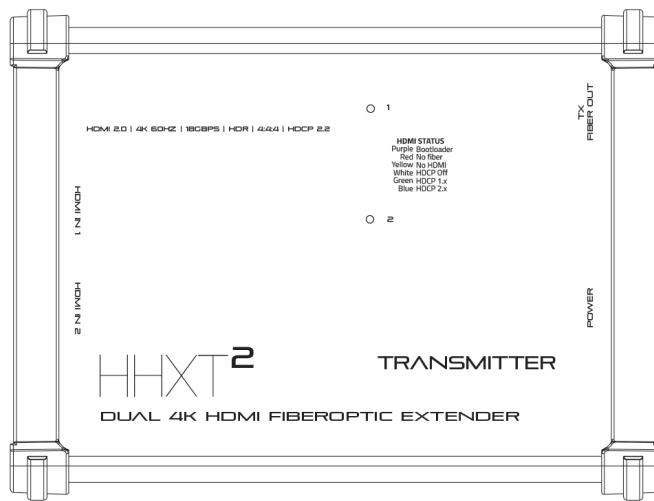


HHXT²

DUAL 4K UHD FIBEROPTIC EXTENDER



User Manual

Visit us on www.xt2-extenders.com



Thank you

Thank you for purchasing the HHXT² Dual HDMI 4K60 FiberOptic Extender.

This user guide provides technical specifications, instructions for installation as well as operation (by qualified and professional technicians)

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Overview

The HHXT² HDMI extender is a rugged, tour grade fiber optic extender for transmitting HDMI signals up to 4K @ 60Hz.

The bandwidth of 18Gbps allows for 4:4:4 color subsampling (uncompressed video) and HDR capability as well as automatic EDID management. It supports HDCP 1.4 and 2.2 content protection. The multi-color LED informs the user of transmission status at all time.

Power is provided through Neutrik powerCON True1 TOP connectors (mains power cables included with CEE 7/7 plug).

The Neutrik HDMI connector is compatible with all current HDMI cables (we recommend using 18Gbps certified HDMI 2.0 cables not exceeding 1,5m on transmitter's and receiver's side to guarantee maximum resolution timing and color space).

The HHXT² is equipped with a Neutrik opticalCON DUO chassis connector for the optical link, providing a robust connection between transmitter (TX) and receiver (RX). Common LC duplex OM3/OM4 fiber can be used with the DUO connector. Optional configurations with Neutrik opticalCON QUAD or FiberFox 2CH chassis connectors are available; however, these variants do not support LC duplex compatibility.

Contents

- 1 HHXT² Transmitter (TX)
- 1 HHXT² Receiver (RX)
- 2 Power cables with Neutrik powerCON TRUE1 TOP Female <-> CEE 7/7 Plug (2m)

Available accessories:

- Heavy Duty Carrying Case
- Purelink ProSpeed PS3000 HDMI 18Gbps cables (1m/1,5m)
- Neutrik Locking HDMI cables (0,6m/1m)
- Cleaning Kit
- Inspection Scope

Features

- Ruggedized touring quality HDMI 2.0 extender over optical fiber
- Two separate HDMI links
- UHD 4K60 4:4:4 color sub sampling with HDR support
- 18Gbps bandwidth
- HDCP 2.2 compliant
- Available with opticalCON DUO (LC compatible), opticalCON QUAD and FiberFox
- Transmission length up to 1000m
- Multi colored signal status LED
- Thread hole for stand or truss mounting

Technical Specifications

Video Signal	HDMI 2.0 Compliant
Optical Connection	Neutrik opticalCON DUO (LC compatible) or opticalCON QUAD or FiberFox
Max. Resolution	4K UHD (4096x2160@60Hz; 3840x2160@60Hz)
Color subsampling	4:4:4 (RGB and YUV)
Supported bitrates	8bit, 10bit, 12bit, 16bit
Video Bandwidth	18 Gbps
HDR	HDR10, HDR12, HLG, PQ, Dolby Vision
EDID	Fully automatic
HDCP Content Protection	Off/1.4/2.2
Max. Transmission Distance	1000m (OM3 multimode fiber)
Enclosure	Lightweight extruded aluminum housing
Dimension	TX and RX unit (L x H x W): 200mm x 61mm x 151mm
Weight	1,0Kg per unit (2,0Kg total)
Device I/O	Video: 2x Neutrik HDMI A female Optical: 1x Neutrik opticalCON DUO/QUAD/FiberFox Power: 1x Neutrik powerCON TRUE1 TOP
Operating temperature	0°C to 50°C
Storing temperature	0°C to 70°C
Power Consumption	2,1W (per TX channel) / 1,3W (per RX channel)
Power Rating	100-240V AC
Miscellaneous	Thread hole for truss or stand mounting 5-color status LED (for HDMI) Anti-slip corners

Setup

1. Connect the HDMI source to the HHXT² Transmitter unit ("HDMI IN").

Note:

For highest resolution, timing, bitrate and color space (2160p60, 8bit, 4:4:4) use 18Gbps certified HDMI cables not exceeding 1,5m in length.



