manufacturers instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding type plugs/sockets. If the provided sockets/plugs are damaged then replacement of the defective parts must be undertaken immediately.
- Protect the power/data cords from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus. Replace damaged power/data cords immediately.
- Only use attachments/accessories specified by the manufacturer.
- Disconnect the power to this apparatus during lightning storms or provide suitable additional lightning protection. Unplug this apparatus when unused for long period of time.
- Refer all servicing to qualified service technicians/personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, the apparatus does not operate normally, or has been dropped.
- Use only with systems or peripherals specified by the manufacturer, or sold with the apparatus. Use caution during lifting/moving or transporting to avoid damage by possible tipping.

## 1.2 Important warnings

### Important warnings

- **Risk of electric shock:**

Do not open. To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.



The lightning flash with an arrowhead within a triangle is intended to tell the user that parts inside this product may cause a risk of electrical shock to persons.

The exclamation point within a triangle is intended to tell the user that important operating and/or servicing instructions are included in the technical documentation for this equipment.

- **Class 1 laser product:**

The Fiberlink 2 does not produce laser radiation hazardous to the user. It is certified as a Class 1 laser product.



- **Maximum and minimum ambient temperature:**

The maximum ambient temperature for the Fiberlink 2 transmitter is 40 °C, the minimum temperature is 0 °C. The maximum ambient temperature for the Fiberlink 2 receiver is 50 °C, the minimum temperature is -20 °C.

- **Ventilation:**

The Fiberlink 2 transmitter requires that air flows freely in both the front and rear ventilation holes. Blocking these holes will greatly reduce the reliability of the unit and lead to the possibility of overheating.

The Fiberlink 2 receiver is equipped with external fans. Ensure that air can flow freely into the fans, otherwise the reliability of the receiver will be reduced and the unit can be overheated.

- **Flammable materials:**

Keep flammable materials away from the installation (such as curtains). A lot of energy is transferred into heat. The installation should be such that the amount of air flow required for safe operation of the equipment is not compromised. Proper ventilation must be provided.

- **This equipment MUST be earthed:**

In order to protect against risk of electric shock, the installation should be properly grounded. Defeating the purpose of the grounding type plug will expose you to the risk of electric shock.

- **Power system:**

It is recommended to use a TN-S power distribution system (a power distribution system with a separate neutral and grounding conductor) in order to avoid large ground currents loops due to voltage differences in the neutral conductor. The total electrical installation should be protected by an appropriate rated disconnect switch, circuit breakers and Ground Fault Current Interrupters. The installation shall be done according to the local electrical installation codes. In Europe special attention should be given to EN 60364, the standard for electrical installation of buildings. In Germany VDE 0100 should be adhered to.

- **Disconnect device:**

When the appliance inlets of the individual tiles are not accessible, the socket outlets supplying the rack shall be installed near the equipment and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.

- **Mains cords:**

The power cords delivered with this system have special properties for safety. They are not user serviceable. If the power cords are damaged, replace only with new ones. Never try to repair a power cord.

- **Rack mounting:**

When using Fiberlink 2 base unit (TX) in a multi rack assembly or closed assembly, the ambient temperature inside the assembly may not exceed the maximum rated ambient temperature of the Fiberlink 2 transmitter, which is 40 °C.

When installed in a rack, the mounting should be such that no hazardous condition is achieved due to uneven mechanical loading.

- **Cabinet openings:**

Never push objects of any kind into this product through cabinet slots as they may touch dangerous high 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.

## 1. Safety

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- **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 device is in proper operating condition.

## 2. GENERAL

### About this chapter

This chapter contains general information about the Fiberlink 2 concept. Reading this chapter will help you to identify the different components of the Fiberlink 2 and understand the functionality of it, which will be a benefit during the installation.

### Overview

- Fiberlink 2
- Functionality

## 2.1 Fiberlink 2

---

### Introduction

The Fiberlink 2 is a bidirectional digital fiber optic transmission system between a Barco Digitizer and a Barco LED-wall. It covers real long distances and has a very high bandwidth. This enables the end-user for instance to setup the Digitizer in a remote control room. The Fiberlink 2 transmits not only the video signals but also the communication to the LED-wall. The Fiberlink 2 receiver is sheltered in a compact IP65 housing which makes the receiver usable for indoor and outdoor LED-wall applications. An extensive self-diagnose system has been implemented to display any transmission fault conditions should they arise.

### Purpose

The Fiberlink 2 is used to achieve transmission distances of more than 100 meter and up to 5 kilometer between Digitizer and LED-wall.

Note that transmission distances shorter than 100 meter can be achieved by the "Compact link" (See installation manual of the Compact link for more information).

### Multi- or single- mode ?

The Fiberlink 2 transmitters and receivers are available in two types. For distances up to 500 meter the "multi mode" Fiberlink 2 transmitters and receivers are used. The optical fiber cable hereby used is a multi mode duplex 50/125  $\mu\text{m}$  cable and the laser used in transmitter and receiver (bidirectional) is a 850 nm VCSEL laser. Those transmitters and receivers have a grey colored housing with a black colored print.

For distances longer than 500 meter you require a Fiberlink 2 Long Distance (LD) transmitter and receiver with "single mode" optical fiber technology. The optical fiber cable hereby used is a single mode duplex 9/125  $\mu\text{m}$  cable and the laser used in transmitter and receiver (bidirectional) is a 1300 nm FP laser. Those transmitters and receivers are marked with the text "LD" or "Long Distance" and have a black colored housing with a grey colored print.



**Multi mode fiber cables can not be used in combination with a single mode (LD) transmitter nor receiver unit, neither can single mode fiber cables be used in combination with a multi mode transmitter nor receiver unit.**

---

## 2.2 Functionality

### System overview

The Fiberlink 2 system is inserted in the data path between the Digitizer and the first tile of the LED-display. One Fiberlink 2 system can handle up to 3 digitizers. Per Digitizer a Fiberlink 2 transmitter unit is inserted into the Fiberlink 2 base unit. The Fiberlink 2 base unit, containing the transmitter unit(s), is installed in the same rack of the Digitizer(s). Each transmitter unit is connected with a fiber optic cable to a Fiberlink 2 receiver unit, which is installed nearby the first tile in the LED-display.

### Diagram

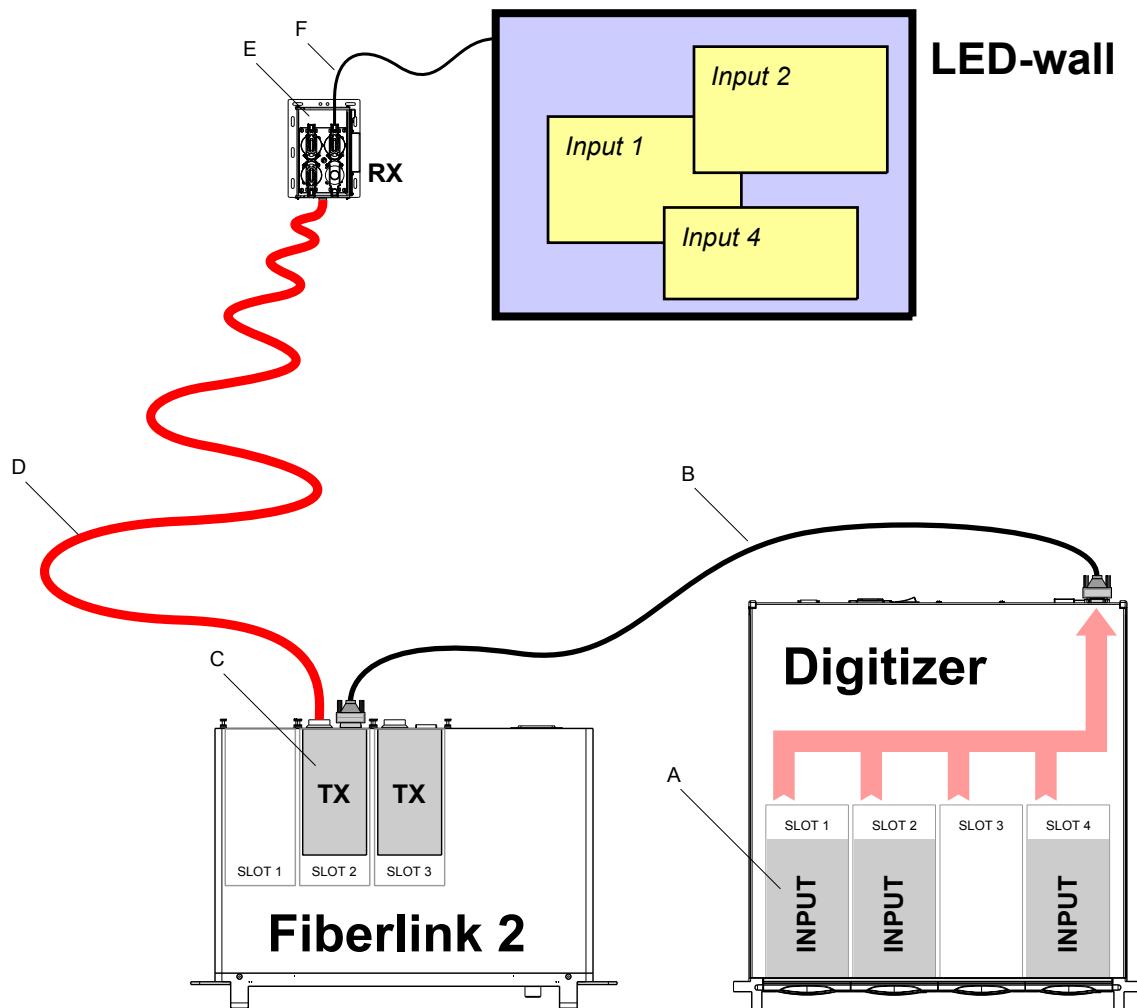


Image 2-1

- A Digitizer input module.
- B DVI cable (R9851211).
- C Fiberlink 2 transmitter unit.
- D Fiber optic cable.
- E Fiberlink 2 receiver unit.
- F Data cable to first tile in display.



## 3. SYSTEM COMPONENTS

### About this chapter

This chapter describes the different components of the Fiberlink 2 system.

