LBO-H2 Series

DIRECT PLUGGABLE LINKBRIDE™
FIBER OPTIC HDMI 2.0
TRANSMISSION SYSTEM

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BROADATA COMMUNICATIONS, INC.

SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AS OUR

PRODUCTS CONTAIN

CLASS I LASER PRODUCTS

WARNING

This product is a **CLASS I LASER PRODUCT** only when the units are connected with a fiber optical cable. Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up. It should be noted that when the fiber is disconnected, the product will have **CLASS IM INVISIBLE LASER RADIATION.**

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.

CAUTION

Only service personnel are intended to access the interior of the units. It should be cautioned that CLASS 1M INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO THE BEAM. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure. This product has operating wavelengths at 800nm range with average -0.5dB to 0dBm optical power per wavelength.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1M LASER PRODUCT.

LASER WARNING
DO NOT VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS
CLASS 1M LASER PRODUCT

SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

TABLE OF CONTENTS

1.0 PRODUCT DESCRIPTION 5
2.0 SETUP 6
2.1 MOUNTING 6
2.2 CABLING AND CONNECTORS 6
2.2.1 HDMI VIDEO INTERFACE 7
2.2.2 OPTICAL FIBER CONNECTION 8
2.3 DC POWER CONNECTION 9
3.0 OPERATION 10
4.0 MAINTENANCE AND TROUBLESHOOTING 11
4.1 MAINTENANCE 11
4.2 TROUBLESHOOTING 11
5.0 SPECIFICATIONS 12
6.0 SERVICE PROCEDURE 13
6.1 REPLACEMENT POLICY 13
6.2 RETURN AND REPAIR SERVICE 13
7.0 LIMITED WARRANTY 14

1.0 PRODUCT DESCRIPTION

The LBO-H2 Series is a high performance, low cost, miniature, directly pluggable Link Bridge™ Fiber Optic HDMI 2.0 Transmission System. It carries one (1) unidirectional HDMI 2.0 video, together with HDCP/DDC, through one (1) multimode fiber. This unique fiber optic transmission system lets your digital flat panel display extend up to 300m at 4k@60Hz, 4:4:4 resolution.

No user adjustment is required for the LBO-H2 system due to the use of advanced digital fiber optic transmission system technology with zero compression and zero bit reduction. This allows for a quick and easy setup, offering trouble-free operation for many years to come. The LBO-H2 supports video resolution up to 4k@60Hz, 4:4:4 video resolution.

Figure 1-1 illustrates the TX and RX view of the LBO-H2 model.

Figure 1-1
LBO-HDMI TX and RX View

2.0 SETUP

The BCI LBO-H2 Series units are used in pairs. One LBO-H2-T transmitter unit is located at the near-end and connected through one optical fiber, to the LBO-H2-R receiver located at the far-end of the link. Figure 2-1 depicts a typical installation for the LBO-H2-T/R.

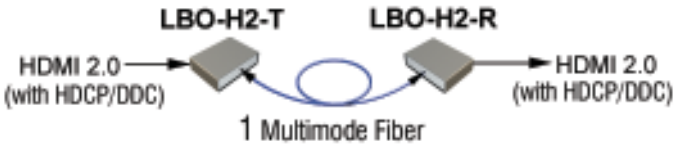

Figure 2-1
LBO-H2 Setup

2.1 Mounting

Before installing the units into your housing, make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitations (also known as the minimum bend radius).

2.2 Cabling and Connectors

In order to setup the BCI LBO-H2 properly, make sure to observe the following instructions when installing the proper cables. The LBO-H2 requires two parts to the cabling setup: the electrical and the optical.

2.2.1 HDMI Video Interface

Use the following instructions to properly connect your HDMI video as illustrated in Figure 2-2.

1. Directly connect the LBO-H2-T (Transmitter) unit's HDMII video input port to the user's HDMI video source.
2. For the receive unit, directly connect the LBO-H2-R (Receiver) unit's HDMI video output ports to the user's HDMI video receivers.

Figure 2-2
Electrical Connection

2.2.2 Optical Fiber Connection

Most cable manufacturers identify individual fibers in the fiber cable. Select an appropriate terminated fiber. Each unit's optical ports in the system are specified for use with SC-connectorized Multimode (62.5/125 micron) fiber. Follow the ensuing instructions on installing and connecting the fiber optic links:

1. Ensure the power is off before proceeding with the fiber optic cable installation.

2. Prior to connecting the fiber optic cables, remove and save the dust caps from the optical port of both the LBO-H2 units. Clean the fiber optic connector and use a lint-free cloth dampened with alcohol to thoroughly wipe the side and end of the ferrule.