2. Plug the power cable in the HHXT² Transmitter's powerCON TRUE1 TOP chassis ("POWER").



3. Connect the fiber cable to the HHXT² Transmitter's Neutrik opticalCON DUO/ QUAD/FiberFox chassis ("FIBER OUT").

Note:

Multimode OM3 or OM4 is required.



You can also use opticalCON LITE DUO or standard Duplex LC Multimode OM3/OM4 optical fiber.



Setup

4. Connect your HDMI display to the HHXT² Receiver unit ("**HDMI OUT**").

Note:

For highest resolution, timing, bitrate and color space (2160p60, 8bit, 4:4:4) use 18Gbps certified HDMI cables not exceeding 1,5m in length.

5. Plug the power cable in the HHXT² Receiver's powerCON TRUE1 TOP chassis ("**POWER**").

6. Connect the fiber cable to the HHXT² Receiver's Neutrik opticalCON DUO/QUAD/FiberFox chassis ("**FIBER IN**").

Note:

Multimode OM3 or OM4 is required.

7. Check the status LED:

If everything is connected correctly, the LED will show the HDMI signal status:

- Red: -> No fiber detected
- Yellow: -> No HDMI detected
- White -> No HDCP
- Green -> HDCP 1.x
- Blue -> HDCP 2.x

Maintenance

Optical fiber connections are capable of transmitting very high bandwidths but are prone to dust and dirt. Therefore we strongly recommend a good maintenance after every use. There are a couple of simple and cost effective ways to easily clean both the cables and connectors on the XT² extenders. These cleaning tools are available through our shop: xt2-extenders.com > Shop > XT Accessories.

Cleaning the HHXT² optical chassis connector(s)

Required tooling:



Dry Cleaner 1,25mm



Neutrik FOCD-STC

Instructions:

1. Insert the Neutrik FOCD-STC in the DUO/QUAD chassis connector.
2. Remove protective cap from Dry Cleaner.
3. Insert the tip of the Dry Cleaner in LC slot "a".
4. Push down on the Dry Cleaner 4 - 5 times.
5. Remove Dry Cleaner and repeat for LC slot "b".
6. The optical connector has been cleaned.
7. Repeat above steps for LC slot "A" and "B".

Maintenance

Cleaning the optical fiber cables

Required tooling:



Neutrik FOCD-STD
(for Neutrik opticalCON DUO)



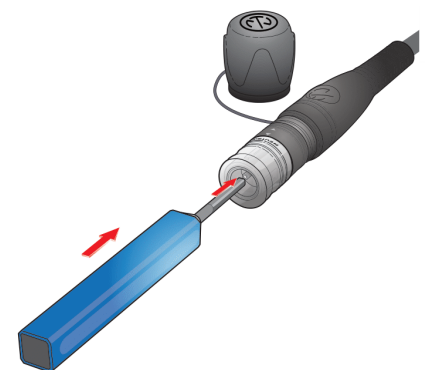
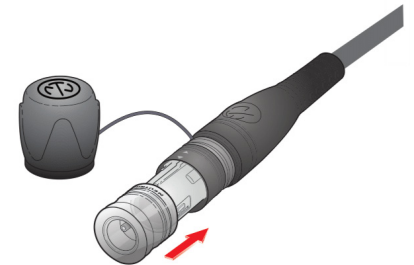
Neutrik FOCD-STQ
(for Neutrik opticalCON QUAD)



Dry Cleaner 1,25mm

Instructions:

1. Remove protective cap from the opticalCON connector.
2. Click the FOCD-STD onto the connector.
3. Insert the Dry Cleaner's tip into the ferrule hole of the FOCD-STD.
4. Push down on the Dry Cleaner 4 - 5 times.
5. Repeat for the remaining ferrule hole of the FOCD-STD.
6. Repeat above steps if necessary.



Troubleshooting

Yellow flashing LED status (No HDMI signal detected)

- Make sure the input HDMI cable is connected correctly to the HDMI source and the output HDMI cable is connected correctly to the display.
- When using high resolutions and timings, verify the HDMI cable's length, shorten down if possible (typical max. length for 2160p 4:4:4 8bit is \pm 1m with a copper HDMI 2.0 cable).
- When transmitting 4K60, be sure to use an HDMI 2.0 cable (Premium HDMI - 18Gbps).