### Overview

- Base unit
- Transmitters
- Receivers
- Optical fiber cables
- Power and data cables

### 3. System components

#### 3.1 Base unit

##### Introduction

The cabinet of the Fiberlink 2 base unit fits in a standard 19" rack (482,6 mm) and has a height of 1U (44 mm). Up to three transmitter units can be inserted into the slots at the rear of the base unit. Each transmitter unit adds a fiber channel to the system. The front of the base unit contains a jog dial and three LCD displays, one per input slot. This jog dial (thumb wheel) allows you to enter the user interface for configuration and diagnostic purposes on each inserted transmitter unit and/or connected receiver unit.

The Fiberlink 2 base unit has an auto ranging power supply between 90 and 132 volt and between 180 and 264 volt (50-60 Hz), which provide power to the local control board and the inserted transmitter units. Furthermore, the base unit is equipped with several small fans that improve the internal airflow to control the heat dissipation. Cool air flows into the base unit cabinet at the front, flows through the transmitter units (slots) and leaves at the rear.

The rear of the Fiberlink 2 base unit contains an USB and TCP/IP port, which allows software updates and diagnostic via network.

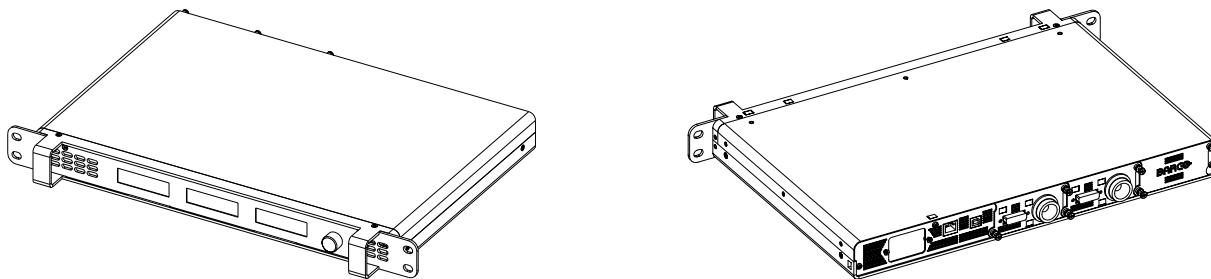


Image 3-1

##### Connector sockets and input slots of the Fiberlink 2 base unit

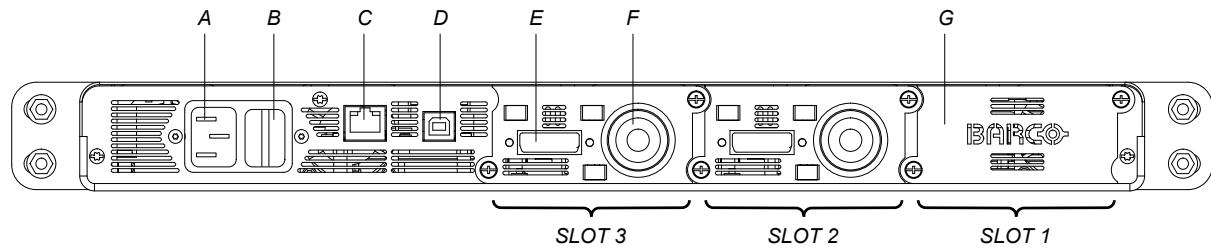


Image 3-2

- A Mains power input.
- B Power ON/OFF switch.
- C TCP/IP port for runtime diagnostics information.
- D USB port (field upgrade purposes).
- E DVI input port of the transmitter unit, which is inserted in SLOT 3.
- F Optical output socket (LEMO connector, connection with receiver unit).
- G Dummy cover plate.

## 3.2 Transmitters

---

### Introduction

The Fiberlink 2 transmitter unit has a DVI-D input, supports dual path graphics data rate (64 MHz pixel rate) and causes no frame delay. The optical transceiver is equipped with a robust LEMO® connector. Furthermore, the transmitter has an internal pattern generator, a build in fiber test (ping) and supports RS422 communication up to 115200 baud.

The Fiberlink 2 transmitter is available in two types, the short distance module "FIBERLINK" (maximum 500 meter) and the long distance module "FIBERLINK LD" (up to 5 kilometer). The short distance module has a grey colored background with a black colored print. The long distance module has a black colored background and a grey colored print.

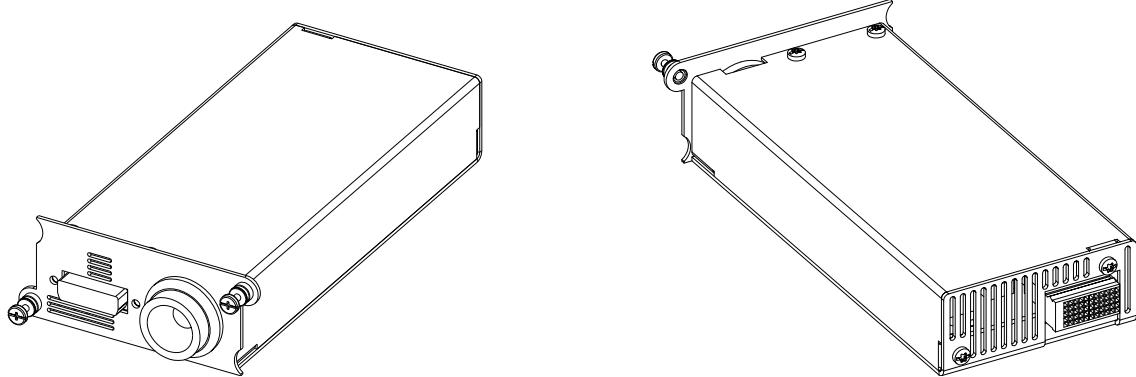


Image 3-3



**The Fiberlink 2 base unit accepts both types of transmitter units even in a mixed combination (e.g. two short distance modules and one long distance module).**

---



**Always use the transmitter unit in combination with the same type of receiver unit.**

---

### 3.3 Receivers

#### Introduction

The Fiberlink 2 receiver is sheltered in a compact IP65 housing which makes the receiver usable for indoor and outdoor LED-wall applications. This single fiber channel device has a robust optical LEMO® connector and standard Barco outdoor connector sockets. To energize the receiver unit, which is auto ranging between 190 and 264 volt (50-60 Hz), the unit is electrical connected in the power path of the tiles in the LED display. Furthermore, the receiver has an internal pattern generator, a build in fiber test (ping) and supports RS422 communication up to 115200 baud.

Just like the Fiberlink 2 transmitter the receiver is also available in two types, the short distance module "FIBERLINK" (maximum 500 meter) and the long distance module "FIBERLINK LONG DISTANCE" (up to 5 kilometer). The short distance module has a grey colored background with a black colored print. The long distance module has a black colored background and a grey colored print.

The receiver unit can be upgraded in the field over fiber while operating (if connected to a transmitter unit) or via USB cable by removing the dummy input.

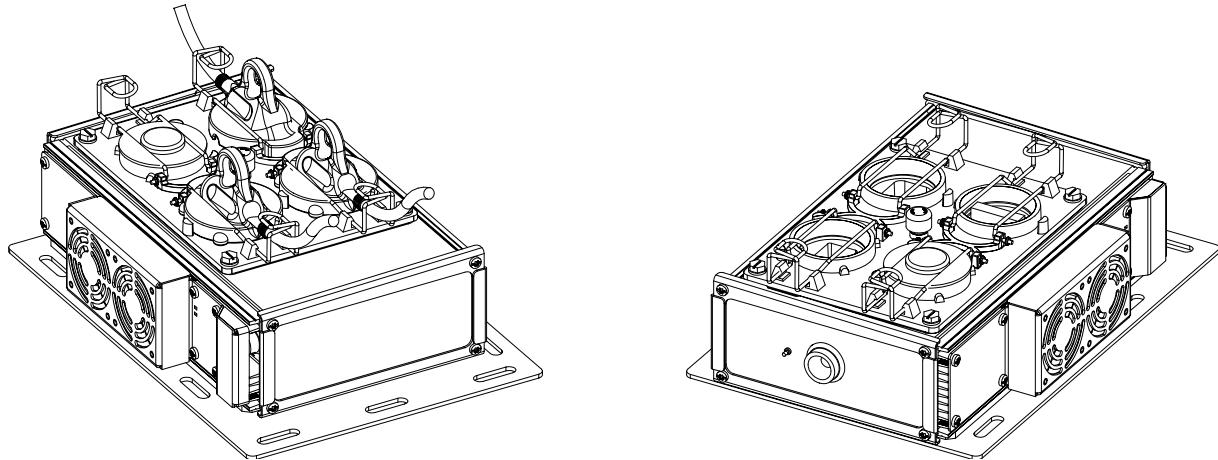


Image 3-4

#### Mounting plate and connector sockets of a Fiberlink 2 receiver

To facilitate the physical installation of the Fiberlink 2 receiver, the receiver is equipped with a mounting plate containing several mounting holes. With hammer bolts, included in the system, the receiver can easily be mounted against the rear of a Barco LED-wall supporting structure.

Barco uses special designed sockets for outdoor power and data connections from tile to tile and to other peripherals like the Fiberlink 2 receiver. These rugged sockets are watertight (IP65) when used with the appropriate plugs and sealing rings. Each socket is equipped with a plug holder clamp which, when locked, ensure that the plug is completely pressed into the socket.

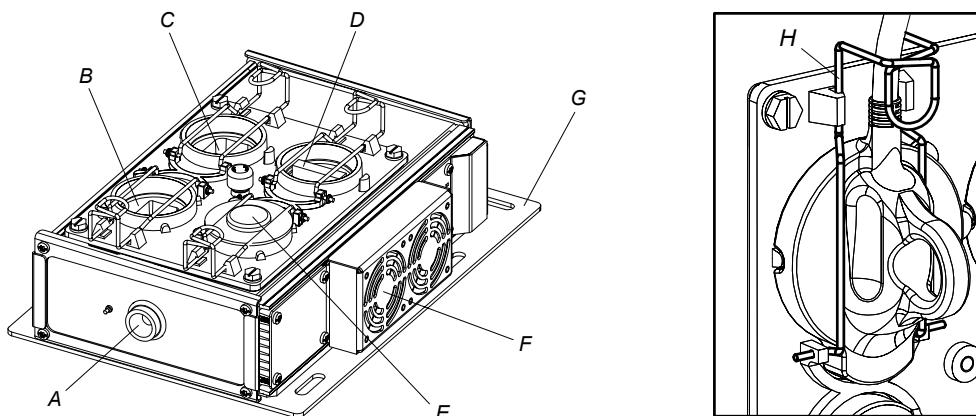


Image 3-5

- A Optical input (LEMO connector, connection with Fiberlink 2 transmitter unit).
- B Power input socket.
- C Power output socket.
- D Data output socket (connection with first tile in the LED-wall).
- E Socket cover for USB port (field upgrade purposes).
- F External fans.
- G Mounting plate.
- H Plug holder clamp.

