



# DWARF CONNECTION DC-LINK Video Transmission System User Manual

[Home](#) » [DWARF CONNECTION](#) » DWARF CONNECTION DC-LINK Video Transmission System User Manual 

## Contents

- [1 DWARF CONNECTION DC-LINK Video Transmission System](#)
- [2 Specifications](#)
- [3 Product Usage Instructions](#)
- [4 FAQ](#)
- [5 INTRODUCTION](#)
- [6 Safety Precautions](#)
- [7 CARE & CLEANING](#)
- [8 Overview](#)
- [9 Characteristics](#)
- [10 Product Description](#)
- [11 Scope of Delivery](#)
- [12 Operation](#)
- [13 Features](#)
- [14 Maintenance](#)
- [15 Troubleshooting](#)
- [16 CONTACT](#)
- [17 Documents / Resources](#)
  - [17.1 References](#)



**DWARF CONNECTION DC-LINK Video Transmission System**



## Specifications

- **Frequency Range:** 5150-5250MHz
- **Transmission Distance:** Up to 300m / 1,000ft
- **Latency:** < 0.001s
- **Connectors:** 3G-SDI, HDMI
- **Power Input:** DC-IN 7.2 – 18V

## Product Usage Instructions

### Safety Precautions

**WARNING:** Read before use to reduce the risk of personal injury or property damage.

- Do not block ventilation slots or unused connectors to prevent short circuits, fire, or electric shock. Unplug the product before cleaning or during lightning storms. Use a clean, soft, dry cloth for cleaning; avoid chemical agents.
- Do not attempt to repair the device yourself as it may cause injury or void the warranty. Contact support for assistance.
- Avoid prolonged skin contact with hot surfaces during operation to prevent discomfort or burns. Recycle packaging and accessories according to regulations.

### Operation

1. Power the receiver using the enclosed D-Tap cables or an NPF battery. Use only 4-pin cables provided by DwarfConnection to avoid product damage.

### FAQ

- **Q:** What is the transmission distance of the DC-LINK video transmission system?
- **A:** The system can transmit video and audio signals up to 300m or 1,000ft with no latency.
- **Q:** Can I use any power cables to power the DC-LINK system?
- **A:** No, only use the 4-pin cables provided by DwarfConnection to power your DC-LINK system. Other cables may cause damage to your products.

## INTRODUCTION

### **Congratulations on purchasing the DC-LINK video transmission system!**

Please read this manual carefully before operating your product. You can also access this through our website: [www.dwarfconnection.com](http://www.dwarfconnection.com) Also read the safety information enclosed with your DwarfConnection product, as it contains more detailed information on product and health safety! The technology contained in this product, including the device itself as well as related software and trademarks, is protected by law. Any duplication or reproduction without the written permission of the copyright owner is prohibited, in part or in full. All third-party brands or copyrights mentioned in this manual are the property of their respective owners\

### **This manual is valid for:**

- DC-X.LINK-XS3.HDMI
- DC-X.LINK-XS3.SDI

## **Safety Precautions**

**WARNING:** READ BEFORE USE TO REDUCE THE RISK OF PERSONAL INJURY OR PROPERTY DAMAGE, INCLUDING DAMAGE TO YOUR TRANSMITTER/RECEIVER AND OTHER POTENTIAL

### **HAZARDS. HANDLING**

- Handle your DC-LINK system with care. You may damage the devices if you disassemble, drop, bend, burn, crush or otherwise subject them to unnecessary force.
- Do not use a device with a damaged enclosure. Using a damaged product may cause injury. Do not expose your devices to liquids of any kind!
- This can cause a short circuit and overheating. If your devices do come into contact with liquids, do not attempt to dry them using an external heat source.
- If the device comes into contact with liquid or corrosive chemicals, immediately turn off the power and remove the power supply.
- Do not operate the device near fire, gas lines or electrical mains or in high humidity or dusty surroundings.
- Do not block or otherwise impede ventilation slots or unused connectors, as this may result in a short circuit, fire or electric shock.
- DC-LINK systems are designed to work in ambient temperatures between 0° and 40°C / 32° to 100°F and should be stored between ambient temperatures of -20° and 60°C / 0° and 140°F.
- Ensure sufficient ventilation when operating your DC-LINK system in warm temperatures to prevent overheating.
- Do not leave your devices in places in which the temperature may exceed 60°C / 140°F as this may damage the product or pose a potential fire risk. Keep your device away from heat sources and out of direct sunlight.
- If your device becomes too hot, disconnect it from its power source if it is plugged in, move it to a cooler place, and do not use it until it has cooled.
- If you accidentally operated your DC-LINK system at temperatures lower than 0° C / 32° F try to avoid condensation water:
- Do not allow your device to cool down in the cold! Put your device in the case immediately after turning it off!

