DIGITALINX™

Complete Digital Solutions for the AV Professional

User's Manual

DigitaLinx™ HDMI™
Coax Transmission System
Part #: DL-HDCX

Table Of Contents

Congratulations on your purchase of a DigitaLinx™ HDMI™ Coax Transmission System. This manual contains information that will assist you in the installation and operation of this product. Please inspect the contents of the package to ensure all required material is present. You will need to provide 2 HDMI cables to connect your equipment to the transmitter and receiver.

Contents:

Each DigitaLinx™ HDMI™ Coax Transmission System package contains the following items:

1 each	DL-HDCX HDMI™ Coax Transmission System Set (TX unit)
1 each	DL-HDCX HDMI™ Coax Transmission System Set (RX unit)
1 each	12 VAC Power Supply (UL) and C(UL) listed Class 2 C(UL)US
1 each	Users Manual

Safety Precautions:

1.) Please read all product manuals and safety notes prior to operating this or any devices.

2.) Retain the product manuals and safety notes for future reference

3.) Unplug this unit prior to cleaning. Use a damp cloth for cleaning.

4.) Do not use this equipment near damp or wet locations.

5.) The product should only be powered by the indicated sources in the specifications. Do not use other sources of power.

6.) Do not use damaged power cords or plugs and do not use loose electrical outlets. Please refer repair of non-conforming electrical equipment to certified personnel.

7.) Do not place heavy articles or other equipment on top of this device or its associated peripherals.

8.) Do not use this device near flammable material, liquids, or gas.

Product Description and General Specifications

This DigitaLinx™ HDMI™ Coax Transmission System is an externally powered digital HDMI and DVI transmission system to send HDMI and DVI signals over four coaxial cables. The fifth coaxial cable is for 12 VAC power distribution. The device is compliant with DVI 1.0 and supports HDMI 1.3 high speed signals. The device is fully compliant with HDCP protocol, CEC (control) and DDC (Monitor Identification). This device uses Gennum's ActiveConnect™ Technology to transmit HDMI and DVI over long distances at very high data rates.

In addition to new installations requiring long transmission distances at high resolutions, this HDMI™ Coax Transmission System is ideal for installations where a pre-wire or past installation has been completed with RGB cable or where space constraints limit installing HDMI® or DVI cables. The RGB cable solution is also excellent for retrofit applications. Current Analog RGBHV installations can be quickly and easily converted to Digital HDMI™. The compact design allows the devices to be unobtrusive in the final installation. It is recommended to test an application using the customer equipment as the signal from the source device varies between manufacturers.

The system can easily accommodate DVI only inputs and outputs by using Liberty's high quality HDMI to DVI interconnects. The DVI connector is routed to the sources and display unit while the HDMI connector plugs into the DigitaLinx™ HDMI™ Coax Transmission System. The digital audio signal is not transmitted when using DVI connectors.

ITEM	DESCRIPTION	
Model Name	DL-HDCX (TX Unit)	DL-HDCX (RX Unit)
Input(s)	(1) HDMI type A Receptacle	(5) BNC Jacks
Output	(5) BNC Jacks	(1) HDMI type A Receptacle
Supported Resolutions	480i, 480p, 720p, 1080i, 1080p up to 60 Hz	
HDCP Compatible	Yes	
Power Consumption	12 VAC 450mA from supplied Power supply. Unit can accommodate a wide range 10-32 VDC or 10-28 VAC or power inputs	
Dimensions:	56 x 112 x 16.5 mm (LxWxH)	56 x 112 x 16.5 mm (LxWxH)
(Length x Width x Height)	2.20" x 4.41" x 0.65"	2.20" x 4.41" x 0.65"
Weight	~0.125 Kg 4.41 ounces	~0.126 Kg 4.41 ounces

The actual transmission distance can vary depending on many factors. Maximum distances are a function of resolution, color depth, refresh rate, cable quality and termination quality. The quality of the RGB cable is a prime factor in limiting distances. The use of Serial Digital Coaxial cable will extend distances. SDI Coaxial Construction is a 100% bonded foil shield and a 95% coverage Tinned Copper braid shield with an SRL value greater then -20dB to 750 MHz. Use of a braid shield only coaxial cable like a closed circuit TV coax is not recommended due to the transmission of higher frequencies however it will work to reduced distances.

This is a practical application chart with actual observed distances and performance in a real application. Longer distances can be achieved at lower resolutions. Higher resolutions and color depths will result in shorter distances. Some sources do not adhere to HDMI standards and may not be transmitted the full expected distance.

Cable Part Number(s)	Cable Description	1080p60 w/HDCP
RGB5C-PVC or PLN	Mini HiRes 26 AWG stranded	150 feet / 45 meters
RGB5C-25-CM or CMP	Mini HiRes 25 AWG solid	175 feet / 53 meters
RGB5C-23-CM	MRG59 SDI 23 AWG Solid	300 feet / 90 meters
RGB5C-20-CMR	RG59 SDI 20 AWG Solid	400 feet / 122 meters (estimated)
RGB5C	RG6 SDI 18 AWG Solid	600 feet / 183 meters (estimated)

Environmental Reliability Specifications

The DigitaLinx™ HDMI™ Coax Transmission System recommended environmental operating limits are a temperature range from 10°C to 40°C, non-condensing humidity levels from 10-80% and an altitude ceiling of 3,000 meters (9,840 feet).