## 3.4 Optical fiber cables

### Introduction

The optical fiber cable, used between the Fiberlink 2 transmitter and receiver, can be installed by a third party, specialized in optical fiber installations. When realizing the fiber channel yourself take into account the fragility of the fiber cable. Note that the placement of optical fiber cables are subject to special installation instructions enforced by the fiber cable manufacturer. Some general instructions are:

- Never bend the optical fiber cable too sharp.
- Always use a bend radius of at least 10 centimeter.
- Place the fiber cable into a cable guard.

Barco offers two types of fiber optic cables. The multi mode (MM) fiber optic cable and the single mode (SM) fiber optic cable. Both types are equipped with robust optical LEMO® plugs and are available in different lengths, see chapter "Order info".



Image 3-6  
Optical fiber cable with LEMO® plugs.



**Always use a single mode fiber optic cable (SM) with a long distance (LD) transmitter and receiver unit and a multi mode fiber optic cable (MM) with a short distance transmitter and receiver unit.**



**To protect the fiber entrance place the protective cap upon the LEMO® plug in case the plug is not inserted into a peripheral. Align the red dot on the cap with the red dot on the plug and then push the cap over the plug until an audible click ensure that the plug is well inserted.**

### Which optical fiber cable to use ?

The Fiberlink 2 requires optical fiber cables with a minimum bandwidth depending on the length of the fiber channel. Consult the table below to choose the correct fiber cable for your Fiberlink 2 system.

Length fiber channel	Fiber type	Minimum bandwidth of fiber
0 - 300 meter	Multi mode fiber	500 MHz.km
300 - 500 meter	Multi mode fiber	2000 MHz.km
500 - 5000 meter	Single mode fiber	—

### Pre-installed optical fiber network

The Fiberlink 2 can make use of a pre-installed (permanent) network of optical fiber cables. Those pre-installed fibers starts and ends in patch panels provided with industrial standard optical connector sockets like ST or SC, which can be connected with a (short) optical fiber cable and adapted plugs to the desired peripherals. Note that, next to the length, each connection in the path of the fiber channel causes a little decrease of the signal power. The two illustrations below show adapted optical fiber cables, to connect the Fiberlink 2 transmitter with the patch panel of the optical fiber network.

### 3. System components

---



Image 3-7  
Short optical fiber cable with LEMO® plug and SC connectors.



Image 3-8  
Short optical fiber cable with LEMO® plug and ST connectors.

### 3.5 Power and data cables

#### General

Next to the fiber optic cables there are also the power and data cables required to realize the connections in the first place between Digitizer and Fiberlink 2 transmitter and in the second place between Fiberlink 2 receiver and LED-wall. Note that the cables used between receiver and LED-wall are different for an outdoor LED-wall than for an indoor LED-wall.



Image 3-9  
CEE power cord for Fiberlink 2 base unit (R326103).



Image 3-10  
CEI power cord for Fiberlink 2 base unit (R3261115).



Image 3-11  
DVI cable for connection between Digitizer and Fiberlink 2 transmitter (R9851211).



Image 3-12  
Waterproof power cable (5 meter) to connect Fiberlink 2 receiver with indoor or outdoor LED-wall (R9850250).



Image 3-13  
Waterproof MDR cable (5 meter) to connect Fiberlink 2 receiver with outdoor LED-wall (R9850220).



Image 3-14  
MDR-DVI cable (5 meter) to connect Fiberlink 2 receiver with indoor LED-wall (R9851217).



## 4. INSTALLATION

### General

This chapter describes the physical installation of the Fiberlink 2 transmitter unit(s) and the Fiberlink 2 receiver(s).

### Overview

- Installing the Fiberlink 2 base unit
- Installing the Fiberlink 2 receiver
- Other mounting positions of the Fiberlink 2 receiver
- Full installation example

## 4.1 Installing the Fiberlink 2 base unit

### What has to be done ?

Physical installation and cabling of the Fiberlink 2 base unit and transmitter unit(s) in a 19 inch mounting rack. One transmitter unit is required per stacked Digitizer. It's recommended to build the Fiberlink 2 base unit in the same 19 inch rack as the Digitizer(s).

### Necessary tools

- Flat blade screwdriver.
- Nut driver.

### Necessary parts

- Fiberlink 2 base unit.
- Fiberlink 2 transmitter unit(s).
- 19 inch mounting rack.
- Fixation parts for rack mounting.
- DVI cable per transmitter unit.
- Fiber optic cable per transmitter unit.
- CEE or IEC power cord (depends on local power system).

### How to install the Fiberlink 2 base unit and transmitter unit(s) ?

1. Remove the dummy cover plate(s) of the input slot(s) and insert the transmitter unit(s) as illustrated. Use a flat blade screwdriver to release and to fasten the two captive screws of the cover plate(s) and transmitter unit(s).

**Note:** *Ensure that you insert the appropriate transmitter unit according the communication distance to bridge. Distances longer than 500 meter require a long distance (LD) transmitter unit and a single mode (SM) fiber optic cable.*

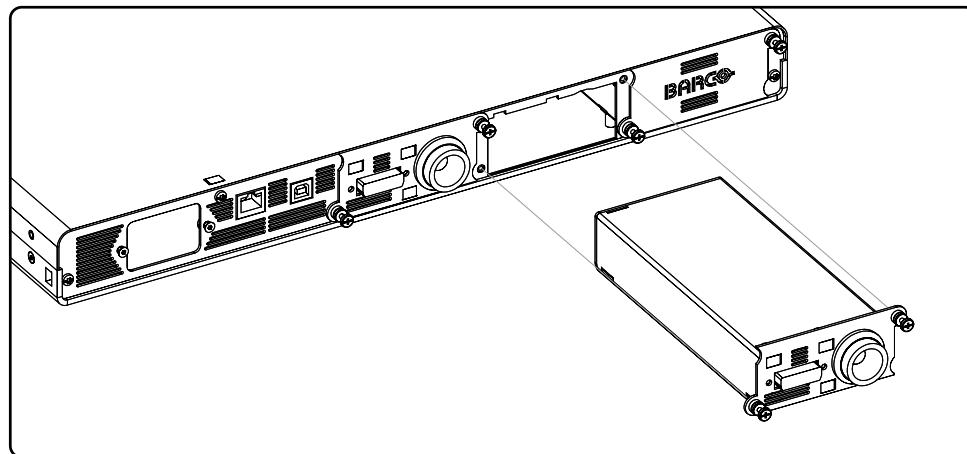


Image 4-1

2. Fasten the Fiberlink 2 base unit into a 19 inch rack as illustrated. Use two screws at both sides of the base unit front plate.

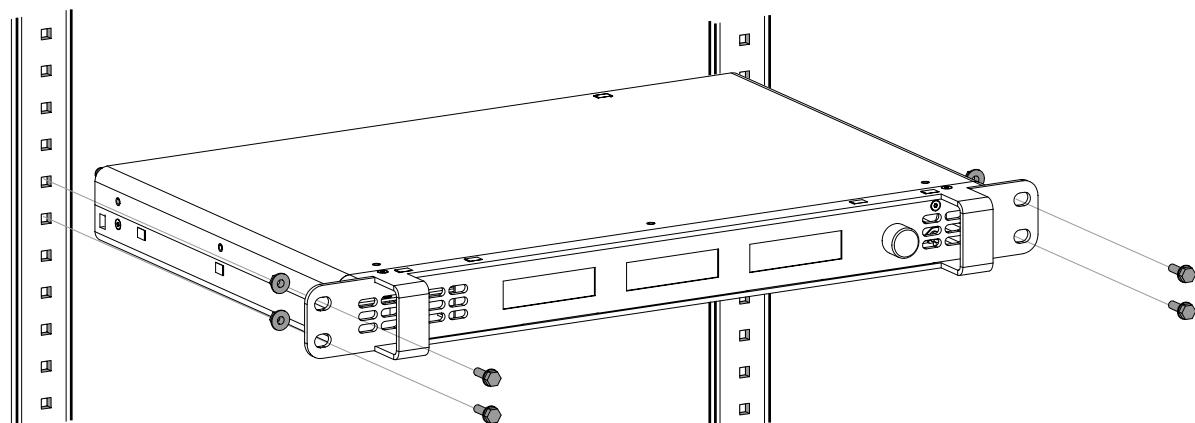


Image 4-2

3. Connect the LED-WALL OUTPUT (A) of the Digitizer(s) with a DVI cable (B) to the DVI input (C) of the transmitter unit(s).  
**Note:** *Fasten the thumbscrews of the DVI cable.*

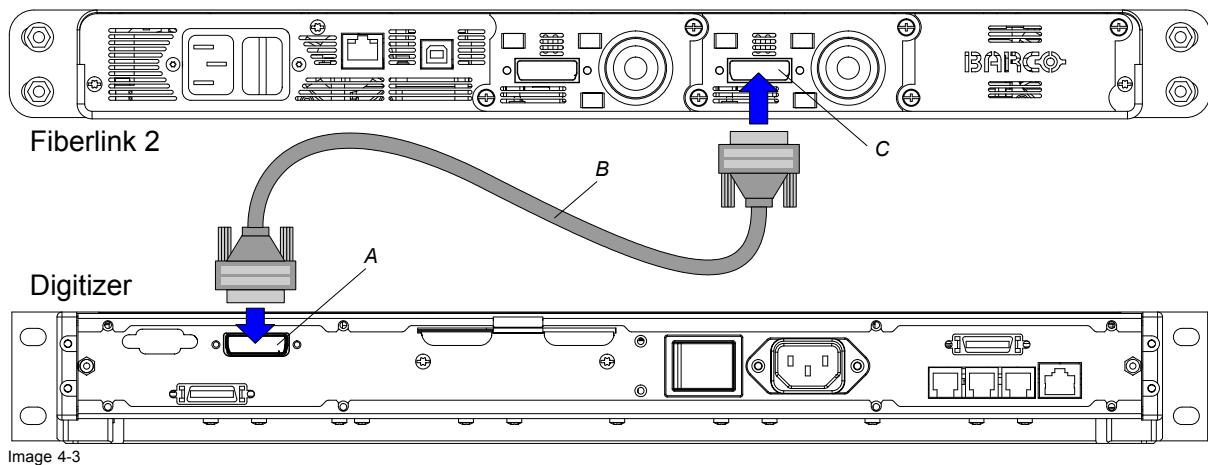


Image 4-3

4. Remove the protective cap of the LEMO socket (fiber entrance).
5. Align the red dot on the plug of the fiber cable with the red dot on the socket and then push the plug into the socket until an audible click ensures the plug is well inserted.