## **CARE & CLEANING**

- Unplug the product and power adapter before cleaning, during lightning storms, or when unused for extended periods of time. Use a clean, soft, and dry cloth to clean devices and their accessories. Do not use any chemical
- detergent, powder, or other chemical agents (such as alcohol or benzene) to clean the product or accessories.

## **REPAIR, SERVICE & SUPPORT**

- Disassembling the devices may cause injury to you or damage to your device. Do not attempt to repair your DC-LINK system yourself. Opening your device voids warranty. If devices cease working or have been damaged, contact our support team.

## **PROLONGED HEAT EXPOSURE**

- Your DC-LINK system generates heat during normal operation and complies with applicable surface temperature standards and limits. Avoid prolonged, direct or indirect skin contact when the devices are in use because exposing skin to hot surfaces for a long
- period of time may cause discomfort or burns.

## **ENVIRONMENTAL RESTRICTIONS**

- To prevent damage to your DC-LINK system, do not use or store the devices or accessories in dusty, smoky, damp, or dirty environments. Leaving the devices in places in which the temperature may exceed 60°C / 140°F may cause damage to the devices or
- pose a fire risk.

## **RADIO FREQUENCY INTERFERENCE**

- Observe rules that prohibit the use of wireless technology in certain environments. Your devices are designed to comply with regulations governing radio frequency emissions but use of such systems can negatively affect other electronic equipment.

## **RECYCLING**

- Please recycle all packaging, devices and accessories in accordance with U.S. regulations.

## **Overview**

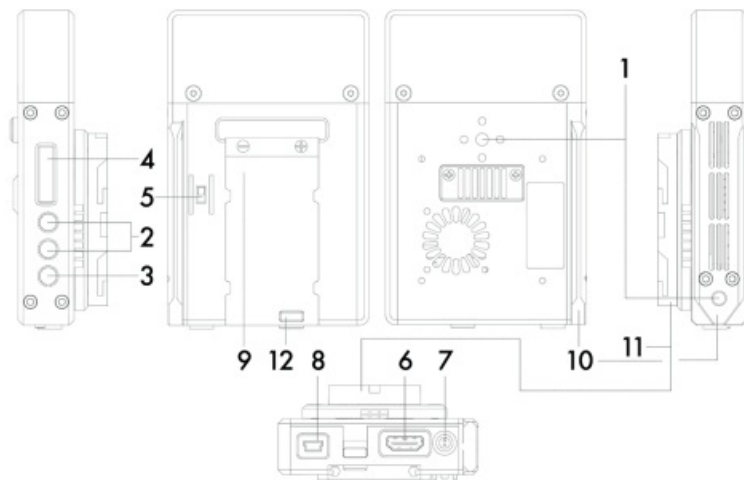
- The DC-LINK-CLR2 is a high-performance WHDI video transmission system which transmits uncompressed video and audio signals up to 300 m / 1,000 ft with no latency (< 0.001 s delay).
- Due to the conscious decision not to implement DFS (Dynamic Frequency Selection) the device has a longer range, greater stability and better usability than comparable systems that DO use DFS.
- The transmitter and receiver both have 3G-SDI and HDMI connectors (Plug & Play). When a video source is attached, the transmitter automatically selects the input (SDI is prioritized).
- The receiver's 3G-SDI and HDMI outputs can be used simultaneously.