Red flashing LED status (No optical connection detected)

- Verify the correct connection of the optical cable on both Transmitter and Receiver side.
- Verify if the Receiver unit is connected to a working power source.
- Clean the fiber optic cables.
- Clean the optical chassis connectors of the HHXT².

No LED status light

- Verify power connection to the unit
- Make sure the powerCON plug is fully inserted and twist-locked
- Verify power connection to mains power

Safety and Notice

1. General Safety Instructions

- **Compliance with Local Laws:** Users must comply with all relevant local, regional, and national safety regulations and standards for installation and operation. The manufacturer assumes no responsibility for improper use or operation in non-compliance with the law.
- **Qualified Personnel:** Installation, operation, and maintenance must only be performed by qualified, licensed professionals. The company disclaims all responsibility for any damages resulting from improper installation or handling by unqualified individuals.
- **Environment:** This product is not designed for unprotected outdoor use or hazardous environments. Avoid exposure to moisture, extreme temperatures, and corrosive environments.

Disclaimer: While every effort is made to ensure accuracy, product specifications and features may change without notice as part of our commitment to continuous improvement. Belram cannot be held responsible for typographical errors or outdated information in this manual.

2. Electrical Safety

- **Correct Power Supply:** Use only the specified power supply with correct voltage ratings. Failure to use the recommended power source may result in product malfunction, damage, or fire hazards. The manufacturer is not liable for damage caused by incorrect voltage usage or third-party power supplies.
- **Power Cord Handling:** Do not bend, modify, or forcefully handle the power cord. Any damage to the cord may lead to electrical shocks, fires, or injury. Users are fully responsible for inspecting and ensuring the integrity of all electrical connections.
- **Wet Conditions:** Never touch the device or power plug with wet hands or operate the device in a humid or wet environment. Failure to comply may result in electric shock or fire. The manufacturer disclaims liability for damages resulting from water or moisture exposure.

3. Product Use and Operation

- **Intended Use:** This product is designed strictly for use as specified in this manual. Any other application or modification of the product may result in injury, damage, or voiding of the warranty. Unauthorized uses or third-party alterations are strictly prohibited, and any resulting damages will not be covered by the manufacturer.
- **Third-Party Modifications:** Do not disassemble, repair, or modify the product without explicit written consent from the manufacturer. Unauthorized repairs or modifications will void all warranties and may result in fire, electrical shock, or malfunction.

Safety and Notice

- **External Devices:** When connecting external devices to the product, ensure compatibility. The manufacturer takes no responsibility for damage caused by third-party equipment or accessories.

4. Installation and Maintenance

- **Location:** Install the device on a stable, level surface. Do not place the product in unstable or high-vibration locations. Falling or tipping of the product may lead to malfunction or personal injury, for which the manufacturer is not liable.
- **Heavy Objects:** Do not place heavy objects on top of the device. Doing so can cause the device to malfunction, overheat, or become damaged. The manufacturer assumes no responsibility for damage due to improper storage or stacking of objects.
- **Cabling:** Do not twist, pull, or place stress on any cables or fiber optic connections. Improper handling may lead to connectivity issues, equipment damage, or degraded performance, for which the manufacturer cannot be held liable.
- **Environment Compliance:** The device must be used only within environments that comply with the technical specifications listed in this manual, including but not limited to temperature, humidity, and ventilation requirements. **Operating temperature, humidity, and other environmental limits must be respected.** Do not install the device in extreme conditions, such as direct sunlight, excessive dust, or high temperatures (e.g., full sun in a desert environment), as these may exceed the device's specified limits and cause irreparable damage. The manufacturer will not be liable for malfunctions or damages resulting from improper environmental conditions.

5. Warranty and Liability

5.1 Limited Warranty (1 Year for Professional Use):

This product is warranted to be free from manufacturing defects in materials and workmanship for one (1) year from the date of original purchase, under normal professional use and service. This warranty is provided exclusively to the original purchaser and is non-transferable. Warranty coverage applies only when the product is used in strict accordance with this manual and all installation, operation, and maintenance instructions provided.