**Caution:** Handle the fiber optic cable with care. Do not crack the fiber optic cable by bending it too sharp. At least 200 millimeters of free area is required behind the Fiberlink 2 transmitter to ensure a smooth curve of the fiber optic cable.

**Note:** In case of using multiple transmitter units, ensure that you connect the right display with the right transmitter unit, otherwise content would be mixed up or not displayed at all.

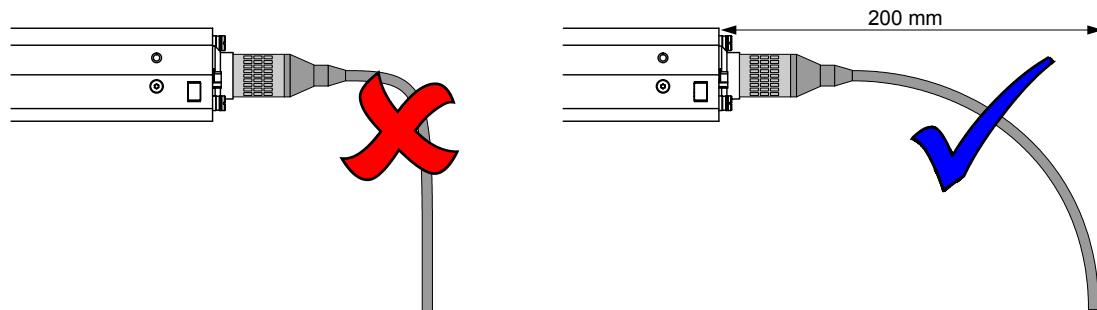


Image 4-4

6. Plug the power cord into the mains input at the rear of the Fiberlink 2 base unit.

**Note:** The Fiberlink 2 system is provide with two types of power cords. One CEE/C13 and one IEC/C13 power cord. Depending on the local power net use the appropriate power cord.

7. Energize the Fiberlink 2 base unit with inserted transmitter units by switching on the main switch at the rear of the Fiberlink 2 base unit.



The transmitter units can not be hot swapped. After the transmitter units are inserted, reboot the Fiberlink 2 base unit by switching the base unit OFF and ON.

## 4.2 Installing the Fiberlink 2 receiver

---

### What has to be done ?

Physical attachment and cabling of the Fiberlink 2 receiver nearby the first tile in the LED-wall. The exact location of the Fiberlink 2 receiver will vary depending on the LED-wall application. The procedure below describes one of the physical installation possibilities of the Fiberlink 2 receiver.



**WARNING:** Be sure that the connector sockets are provided with sealing rings before plugging in the power and data cables. Use the correct sealing ring for the corresponding socket. Black colored ring (B361243, left image) for power, red (B361595, right image) for data. Replace damaged sealing rings immediately.



**WARNING:** Ensure that all plug holder clamps of the outdoor tiles and the Fiberlink 2 receiver are locked firmly after installation.



**CAUTION:** Always install the Fiberlink 2 receiver with the optical input (LEMO connector) downwards.

### Necessary tools

10 or 13 millimeter nut driver (depends on LED-wall structure).

### Necessary parts

- Fiberlink 2 receiver unit.
- Four M5 hammer bolts with nuts (B362166).
- Four spacers (V3673807).
- Four M8 hammer bolts (B360624) with nuts (B3606235).
- Power cable for indoor and outdoor use (R9850250).
- Indoor data cable (R9851217).
- Outdoor data cable (R9850220).

### How to install the Fiberlink 2 receiver ?

1. Fasten the receiver unit against the rear of the LED-wall structure with the optical input downwards as illustrated. Depending on the profiles of the structure, use the four larger or smaller hammer bolts with matching nuts and spacers.

**Caution:** Ensure that the fans are not covered by the profiles of the LED-wall structure or by other equipment.

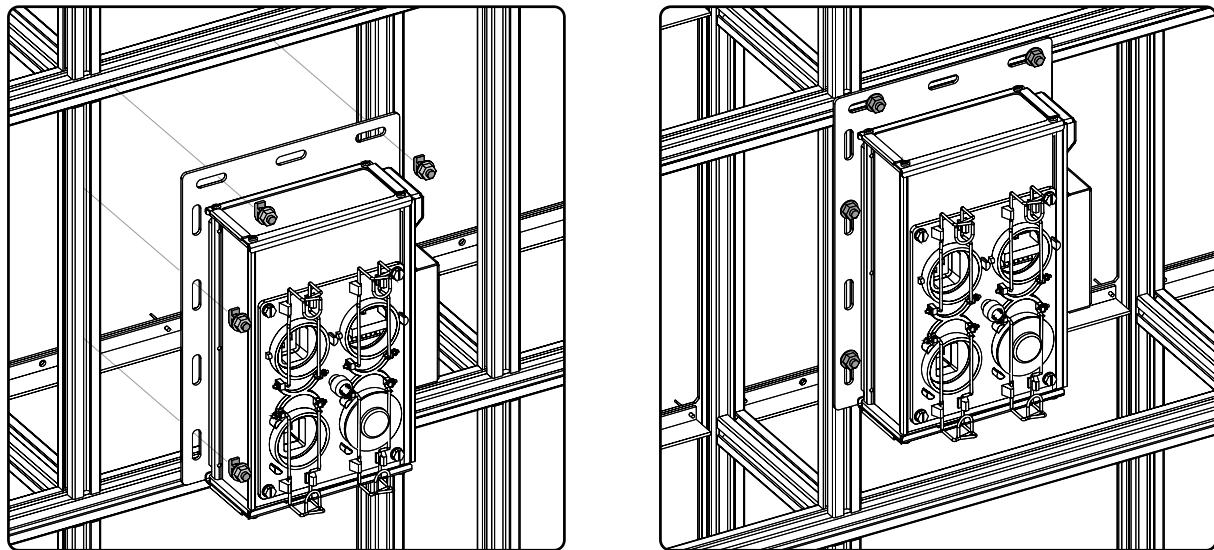


Image 4-5

2. Connect the Fiberlink 2 receiver with one of the power circuits of the Barco LED-wall. Do this by interrupting a power circuit of the tiles somewhere nearby the receiver, and connecting the power ports of the receiver with the power ports of the two tiles at the interruption. So the power flows from tile to receiver and then from receiver to the next tile.

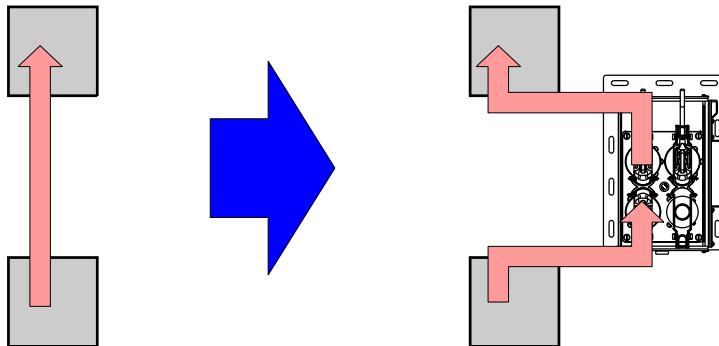


Image 4-6

**Tip:** A second possibility is to connect the power input connector of the receiver with the unused power output connector of the last tile in a power circuit nearby the receiver. In this case the power output socket of the receiver is not used and needs to be sealed with a dummy power plug in case of an outdoor application. Note that the power cable for the receiver, included in the Fiberlink 2 package, has a length of 5 meter. So, in most cases an unused power output connector can be found nearby the receiver.

**Caution:** Ensure that the plug holder clamps are locked firmly.

3. Connect the data output socket of the Fiberlink 2 receiver with the data input socket of the first tile in the LED-wall. Use the appropriate data cable for the indoor or outdoor LED-wall. Ensure that the plug holder clamps are locked firmly.

**Note:** Two types of data cables are included with the Fiberlink 2 receiver. One to realize the data connection between the receiver and an indoor LED-wall and one to realize the connection with an outdoor LED-wall. The data cable for outdoor use has two waterproof plugs, the indoor version only one.

4. Remove the protective cap of the LEMO socket (fiber entrance).

5. Align the red dot on the plug of the fiber cable with the red dot on the socket and then push the plug into the socket until an audible click ensures the plug is well inserted.

**Caution:** Handle the fiber optic cable with care. Do not crack the fiber optic cable by bending it too short. At least 200 millimeters of free area is required below the Fiberlink 2 receiver to ensure a smooth curve of the fiber optic cable.



**CAUTION:** In case you use the power output socket of the receiver be aware that the maximum output current not exceeds 14 amperes.

### 4.3 Other mounting positions of the Fiberlink 2 receiver

---

#### Example of other mounting positions of the Fiberlink 2 receiver

Some LED-wall installations do not let sufficient space behind the support structure to install the Fiberlink 2 receiver as described in the procedure before. The illustrations below show some other mounting positions of the receiver as a solution for this lack of space. Ensure the fans are never blocked.