3. Connect the fiber from one unit to the other connecting the near end LBO-H2-T unit's optical port to the far end of the LBO-H2-R unit's optical RX port as illustrated in Figure 2-3.

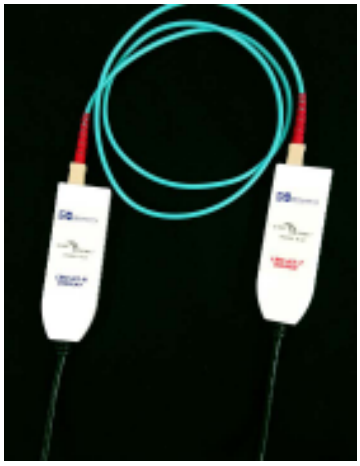

Figure 2-3
Fiber Optic Connection

2.3 DC Power Connection

Congratulations! You are now ready to power up the LBO-H2 and set up your network connection. In order to make sure that you have a proper installation, please observe the following:

1. Your AC jack has power.
2. The 5VDC power supply is working.
3. Your electrical system has proper grounding (this ensures that your power supply does not suffer from voltage variations).
4. **Power Surge Protection. This is optional**, but highly recommended. A UPS system provides voltage regularity as well as prevents spikes from occurring, thus protecting your LBO-H2 from sensitive voltage conditions.

The LBO-H2 derives power from an external 5VDC power supply. This power supply is a wall mounted AC/DC adapter, 100-240 VAC, 50-60 Hz, at 1.0A. This power supply comes standard for the LBO-HDMI unless otherwise specified.

To provide power to the LBO-H2, simply connect the power cord, already provided with the units, and connect it to the wall jack. (You will find one power cord per unit). Once the power cord has been connected to the wall jack, connect 5VDC to the unit and the unit should power up immediately.

If you have any problems or concerns, regarding the installation, make sure that you have taken the proper steps to ensure a proper power connection. Otherwise, feel free to contact us for any questions you may have.

3.0 OPERATION

After the installation procedure is completed, the units are ready for operation. To operate the BCI LBO-H2 units, simply apply power as indicated in the previous step. The following status LED indicators are in the TX/RX unit.

The transmit module includes a single status LED that shall be decoded as follows:

Off	-Module has no power
Red	-Module detects open fiber connection
Yellow	-Fiber detected but link initialization failed
Green Flash	-Good link with no HDCP video
Green	-Good HDCP 1.X link
Blue	-Good HDCP 2.X link

The receive module includes a single status LED that shall be decoded as follows:

Off	-Module has no power
Red Flash	-Module detects open fiber connection
Yellow	-Fiber detected but link initialization failed
Green Flash	-Good link with no HDCP video
Green	-Good HDCP 1.X link
Blue	-Good HDCP 2.X link
Pink or Flashing Pink	-Bootloader connected

4.0 MAINTENANCE AND TROUBLESHOOTING

4.1 Maintenance

There is no operator maintenance other then keeping the units clean.

4.2 Troubleshooting

If the BCI LBO-H2 units do not operate properly after installation, check for: possible cable breaks, loose connections, and incorrect cable connections. If a problem exists on the fiber link, please check your fiber connectors for improperly cleaned fiber cables and connectors. If problems persist that may be fiber related, contact BCI at 1-800-214-0222 for further assistance.

For electrical problems, perform the following troubleshooting procedures:

1. **If the POWER indicator is OFF, check for the following:**
   a. The line cord is plugged into the unit and your outlet has power.
2. **If the POWER indicator is ON, but the units are not working, check for the following:**
   a. Make sure the appropriate (Multimode) fibers are being used.
   b. Fiber and fiber connectors are not broken.
   c. For each unit, the transmit (TX) fiber is connected to the other unit's receiver (RX).

5.0 SPECIFICATIONS

Video

Resolution	Up to 4K @ 60Hz, 4:4:4
Connector	HDMI Male
Protocol	DDC/EDID/HDCP 2.2 Capable

Optical

Fiber Type	Multimode
Number of Fibers	1
Connector	SC/300m

Physical

Dimension (H x W x D)	0.46” x 1.19” x 3.47”
Power Level (max.)	+5VDC @ 500mA
LED Indicator	Power/Link/HDCP
Operating Temperature	0 to +40°C
Humidity	0 to 95% RH, non-condensing

6.0 SERVICE PROCEDURE

6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at **800-214-0222** for information.

6.2 Return/Repair Service

The BCI LBO-H2 System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

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7.0 LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

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