- **Covered Items:** This warranty covers repair or replacement (at the manufacturer's discretion) of parts proven to be defective due to manufacturing or material flaws within the 1-year period.
- **Excluded Items:** This warranty does not cover damages or defects resulting from:

Safety and Notice

- * Improper installation, use, or maintenance, including failure to follow guidelines outlined in this manual.
- * Unauthorized modifications, alterations, or repairs performed by anyone other than an authorized technician.
- * Environmental exposure beyond specified limits, including excessive heat, cold, humidity, or exposure to liquids or corrosive substances.
- * Electrical issues arising from improper power sources, voltage fluctuations, or surges.
- * Physical damage resulting from accidents, abuse, misuse, neglect, or any other act beyond the manufacturer's control.
- * Damage from shipping or transportation after the product has been delivered to the user.
- * Normal wear and tear, cosmetic damage (e.g., scratches, dents), or expendable parts (e.g., cables, batteries) unless proven to be a manufacturing defect.

5.2 Warranty Voiding Conditions

The following actions will void all warranties:

- Any repairs, alterations, or adjustments performed by unauthorized personnel.
- Operation outside specified environmental, electrical, or operational limits.
- Use of non-recommended, third-party accessories, parts, or software updates.
- Installation of the device in environments that do not meet the specifications listed in this manual, such as exposure to direct sunlight, high humidity, or extreme temperatures.

5.3 Limitation of Liability

The manufacturer's liability is strictly limited to the repair or replacement of the product as specified in this warranty. Under no circumstances shall the manufacturer be liable for:

- **Incidental, Indirect, or Consequential Damages:** This includes but is not limited to losses arising from loss of profits, data, revenue, or business, or from damage to other equipment or property. The manufacturer disclaims all liability for indirect, incidental, or consequential damages resulting from any breach of warranty or condition, negligence, strict liability, or any other legal theory.
- **Personal Injury or Property Damage:** The manufacturer is not liable for any injury, damage, or loss resulting from the installation, use, or maintenance of this product, except as required by law.
- **Product Downtime or Loss of Service:** The manufacturer disclaims responsibility for any product downtime, business interruptions, or loss of service that may occur due to product malfunction, defect, or unavailability during warranty service.

Safety and Notice

5.4 Software and Firmware Updates

Only authorized firmware or software updates should be used with this product. Any issues or damage resulting from unauthorized updates, modifications, or the use of third-party software will not be covered under warranty and may result in voiding the warranty entirely.

5.5 Conditions Beyond the Manufacturer's Control

The manufacturer is not responsible for delays, interruptions, or damages due to conditions beyond its control, including but not limited to natural disasters (earthquakes, floods, etc.), acts of government, labor strikes, or supply chain disruptions. The warranty coverage does not extend to damage caused by such force majeure events.

5.6 Exclusive Remedy

This warranty provides the purchaser's sole and exclusive remedy and supersedes any other representations or warranties, whether written, verbal, express, or implied. The manufacturer makes no other warranties, including any implied warranties of merchantability or fitness for a particular purpose.

5.7 Jurisdiction and Governing Law

Any disputes arising from this warranty or related to product liability shall be governed by the laws of the jurisdiction in which the manufacturer is located. The purchaser agrees to resolve any legal disputes exclusively through courts located within the manufacturer's jurisdiction.

6. Firmware and Software Updates

- **Authorized Updates Only:** Only perform firmware and software updates provided by the manufacturer or authorized partners. Any issues arising from unauthorized updates or third-party software are not covered by warranty, and the manufacturer disclaims all responsibility.
- **Responsibility of User:** It is the user's responsibility to ensure that they are operating the latest approved firmware or software for the device. The manufacturer is not liable for malfunctions or security vulnerabilities caused by outdated or unsupported software.

7. Product Disposal and Recycling

- **Proper Disposal:** Dispose of the product in accordance with local electronic recycling laws and regulations. Improper disposal of electronic devices may lead to environmental harm or penalties for which the manufacturer is not responsible.

Safety and Notice

8. Force Majeure

- **Uncontrollable Events:** The manufacturer is not liable for any delays, interruptions, or damages caused by events beyond its control, including but not limited to natural disasters, government actions, labor strikes, or supply chain disruptions.

9. User Responsibility

- **Proper Usage Monitoring:** The user is responsible for periodically inspecting the product to ensure that it operates in accordance with this manual. Any signs of wear, malfunction, or unusual operation must be reported to an authorized service center immediately. The manufacturer disclaims liability for continued use of a defective or damaged product.
- **Vague Misuse:** Any vague or unforeseen misuse of the product, including but not limited to failure to adhere to instructions, unforeseen modifications, or operation outside of specified environmental conditions, will not be covered by warranty or liability claims. It is the user's responsibility to ensure the product is used in accordance with the intended purpose and all safety standards.

Visit us for more information
www.xt2-extenders.com
www.belram.be