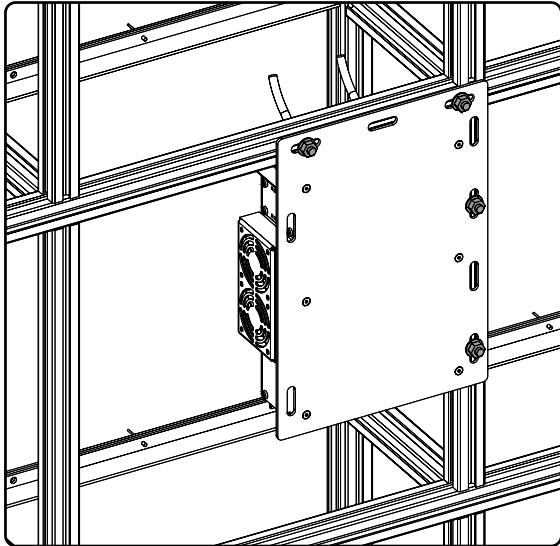
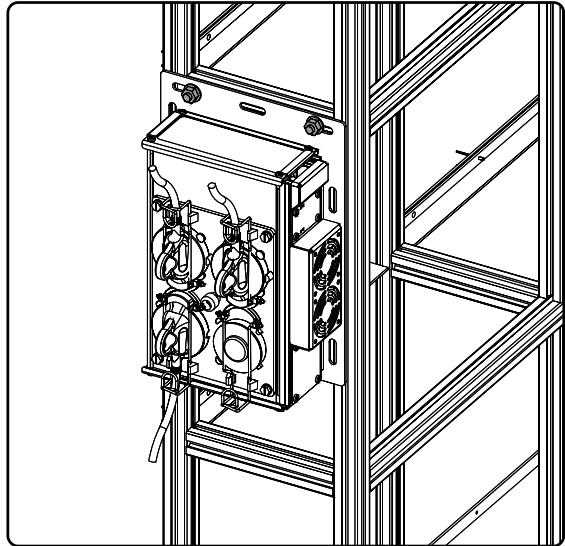


Image 4-7



## 4.4 Full installation example

### Full installation example

The illustration below shows the data path of a Fiberlink 2 system with three transmitter units and three receiver units.

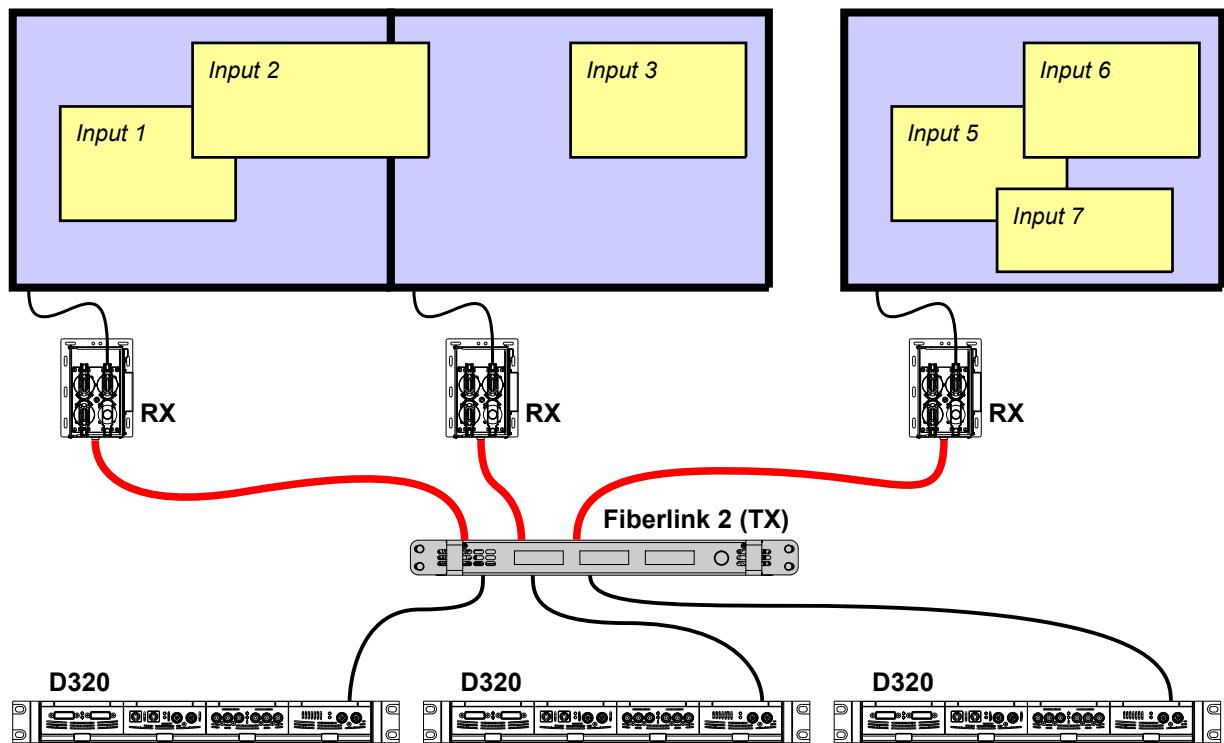


Image 4-8



## 5. USER INTERFACE

### General

The Fiberlink 2 is a plug and play device. Nevertheless, a user interface is provided mainly for diagnostic purposes. The user interface exists in one jog dial and three LCD displays, one per fiber channel. The user interface allows you to retrieve the current software versions, information about the lasers or the timings of the DVI input. Furthermore, with the user interface you can activate and adjust the pattern generator either on the transmitter or the receiver. Ethernet addresses can also be retrieved and configured via the user interface of the Fiberlink 2.



Most of the functionality of the user interface can also be achieved with the control software used to configure the complete LED-wall system (e.g. Director toolset).

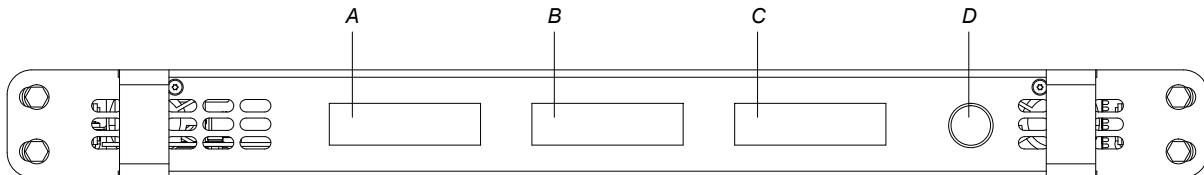


Image 5-1

- A LCD display dedicated to fiber channel 1.
- B LCD display dedicated to fiber channel 2.
- C LCD display dedicated to fiber channel 3.
- D Jog dial.

### Using the jog dial

The jog dial (thumb wheel) has four functions:

- **Browsing** : Turn the jog dial to browse through the menus.
- **Selecting** : Push the jog dial shortly to enter one of the menus.
- **Adjusting** : Turn the jog dial either clockwise (+) or counterclockwise (-) to adjust the value of one of the previous selected parameters.
- **Escaping** : Push the jog dial about 1 second to go back to the parent menu. Note that selecting “<<” will also result in going back to the parent menu. Push the jog dial more than 2 seconds to close the user interface.

### Activating the user interface

Push the jog dial shortly to activate the user interface. The LCD display of fiber channel 1 (most left) will display the text:

“ > ENTER MENU < ”.

Turn the jog dial to select one of the other fiber channels or push the jog dial to enter the main menu for that fiber channel. Note that after an inactive period of 30 seconds the user interface is automatically closed and the LCD display shows repeatedly some parameter values (versions, temperature, power, etc. ) of the fiber channel. In case of an empty input slot, the displayed message is:

“No input Detected”.

### Overview

- Main menu structure
- “Diagnostics” menu description
- “Pattern GEN” menu description
- “LED-wall” menu description
- “Ethernet conf” menu description
- Fiberlink 2 messages (apart from menu messages)

## 5.1 Main menu structure

---

### Overview “Main menu”

- Diagnostics
  - Versions
    - TX Software
    - TX Firmware
    - TX Input
    - RX Software
    - RX Firmware
  - Laser
    - TX Status
    - RX Status
    - Power
      - TX -> power out
      - TX -> power in
      - RX -> power out
      - RX -> power in
    - TX info
      - Vendor name
      - Wavelength
      - Nom. bit rate
      - Length 9/125
      - Length 9/125
      - Length 50/125
      - Length 62.5/125
    - RX info
      - Vendor name
      - Wavelength
      - Nom. bit rate
      - Length 9/125
      - Length 9/125
      - Length 50/125
      - Length 62.5/125
  - DVI timings
    - PPL
    - LPF
    - CLK
    - PS
    - AP
    - LS
    - AL
    - Vsync
    - PPL Last line
  - Ethernet
    - IP Address
    - GW Address
    - NM Address
    - MAC Address
  - Temperature
    - TX FPGA temp
    - TX Laser temp
    - RX FPGA temp
    - RX Laser temp

- Pattern GEN
  - TX
    - Enable Patt
    - Patt Timings
      - PPL
      - HS-Width
      - LPF
      - VS-Width
      - PS
      - AP
      - LS
      - AL
      - DUAL Path
      - SAVE
    - Patt Settings
      - Type
      - Color
      - Color porch
      - Motion
  - RX
    - Enable Patt
    - Patt Timings
      - PPL
      - HS-Width
      - LPF
      - VS-Width
      - PS
      - AP
      - LS
      - AL
      - DUAL Path
      - SAVE
    - Patt Settings
      - Type
      - Color
      - Color porch
      - Motion
- LED-wall
- Ethernet conf
  - Enable eth
  - DHCP
  - Static IP
  - Static NM
  - Static GW

## 5.2 “Diagnostics” menu description

---

### **Diagnostics > Versions > TX Software**

Shows the version of the software used in the Fiberlink 2 base unit. Note that the TX software can be updated via the TCP/IP or USB port of the base unit or via the control software like the Director toolset if connected to a Digitizer. The latest software version is available in the secured Partner Zone section of the Barco web site.

### **Diagnostics > Versions > TX Firmware**

Shows the version of the firmware used in the Fiberlink 2 base unit. Note that the TX firmware can be updated via the TCP/IP or USB port of the base unit or via the control software like the Director toolset if connected to a Digitizer. The latest firmware version is available in the secured Partner Zone section of the Barco web site.

### **Diagnostics > Versions > TX Input**

Shows the version of the firmware used in the Fiberlink 2 transmitter unit. Note that the TX input firmware can be updated via the TCP/IP of the base unit or via the control software like the Director toolset if connected to a Digitizer. The latest firmware version is available in the secured Partner Zone section of the Barco web site.

### **Diagnostics > Versions > RX Software**

Shows the version of the software used in the Fiberlink 2 receiver. Note that the RX software can be updated via the TCP/IP port of the base unit or via the USB port of the receiver or via the control software like the Director toolset if connected to a Digitizer. The latest software version is available in the secured Partner Zone section of the Barco web site.

### **Diagnostics > Versions > RX Firmware**

Shows the version of the firmware used in the Fiberlink 2 receiver. Note that the RX firmware can be updated via the TCP/IP port of the base unit or via the USB port of the receiver or via the control software like the Director toolset if connected to a Digitizer. The latest firmware version is available in the secured Partner Zone section of the Barco web site.