## Characteristics

- Max. transmission range 300m/1000ft line of sight
- Rapid and reliable connectivity, no need for complex pairing
- Real-time transmission with no latency (< 0.001s)
- Uncompressed transmission. 10-bit, 4:2:2 transmissions via 3G-SDI or HDMI without format conversion
- Supports formats up to and including 1080p 60Hz
- 2- channel audio transmission, embedded audio transmission on CH1 & CH2 via SDI or HDMI
- Operates within the license-free 5GHz ISM band, frequency range from 5.1 to 5.9GHz
- Multicast support 1:1 or 1:n transmissions with up to four parallel systems
- Limited Metadata Support: Start/Stop, Timecode\*
- Metadata Cross Translation (SDI to HDMI)\*
- High-grade aluminium casing: extremely durable and heat-regulating
- Variable Input Voltage from 7,2-18,0V DC allows the system to be operated with a variety of batteries or power supplies
- Status displays for DC power, video and RSSI signal strength
- 2x 1/4" Thread
- NPF battery mount male and female for sandwich setup
- Plug-and-Play design. Ready to use without the need for complex configuration
- 1 Year warranty by manufacturer

## Product Description

### XS3 Receiver



1. 1/4" Thread
2. Control Buttons
3. Menu Button
4. OLED display
5. Power Switch
6. HDMI OUT
7. DC-IN 7,2 – 18V
8. Mini USB: For firmware upgrade

9. NPF Battery Port
10. Nato Rail
11. NPF Sandwich Plate
12. Battery Release Button



## DC.LINK XS3 NPF-Battery Adapter Assembly Guide

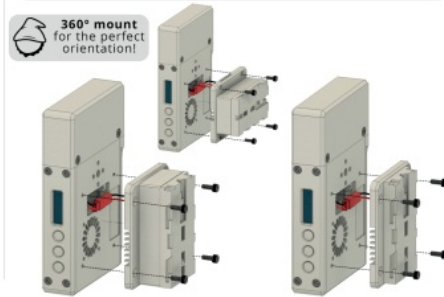
**1** Remove the Case-Power-Plate by unscrewing both M3x6 Flat Head screws and pull out the red 2-pin connector.



**2** You can either install the NPF Battery Plate with or without the spacer. To guarantee access to the battery release button on the ATOMOS Shogun, install the spacer using the provided (4) M3x25 flat head screws.



**3** After removing the Case-Power-Plate you can access and pull out the red 2-pin connector cable and connect it with the NPF-battery plate 2-pin plug. Bolt on the assembly with the provided (4) M3x6 socket screws.



## Scope of Delivery

- 1x Receiver
- 1x Multidirectional NPF Battery Plate 1x Spacer for NPF Battery Plate
- 1x Mounting Piece for NPF Battery Plate 1x Power Cable 4pin to D-Tap
- 4x M3x6 socket head screws
- 4x M3x25 flat head screws
- Quick Start Guide
- Assembly Guide
- USB flash drive with product manual

## Operation

1. Use the enclosed D-Tap cables or an NPF battery to power your receiver. Only use 4-pin cables provided by DwarfConnection to power your DC-LINK system! Other cables might cause damage of your products!
2. Turn on your devices.
3. Make sure transmitter and receiver are set to the same channel. Switch channels if necessary. (Find detailed instructions in "Features")

## Signal Distribution

Connect the receiver's SDI or HDMI output to the SDI or HDMI input of the monitoring/recording device. Only use high quality 7,2 – 18,0V batteries.

## Features

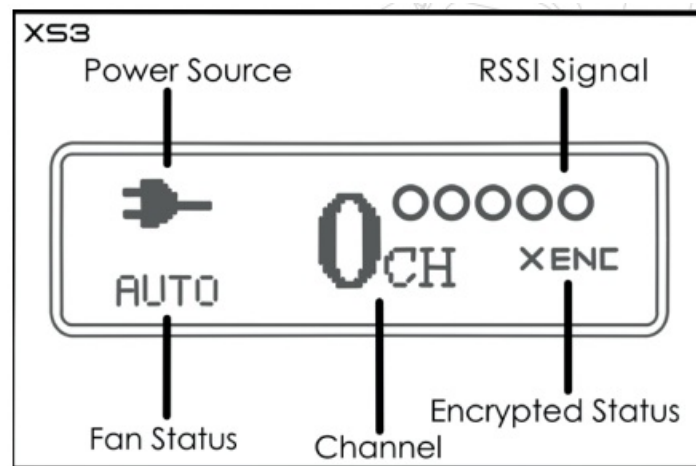
## Menu Navigation

- Use the MENU button to easily navigate through the sub menus of your DC-LINK device. Press several times until the referring indicator is flashing. Then use + and – to change the state and confirm with MENU.