### **Diagnostics > Laser > TX Status**

Shows the status of the laser in the transmitter unit:

- **LINK UP** : normal operation.
- **Laser failed to lock** : transmitter and receiver failed to go in sync with each other. Check if the plug of optical fiber cable is well inserted and ensure that the optical fiber cable is not damaged.
- **No Laser** : no laser module was detected.
- **FATAL ERROR PLEASE REBOOT** : catastrophic error occurred from which the device could not recover. Switch the Fiberlink 2 base unit OFF and ON.

### **Diagnostics > Laser > RX Status**

Shows the status of the laser in the receiver unit:

- **LINK UP** : normal operation.
- **Laser failed to lock** : transmitter and receiver failed to go in sync with each other. Check if the plug of optical fiber cable is well inserted and ensure that the optical fiber cable is not damaged.
- **No Laser** : no laser module was detected. Contact a service technician to solve the problem.
- **FATAL ERROR PLEASE REBOOT** : catastrophic error occurred from which the device could not recover. Restart the Fiberlink 2 receiver (power off and on).

### **Diagnostics > Laser > Power > TX → power out**

Shows the power value of the outgoing laser beam at the transmitter unit. Values around -5 dBm (e.g. “-6.11 dBm”) are very good but values around -20 dBm are weak and are indicative of a malfunction laser of the transmitter unit. (e.g. “-20.66 dBm”).

### **Diagnostics > Laser > Power > TX → power in**

Shows the power value of the incoming laser beam at the transmitter unit. Values around -5 dBm (e.g. “-8.15 dBm”) are very good but values around -20 dBm are weak and are indicative of a malfunction laser of the receiver or a damaged optical fiber cable (e.g. “-21.52 dBm”). Note that the longer the optical fiber cable the weaker the optical signal will be.

### **Diagnostics > Laser > Power > RX → power out**

Shows the power value of the outgoing laser beam at the receiver unit. Values around -5 dBm (e.g. “-6.02 dBm”) are very good but values around -20 dBm are weak and can possible indicates a malfunction of the laser of the receiver unit. (e.g. “-21.52 dBm”). In case the message “Failed” appears means that the receiver unit does not respond to the request of the transmitter unit. Probably the optical fiber link is interrupted or the receiver is powerless.

### **Diagnostics > Laser > Power > RX → power in**

Shows the power value of the incoming laser beam at the receiver unit. Values around -5 dBm (e.g. “-6.94 dBm”) are very good but values around -20 dBm are weak and can possible indicates a malfunction of the laser of the transmitter unit or a damaged

optical fiber cable (e.g. “-20.55 dBm”). Note that the longer the optical fiber cable the weaker the optical signal will be. In case the message “Failed” appears means that the receiver unit does not respond to the request of the transmitter unit. Probably the optical fiber link is interrupted or the receiver is powerless.

**Diagnostics > Laser > Power > TX info > Vendor name**

Shows the vendor name of the laser used in the transmitter unit.

**Diagnostics > Laser > Power > TX info > Wavelength**

Shows the wavelength of the laser used in the transmitter unit.

**Diagnostics > Laser > Power > TX info > Nom. bit rate**

Shows the nominal bit rate (units of 100 MBits/sec) of the transmitter unit.

**Diagnostics > Laser > Power > TX info > Length 9/125**

Shows the maximum cable length, in meters or kilometers, that the laser in the transmitter unit supports in case of using a 9/125 µm single mode optical fiber cable.

**Diagnostics > Laser > Power > TX info > Length 50/125**

Shows the maximum cable length, in meters, that the laser in the transmitter unit supports in case of using a 50/125 µm multi mode optical fiber cable.

**Diagnostics > Laser > Power > TX info > Length 62.5/125**

Shows the maximum cable length, in meters, that the laser in the transmitter unit supports in case of using a 62.5/125 µm multi mode optical fiber cable.

**Diagnostics > Laser > Power > RX info > Vendor name**

Shows the vendor name of the laser used in the receiver unit.

**Diagnostics > Laser > Power > RX info > Wavelength**

Shows the wavelength of the laser used in the receiver unit.

**Diagnostics > Laser > Power > RX info > Nom. bit rate**

Shows the nominal bit rate (units of 100 MBits/sec) of the receiver unit.

**Diagnostics > Laser > Power > RX info > Length 9/125**

Shows the maximum cable length, in meters or kilometers, that the laser in the receiver unit supports in case of using a 9/125 µm single mode optical fiber cable.

**Diagnostics > Laser > Power > RX info > Length 50/125**

Shows the maximum cable length, in meters, that the laser in the receiver unit supports in case of using a 50/125 µm multi mode optical fiber cable.

**Diagnostics > Laser > Power > RX info > Length 62.5/125**

Shows the maximum cable length, in meters, that the laser in the receiver unit supports in case of using a 62.5/125 µm multi mode optical fiber cable.

**Diagnostics > DVI timings > PPL**

Shows the “Pixels Per Line” value of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > LPF**

Shows the “Lines Per Field” value of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > CLK**

Shows the “Clock frequency” in MHz of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > PS**

Shows the start position of the first active pixel (Pixel Start) of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > AP**

Shows the amount of “Active Pixels” of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > LS**

Shows the start position of the first active line (Line Start) of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > AL**

Shows the amount of "Active Lines" of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > Vsync**

Shows the vertical sync (frame rate) in Hz of the incoming DVI signal on the transmitter unit.

**Diagnostics > DVI timings > PPL Last Line**

Shows the amount of pixels in the last line of the incoming DVI signal on the transmitter unit.

**Diagnostics > Ethernet > IP Address**

Shows the Internet Protocol Address.

**Diagnostics > Ethernet > GW Address**

Shows the Gate Way Address.

**Diagnostics > Ethernet > NM Address**

Shows the Net Mask Address.

**Diagnostics > Ethernet > MAC Address**

Shows the MAC Address.

**Diagnostics > Temperature > TX FPGA temp**

Shows the temperature of the FPGA in the transmitter unit.

**Diagnostics > Temperature > TX Laser temp**

Shows the temperature of the laser in the transmitter unit.

**Diagnostics > Temperature > RX FPGA temp**

Shows the temperature of the FPGA in the receiver.

**Diagnostics > Temperature > RX Laser temp**

Shows the temperature of the laser in the receiver.

## 5.3 "Pattern GEN" menu description



The pattern generator menus for the transmitter unit (TX) are the same for the receiver unit (RX).

### Pattern GEN > TX (RX) > Enable Patt

ENABLE or DISABLE the pattern generator. Note that the internal pattern generator of the tile takes priority to the pattern generator of the Fiberlink 2 receiver and on its turn, the pattern generator of the receiver takes priority to the pattern generator of the Fiberlink 2 transmitter unit.

### Pattern GEN > TX (RX) > Patt Timings > PPL

Adjust the pixels per line of the pattern generator. Factory default : 840 pixels.

### Pattern GEN > TX (RX) > Patt Timings > HS-Width

Adjust the width of the horizontal sync in pixels of the pattern generator. Factory default : 10 pixels.

### Pattern GEN > TX (RX) > Patt Timings > LPF

Adjust the pixels per field of the pattern. Factory default : 635 pixels.

### Pattern GEN > TX (RX) > Patt Timings > VS-Width

Adjust the width of the vertical sync in pixels of the pattern. Factory default : 10 pixels.

### Pattern GEN > TX (RX) > Patt Timings > PS

Adjust the start position of the first active pixel (Pixel Start) of the pattern. Factory default : 36.

### Pattern GEN > TX (RX) > Patt Timings > AP

Adjust the amount of active pixel (pixels displayed) of the pattern. Factory default : 800.

### Pattern GEN > TX (RX) > Patt Timings > LS

Adjust the start position of the first active line (Line Start) of the pattern. Factory default : 12.

### Pattern GEN > TX (RX) > Patt Timings > AL

Adjust the amount of active lines (lines displayed) of the pattern. Factory default : 600.

### Pattern GEN > TX (RX) > Patt Timings > DUAL Path

Choice between SINGLE and DUAL path. Dual path means that the pixel rate of the generated pattern is doubled.

### Pattern GEN > TX (RX) > Patt Timings > SAVE

Choice between OK and CANCEL. Select OK if you want to save the previous changes to the values of the pattern timings.

### Pattern GEN > TX (RX) > Patt Settings > Type > Edit Type ?

Select the pattern type. Choices are:

- CrossHatch
- ByteLevel
- Bocks
- H MultiBurst
- V MultiBurst
- H SawTooth
- V SawTooth

### Pattern GEN > TX (RX) > Patt Settings > Type > Edit Width ?

Set the width of the pattern lines between 1 and 4 pixels (values between 0 and 3).

### Pattern GEN > TX (RX) > Patt Settings > Type > Edit Outline ?

ENABLE or DISABLE the outline of the pattern.

### Pattern GEN > TX (RX) > Patt Settings > Type > Edit Bytelevel ?

Set the byte level of the pattern between 0 (dark) and 255 (bright).

**Pattern GEN > TX (RX) > Patt Settings > Type > SAVE ?**

Save the changes done to the settings of the pattern type.

**Pattern GEN > TX (RX) > Patt Settings > Color**

Change the color of the pattern. Choices are:

- RGB
- RG\_
- R\_B
- \_RB
- R\_\_
- \_\_G
- \_\_B
- \_\_\_\_

**Pattern GEN > TX (RX) > Patt Settings > Color porch**

Change the color of the pattern porch. Choices are:

- RGB
- RG\_
- R\_B
- \_RB
- R\_\_
- \_\_G
- \_\_B
- \_\_\_\_

**Pattern GEN > TX (RX) > Patt Settings > Motion > Edit V Motion ?**

ENABLE or DISABLE the vertical motion of the pattern.

**Pattern GEN > TX (RX) > Patt Settings > Motion > Edit H Motion ?**

ENABLE or DISABLE the horizontal motion of the pattern.

**Pattern GEN > TX (RX) > Patt Settings > Motion > Edit V Up ?**

Select the direction, UP or DOWN, of the vertical motion of the pattern.

**Pattern GEN > TX (RX) > Patt Settings > Motion > Edit H Left ?**

Select the direction, LEFT or RIGHT, of the horizontal motion of the pattern.

**Pattern GEN > TX (RX) > Patt Settings > Motion > Edit Color roll ?**

ENABLE or DISABLE the color roll of the pattern.

**Pattern GEN > TX (RX) > Patt Settings > Motion > SAVE ?**

Save the changes done to the motion settings of the pattern.

## 5.4 “LED-wall” menu description

---

### **LED-wall > ON / OFF**

Choice to switch the LED-wall ON or OFF.

## 5.5 “Ethernet conf” menu description

---

### **Ethernet conf > Enable eth**

ENABLE or DISABLE the Ethernet communication. After a change, reboot the Fiberlink 2 base unit by switching the base unit OFF and ON to validate the setting.

### **Ethernet conf > DHCP**

Choice between DHCP or STATIC network address. After a change, reboot the Fiberlink 2 base unit by switching the base unit OFF and ON to validate the setting.

### **Ethernet conf > Static IP**

Change static Internet Protocol address. Push and turn the jog dial (thumb wheel) to set the first three digits, then push and turn the jog dial to set the next set of digits and so on. After change reboot the Fiberlink 2 base unit by switching the base unit OFF and ON to validate the setting.

### **Ethernet conf > Static NM**

Change static Net Mask address. Push and turn the jog dial (thumb wheel) to set the first three digits, then push and turn the jog dial to set the next set of digits and so on. After change reboot the Fiberlink 2 base unit by switching the base unit OFF and ON to validate the setting.

### **Ethernet conf > Static GW**

Change static Gate Way address. Push and turn the jog dial (thumb wheel) to set the first three digits, then push and turn the jog dial to set the next set of digits and so on. After change reboot the Fiberlink 2 base unit by switching the base unit OFF and ON to validate the setting.

## 5.6 Fiberlink 2 messages (apart from menu messages)

### When booting

Setting up  
Ethernet

Please  
wait

### When failed to setup Ethernet

Setting up  
Ethernet

FAILED

Please wait  
while restarting

### When uploading to flash

Flash upload  
--> -----

OR

Flash upload  
finished

Please  
wait

### DVI sync information

Vsync  
No input

→ No input inserted.

Vsync  
No Vsync

→ No sync detected on DVI connector.

Vsync  
Detected

→ Sync detected on DVI connector.

### TX laser status

Laser status  
No input

→ No input inserted.

No laser  
detected

→ No laser module in input.

FATAL ERROR  
PLEASE REBOOT

→ No recoverable error occurred.

Laser failed  
to lock

→ Failed to lock on RX laser.

LINK  
UP

→ Link established.

Laser status  
Failed

→ Failed to read laser status.

**TX laser TX power**

TX -> Power Out  
No input

→ No input inserted.

TX -> Power Out  
x.xx dBm

→ Power of laser beam send by TX.

TX -> Power Out  
Failed

→ Failed to read laser power.

**TX laser RX power**

TX -> Power In  
No input

→ No input inserted.

TX -> Power In  
x.xx dBm

→ Power of laser beam received by TX.

TX -> Power In  
Failed

→ Failed to read laser power.

**RX laser TX power**

RX -> Power Out  
No input

→ No input inserted.

RX -> Power Out  
x.xx dBm

→ Power of laser beam send by RX.

RX -> Power Out  
Failed

→ Failed to read laser power.

**RX laser RX power**

RX -> Power In  
No input

→ No input inserted.

RX -> Power In  
x.xx dBm

→ Power of laser beam received by RX.

RX -> Power In	→ Failed to read laser power.
Failed	

#### TX laser temperature

TX laser temp	→ No input inserted.
No input	

TX laser temp	→ Temperature in degrees Celsius.
xx C	

TX laser temp	→ Failed to read temperature.
Failed	

#### RX laser temperature

RX laser temp	→ No input inserted.
No input	

RX laser temp	→ Temperature in degrees Celsius.
xx C	

RX laser temp	→ Failed to read temperature.
Failed	

#### FPGA temperature

FPGA temp	→ No input inserted.
No input	

FPGA temp	→ Temperature in degrees Celsius.
xx C	

FPGA temp	→ Failed to read temperature.
Failed	



## 6. MAINTENANCE

### About this chapter

This chapter contain maintenance information about the Fiberlink 2.

### Overview

- Diagnoses via TCP/IP
- Software update

## 6.1 Diagnoses via TCP/IP

### Necessary parts

- Network cable with RJ45 plugs.
- PC with web browser connected to the network.

### How to retrieve information of the Fiberlink 2 via TCP/IP ?

1. Connect the TCP/IP port of the Fiberlink 2 base unit with the network using a network cable with RJ45 plugs.
2. Enable the internet communication of the Fiberlink 2 base unit via the user interface.  
Main menu > Ethernet conf > Enable eth > ENABLE
3. Set the Ethernet configuration to DHCP (Dynamic Host Configuration Protocol).  
Main menu > Ethernet conf > DHCP > IP Address DHCP
4. Retrieve the IP address that the Fiberlink 2 base unit received from the DHCP server.  
Main menu > Diagnostics > Ethernet > IP Address xxx.xxx.xxx.xxx
5. Key the retrieved IP address in the url field of the web browser on the PC, which is connected to the network. The IP address in the url field must precede with "HTTP://". Example of url : "HTTP://150.158.192.132". As a result a web page is opened showing lots of information about the Fiberlink 2 configuration.

Transmitter 1		Transmitter 2	Transmitter 3								
Transmitter status											
Transmitter Software	0.5.3										
Controller Firmware	1.0.2										
Transmitter Firmware	1.0.5										
Laser Temperature	43 °C										
PCB Temperature	39 °C										
FPGA Temperature	40 °C										
TX Power	-6.1 dBm										
Returned Power	-8.2 dBm										
Laser status	Link up										
System status	<table border="1"> <tr> <td>LED-wall start signal</td> <td>Detected</td> </tr> <tr> <td>8V Link</td> <td>Detected</td> </tr> <tr> <td>5V Link</td> <td>Detected</td> </tr> <tr> <td>DVI Sync</td> <td>Detected</td> </tr> </table>	LED-wall start signal	Detected	8V Link	Detected	5V Link	Detected	DVI Sync	Detected		
LED-wall start signal	Detected										
8V Link	Detected										
5V Link	Detected										
DVI Sync	Detected										
	<table border="1"> <tr> <td>Pixels per line</td> <td>853</td> </tr> <tr> <td>Lines per field</td> <td>624</td> </tr> <tr> <td>Clock</td> <td>32.000 MHz</td> </tr> <tr> <td>Pixel start</td> <td>33</td> </tr> </table>	Pixels per line	853	Lines per field	624	Clock	32.000 MHz	Pixel start	33		
Pixels per line	853										
Lines per field	624										
Clock	32.000 MHz										
Pixel start	33										

Image 6-1

## 6.2 Software update

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### Software for Fiberlink 2

Software and firmware (flash) of the Fiberlink 2 base unit, transmitter and receiver can be updated in the field if required. New releases of flash software are available on the "Partner Zone" of the Barco web site [www.barco.com](http://www.barco.com). Refer to the user guide of the control software (e.g. Director toolset) for upload instructions of new versions.



# A. DIMENSIONS

## **About this chapter**

This chapter contains the drawings of the Fiberlink 2 components with most of the external dimensions.

## **Overview**

- Dimensions of the Fiberlink 2 base unit
- Dimensions of the Fiberlink 2 transmitter unit
- Dimensions of the Fiberlink 2 receiver

*A. Dimensions*

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**A.1 Dimensions of the Fiberlink 2 base unit**