## OLED Display

- The OLED Display shows all important information on the transmitter and the receiver. To make any changes to your settings, use MENU to navigate to the desired Sub-Menu. Then use + and – to make your changes and confirm with MENU.

## Received Signal Strength Indicator (RSSI)



Display	Status	Description
RSSI	0-1 LEDs	Radio signal strength is weak and artifacts are visible in the video signal
	2-3 LEDs	Radio signal strength is normal and video quality is good
	4-5 LEDs	Radio signal strength is very strong and video quality is very good

## Choosing a Channel

- To choose a channel on the transmitter/receiver press MENU and select with the + or – button. Press MENU again to confirm.
- The system works on 10 channels in the license-free 5 GHz ISM frequency band, using numbers 0-9.
- You can choose from 41 different channels. This is due to Multi Brand Connectivity,
- which makes your DC-LINK receiver compatible with multiple other Brands.
- When working with a DwarfConnection transmitter, always use channels 0-9!
- To learn more about Multi Brand Connectivity, please read the corresponding section of this manual.
- The transmitter and receiver have to be set to the same channel to work. If several systems are used at the same time, do not use neighboring channels to avoid interferences. A maximum number of 4 systems can be

used simultaneously

## Master Channel Selection

- All receivers on the same channel will react to channel changes of the transmitter and follow automatically. Of course, a receiver can switch to another channel independently at any time.

## Multi Brand Connectivity

- Your X.LINK-XS3 receiver is equipped with DwarfConnections's unique Multi Brand Connectivity Feature that makes it compatible with most common non-DFS WHDI wireless video systems on the market by letting you choose from different frequency sets. This is as easy as choosing a channel:
- Use the MENU button to go to channel selection. Choose a channel from different frequency sets using the + and – buttons.
- The letter on your display shows the frequency set, the number shows the change. The channels used by DwarfConnection transmitters, do NOT show a letter.
- Therefore, when working with a DC-LINK transmitter, choose from channels 0 to 9 on your receiver. Besides the DwarfConnection frequencies, there are 3 more frequency sets: A0-A9, B0-B9, C0-C9, CA. These frequency sets correspond with the channel sets, other manufacturers are using.

The channel sets and referring frequencies are:

- 0-9 (DwarfConnection):
- 5550, 5590, 5630, 5670, 5150, 5190, 5230, 5270, 5310, 5510 A0-A9:
- 5825, 5190, 5230, 5755, 5795, 5745, 5765, 5775, 5785, 5805 B0-B9:
- 5130, 5210, 5250, 5330, 5370, 5450, 5530, 5610, 5690, 5770 C0-C9 plus CA:
- 5150, 5230, 5270, 5310, 5510, 5550, 5590, 5630, 5670, 5755, 5795

## On Screen Display (OSD)

The OSD shows status information in case of transmission or signal problems. In live situations, the OSD might be distracting or simply unwanted. Therefore, it can be turned off: Press the MENU button several times to navigate to the OSD menu and select the desired state by using the + or – button. Confirm your selection with MENU. An indicator on the OLED display of the receiver shows the OSD state.

## Metadata Cross Translation\*

Camera metadata is transmitted through SDI only. On your XS3 HDMI receiver, the incoming information is translated into HDMI, which allows you to use meta-data-bound features, like automatic recording on your monitor.

## Fan Control & Cinema Mode

Fan control allows you to turn the fans of the devices on or off to keep them cool but also prevent unwanted noise. Press MENU to navigate to the fan menu and select the desired state by using + or –.

AUTO indicates cinema mode, which triggers the fans using the start / stop flags of the camera. Once you hit record, the fan will stop, ensuring total silence. After recording, it will turn back on automatically. Cinema mode is bound to metadata support. switches the fans on permanently. X switches the fans off.