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**Dimensions base unit**

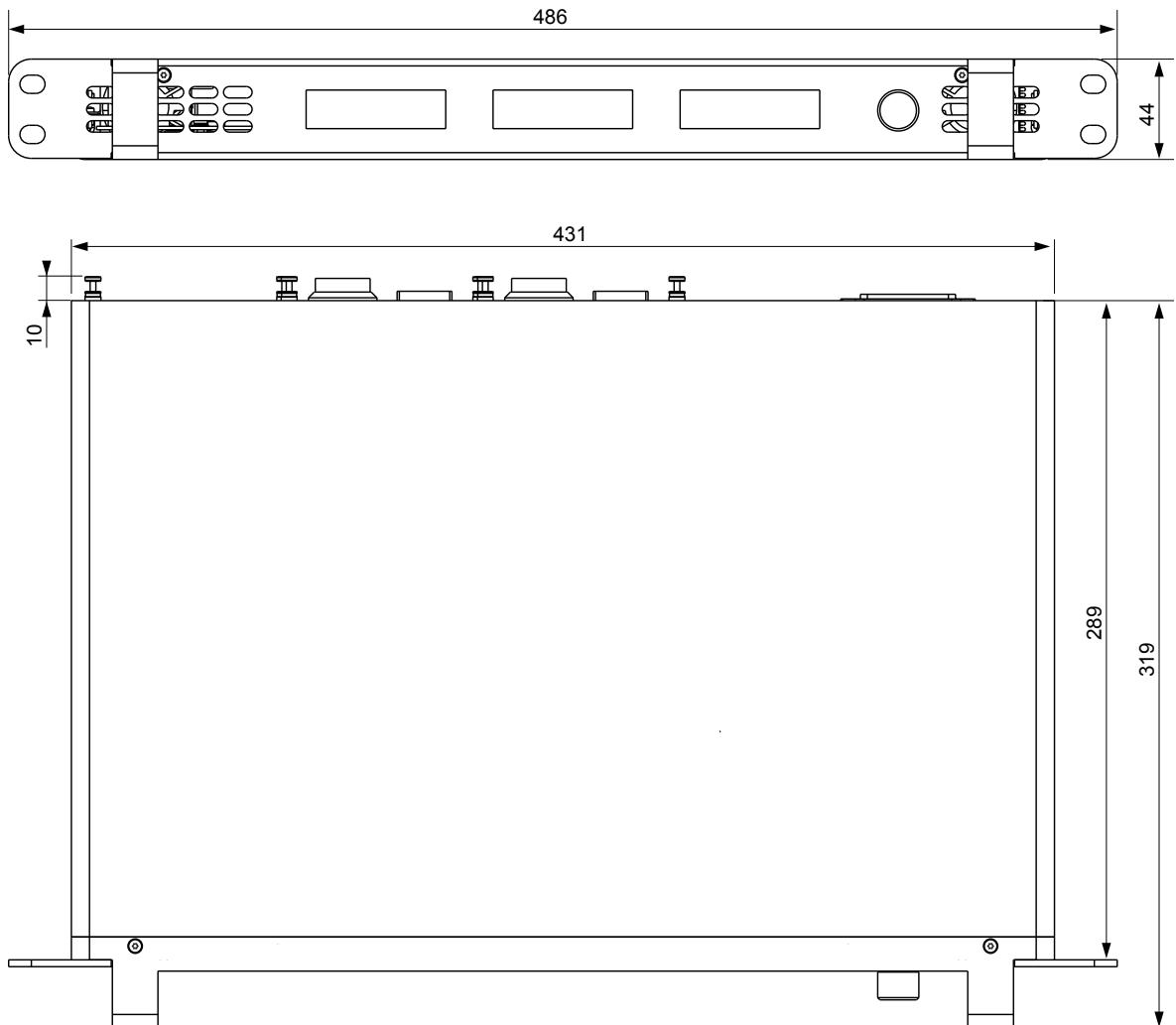
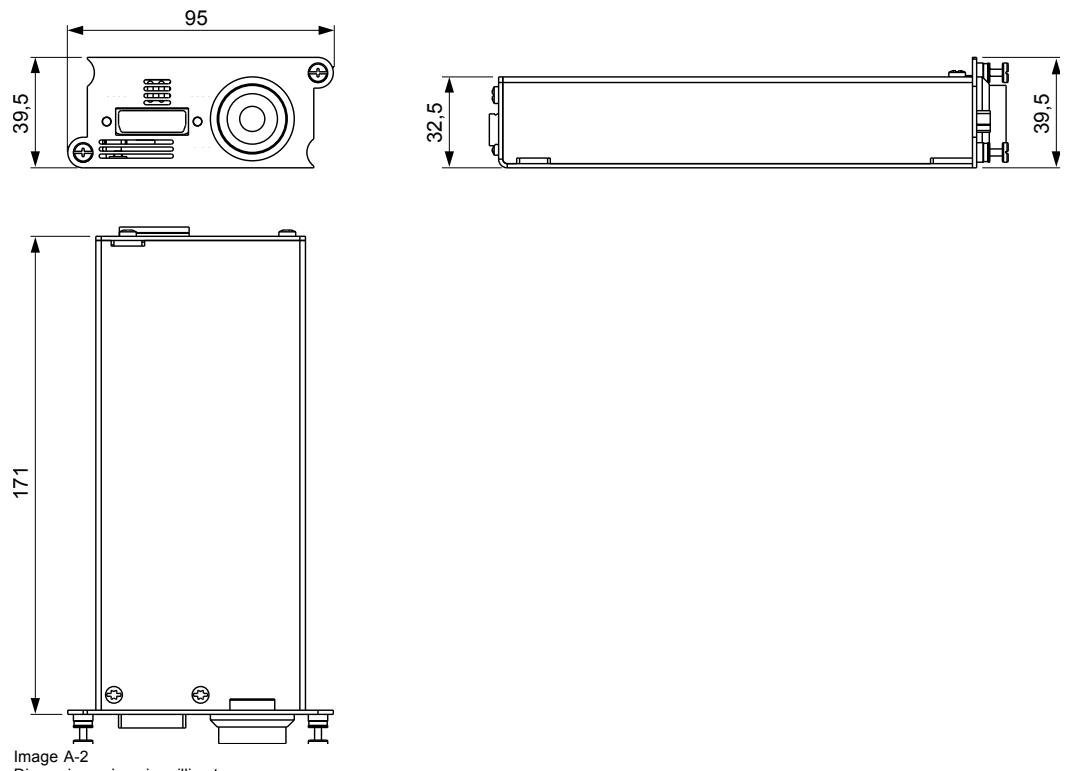


Image A-1  
Dimensions given in millimeters.

## A.2 Dimensions of the Fiberlink 2 transmitter unit

### Dimensions transmitter unit



### A.3 Dimensions of the Fiberlink 2 receiver

Dimensions receiver

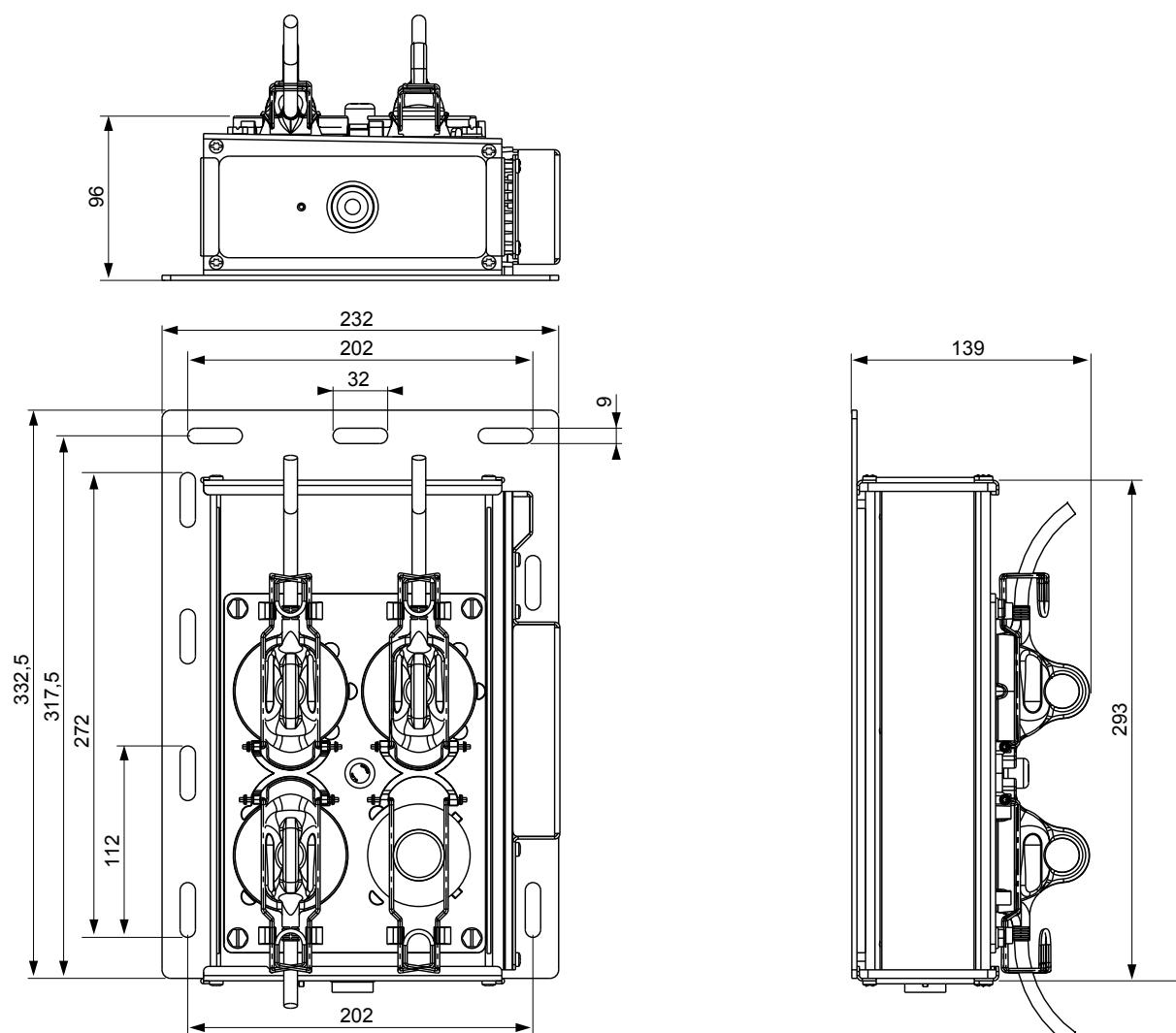


Image A-3  
Dimensions given in millimeters.

## B. SPECIFICATIONS

### **About this chapter**

This chapter contains a list with the specifications of the Fiberlink 2 system.

### **Overview**

- Fiberlink 2 specifications

## B.1 Fiberlink 2 specifications

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### Specifications

#### Reach

- Multimode up to 500 m (984 ft)
- Single Mode up to 5000 m (16404 ft)

#### Transmitter

- 19 inch rack compatible base unit (1U height)
- Modular fiber channel system. Up to three channels per base unit.
- Auto ranging power supply between 90 and 132 volt and between 180 and 264 volt (50-60 Hz).
- Operating Temperature 0 - 40°C (32 - 104°F).
- Controlled and configured via control software (e.g. XLite toolset or Director toolset).
- Built in user interface to control most basic functionality.
- Built in pattern generator.
- DVI-D input per transmitter unit.
- No frame delay.
- Supports RS422 communication up to 115200 baud (9600 baud on Fiberlink I).
- Field upgradeable over TCP/IP or USB (USB-B).
- Power consumption base unit: 50 watt maximum.
- Built in fiber test ("ping").
- Optical transceiver with robust LEMO® connectors.

#### Receiver

- Auto ranging power supply 190-264 volt (50-60 Hz).
- Operating Temperature -20 - 50°C (-4 - 122°F).
- Compact receiver unit sheltered in an IP65 rated housing.
- Controlled and configured via control software (e.g. XLite toolset or Director toolset).
- Built in pattern generator.
- No frame delay.
- Supports RS422 communication up to 115200 baud (9600 baud on Fiberlink I).
- Field upgradeable over TCP/IP or USB (USB-B).
- Power consumption receiver unit: 50 watt maximum.
- Built in fiber test ("ping").
- Optical transceiver with robust LEMO® connectors.

## **C. ORDER INFO**

### **About this chapter**

This chapter contains a list with the ordering code of the different components of the Fiberlink 2 system.

### **Overview**

- Order info

## C.1 Order info

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### Order info

Order No.	Description
R9853350	Fiberlink 2 base unit.
R9853360	Fiberlink 2 long distance (LD) receiver (up to 5 kilometer) for single mode optical fiber.
R9853361	Fiberlink 2 short distance receiver (up to 500 meter) for multi mode optical fiber.
R9853370	Fiberlink 2 long distance (LD) transmitter input (up to 5 kilometer) for single mode optical fiber.
R9853371	Fiberlink 2 short distance transmitter input (up to 500 meter) for multi mode optical fiber.
R9850430	50 meter multi mode optical fiber cable with LEMO® connectors.
R9850431	100 meter multi mode optical fiber cable with LEMO® connectors.
R9850432	150 meter multi mode optical fiber cable with LEMO® connectors.
R9850433	200 meter multi mode optical fiber cable with LEMO® connectors.
R9850434	250 meter multi mode optical fiber cable with LEMO® connectors.
R9850435	300 meter multi mode optical fiber cable with LEMO® connectors.
R9850436	Custom made multi mode optical fiber cable.
R9850481	Custom made single mode optical fiber cable.

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