## CAUTION!

For a long product life, we highly recommend NOT to operate your DC-LINK with permanently switched-off fans. Whenever you are operating your devices without cooling, monitor the temperature and make cooling breaks when the indicator on your display is flashing (60°C/140°F). THE DEVICES DO NOT HAVE AN EMERGENCY OUT! If you allow your devices to get too hot, you might cause serious damage of your equipment.



## Encryption

- In encryption mode, the transmitter sends an encoded signal that only linked receivers can read, making it easy to protect confidential content that is not meant for everyone's eyes.
- To activate encryption mode, press the MENU button until ENC is flashing. Use + or – to check either ✓ENC or XENC and confirm with MENU.
- To link your devices, set your transmitter and all the receivers to the same channel, then activate encryption on your transmitter.
- All receivers will follow into encryption mode automatically. Settings remain active after turning your devices off. This means that ENC can be prepared prior to shooting and will stay active unless you turn it off.
- A linked receiver does not HAVE to stay linked. To take a receiver out of the encrypted system, simply turn off ENC.
- Then you can easily access another (unen-cripted) transmitter's images by choosing the referring channel within seconds. To link back to the previous (encrypted) transmitter, turn ENC on again.

### IMPORTANT:

Switching back and forth between two encrypted systems is not possible. You cannot slip into an encrypted wireless system, if your receiver was not initi-ally linked to the transmitter. If you want to add a new receiver to an encrypted system, you need to link the whole system again.

## Maintenance

Please do not attempt to repair, modify or alter these devices under any circumstances. Clean the devices with a soft, clean, dry and lint-free cloth. Do not open the devices, they contain no user-serviceable parts.

### Storage

The devices can be stored at temperatures between -20°C and 60°C. For long-term storage, please use the original transport case and avoid environmental conditions such as high humidity, dust, or excessively acidic or base surroundings.



To ensure your own safety, please use only high-quality brand-name batteries, and follow the safety instructions provided by the manufacturer.

## Troubleshooting

Possible Cause		Possible Solution
No video output	Lack of power	Check power supplies of transmitter and receiver and ensure that all cables are connected properly and that there is sufficient power.
	Antennas	Ensure antennas are not damaged and are firmly connected. Please use the DC-Scan to check.
	Video connection cable	Examine the transmitter's "Video" LED display. If the LED is dark, check the HDMI or SDI connection cable.
	Frequency selection	Ensure that the transmitter and receiver are set to the same channel.
	Unsupported video format	Make sure you using a supported video format.
Inadequate video quality	Connections	Ensure that all SDI or HDMI cables are firmly connected.
	Range is too great or signal is obstructed	Check how many "RSSI" LEDs are lit on the receiver. For decent quality, at least 2-3 LEDs should be lit. If only one is lit, the signal is weak and the distance between transmitter and receiver should be reduced. Alternatively, obstacles between the devices should be removed or another channel selected.
	Radio signal is experiencing interference	Open the DC-Scan and choose a free channel.

HDMI		SDI
Connections	1x HDMI Input (Type A female) 1x DC Input (4-pin female)	2x SDI Output (BNC female)  1x HDMI Output (Type A female) 5x Antenna (RP-SMA male) 1x DC Input (4-pin female)
Power	7,2 – 18,0V DC	7,2 – 18,0V DC
Power Consumption	< 8 W	< 8 W
Dimensions (LxWxH), w/oAntennas	130,5 x 84 x 24mm 5,1" x 3,3" x 0,9"	130,5 x 84 x 24mm 5,1" x 3,3" x 0,9"
Weight	265,0 g / 9,35oz	278,0g / 9,81oz
Supported Video Formats	1080p (60, 59.94, 50, 30, 29.97, 25, 24, 23.98) 1080i (60, 59.94, 50) 720p (60, 59.94, 50)	1080p (60, 59.94, 50, 30, 29.97, 25, 24, 23.98) 1080i (60, 59.94, 50) 720p (60, 59.94, 50)
Audio Format	Embedded Audio on Ch 1 & 2 Audio 24bit/48kHz	Embedded Audio on Ch 1 & 2 Audio 24bit/48kHz
Displays	0.91" OLED panel	0.91" OLED panel
Receiver Sensitivity	- 75 dBm	- 75 dBm
Bandwidth	40MHz	40MHz
Operating Temperature	32 – 100°F (Operation) 0 – 140°F (Storage)	32 – 100°F (Operation) 0 – 140°F (Storage)

### Appropriate application

The DC-LINK video radio system from DwarfConnection is a modular radio system based on WHDI (Wireless Home Digital Interface) technology, consisting of a transmitter and any number of receivers. Different models of transmitters and receivers are available within the product group, which are compatible with each other and can therefore be combined to form a customizable video radio system. The following sales units are available:

- DC-LINK-CLR2.MKII set (1x transmitter, 1x receiver)
- DC-LINK-ULR1.MKII set (1x transmitter, 1x receiver)
- DC-X.LINK-S1.MKII (1x receiver)
- DC-X.LINK-L1.MKII (1x receiver)

The intended use of wireless systems is the wireless transmission of a video signal and metadata from a camera to a monitor via an HDMI or SDI connection. The transmitter is connected to a camera\* or other image source\* via an HDMI or SDI cable\*. The receiver is connected to a monitor\* or other device for signal processing or distribution\* via an HDMI or SDI cable\*. The transmitter and receiver must be powered via a suitable power source of 7.2-18V. The following power inputs are available:

- 4pin socket
- 2-pin JST plug or V-mount battery holder

DwarfConnection offers the following accessories for the power supply:

- 12V power supply\*\*
- D-Tap to 4pin cable
- 2pin to 4pin cable\*
- NPF plate\*

After switching on, the transmitter and receiver are set to the same channel by pressing the buttons. The transmitter then transmits the video signal and the camera's metadata to the receiver. Due to the mode of operation (manual frequency selection), the use of DwarfConnection radio systems in the EU is restricted to indoor use and channels 4, 5, and 6. Any use contrary to these restrictions is considered improper. Compliance is the responsibility of the user. The manufacturer accepts no liability whatsoever.

In the standard operating mode, the radio signal is transmitted unencrypted. Encrypted operation (128-bit) is also possible in encryption mode. The manufacturer is not liable for damage caused by the loss of sensitive data.

- The transmitter and receiver have active fans. These can be switched on and off permanently.
- The fan can also be operated in automatic mode. It then switches off when the recording is started on the camera.
- Operation with permanently deactivated fans requires continuous monitoring of the device temperature in accordance with the specifications in the user manual.
- All ventilation openings on the housing must remain unobstructed at all times and proper operation of the fans must be ensured.
- All devices (except those with internal antennas) have standard RP-SMA antenna ports.
- The use of antennas from third-party manufacturers is not recommended, as these may not comply with the legal guidelines and may exceed the limit of the legally permitted transmission power.
- Mechanical manipulation of the devices may only be carried out in connection with the intended use of DwarfConnection's original accessories and proper installation by a competent person in accordance with the manufacturer's instructions.

Proper use requires professional installation of the transmitter and receiver in accordance with the application.

- All devices have 1/4" threads for fastening. The user is responsible for selecting an appropriate fastening method.
- All devices must be protected from moisture and humidity.
- The manufacturer accepts no liability for damage caused by improper installation or moisture.

DC-LINK video radio systems are designed for use in the professional film and broadcast sector.

- Any operation outside this area of application or by non-professionals is not intended and does not correspond to the intended use.
- The manufacturer is not liable for damage caused by improper use or incorrect operation.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental

capabilities, or lack of experience and/or knowledge unless they have been given supervision or instruction concerning use of the appliance by a


- person responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.

Not included in the scope of delivery Included with ULR1.MKII or X.LINK-L1.MKII only

## CONTACT

- DwarfConnection GmbH & Co KG Münzfeld 51
- 4810 Gmunden
- AUSTRIA
- [www.dwarfconnection.com](http://www.dwarfconnection.com)

## Documents / Resources

	<p><a href="#">DWARF CONNECTION DC-LINK Video Transmission System</a> [pdf] User Manual X.LiNK-XS3.HDMI, X.LiNK-XS3.SDI, DC-LINK Video Transmission System, DC-LINK, Video Transmission System, Transmission System, System</p>
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## References

- [Wireless Video | DwarfConnection GmbH & Co KG | Moosham](#)
- [FAQ | DwarfConnection NEU](#)
- [User Manual](#)

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