Environmental limits for transportation are established as a temperature range of -25°C to 60°C, non-condensing humidity levels from 5-95%, and an altitude ceiling of 15,000 meters (49,200 feet)

Environmental limits for storage are established as a temperature range of -20°C to 45°C, non-condensing humidity levels from 5-95%, and an altitude ceiling of 3,000 meters (9,840 feet)

High Quality Picture –
No Loss of Resolution or introduced Digital Artifacts
Our HDMI™ Coax Transmission System is manufactured to deliver the highest quality picture by preserving the native resolution from the video sources and eliminating any digital artifacts (pixel loss or "sparklies"). Due to the nature of digital signals any non-active connector junctions will detrimentally affect the signal, this device provides active junctions to equalize and amplify the signal (boosting) and ensures the best signal quality to the display.

No Digital to Analog or Analog to Digital Conversion
This device does not convert the digital HDMI signal to an analog signal. Rather it takes advantage of the high bandwidth capabilities of a coax cable to transmit the digital HDMI signal hundreds of feet. HDCP, DDC and CEC signals are also supported to the full transmission distance of the HDMI signal.

Signal Amplification
Each HDMI™ Coax Transmission System has a safety certified 12 VAC external power supply to ensure adequate power is available to perform the signal boost to the correct specification. This is necessary because the introduction of a HDMI™ Coax Transmission System usually indicates that longer cable lengths are in use. This device amplifies and equalizes the signal from a longer length cable to the original native shape and signal power. All Liberty Wire & Cable HDMI interconnects are tested to ensure 1080p resolution.

Compact Design
The HDMI™ Coax Transmission System device is manufactured in a small convenient form factor which allows the devices to be situated in an unobtrusive installation. The Five BNC receptacles are oriented 180° from the HDMI connector to facilitate a straight cable lay.

Wide Range of Power Input
The HDMI™ Coax Transmission System device is manufactured to support the custom installation market and the device can accommodate a wide range of input power sources. It can accept DC power from 10-32 volts and AC power from 10-28 volts. Each unit is packaged with a Phoenix style connector for assembly onto the power supply wires.

Installation

The recommended method for connection of devices to the HDMI™ Coax Transmission System is listed in the following steps. Please ensure this order is followed to enjoy the full function of the device.

1.) Ensure the digital video/audio source and display is turned off.

2.) Connect the digital video/audio source to the input port of the DigitaLinx™ HDMI™ Coax Transmission System.

3.) Connect the digital display to the output port of the DigitaLinx™ HDMI™ Coax Transmission System.

4.) Power up the DigitaLinx™ HDMI™ Coax Transmission System. Power LEDs on both the transmitter and receiver should be illuminated.

5.) Power up the digital display.

6.) Power up the digital video/audio sources

7.) HDCP handshaking operation can take up to 20 seconds.

8.) Check the LED power indicator and status indicators on the DigitaLinx™ HDMI™ Coax Transmission System. The signal indicators should be lit when the devices are correctly attached. It does not indicate successful data transmission between the transmitter and receiver. See troubleshooting on Page 12 if the LED's are not lit.

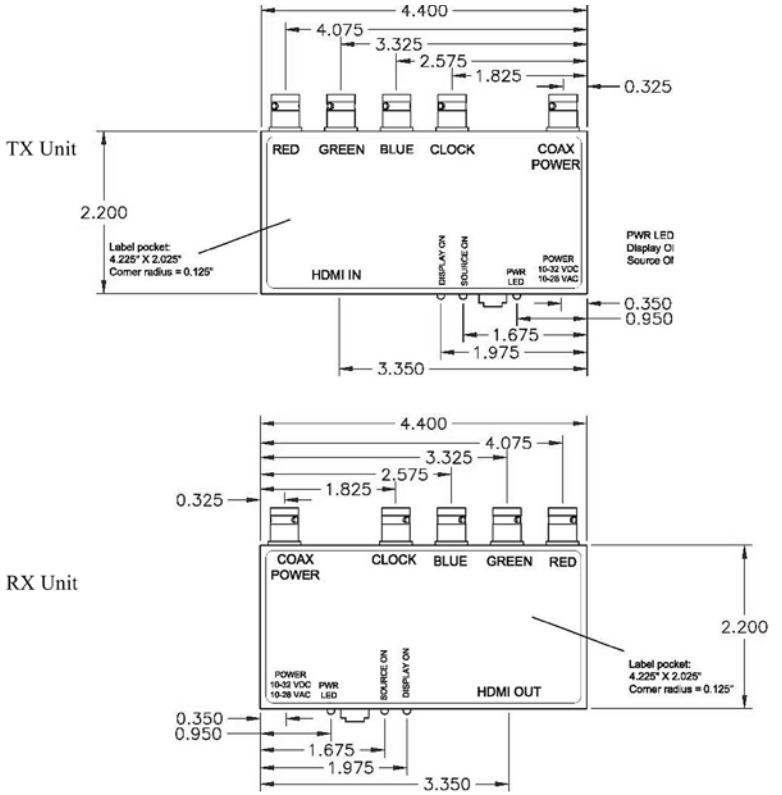
Alternative Power Strategies

Note: The unit can function without the fifth coaxial cable if power is supplied to both the TX and RX unit by separate DC power units. Extra Power units are sold separately under part number DL-HDCX-PS. In addition the power supply can be connected at either the TX or RX end of the system. If there are only 4 coax cables available a twisted pair cable can be connected between the green phoenix power supply connectors to supply power to the TX or RX not directly connected to the power supply. Make sure that the twisted pair and power supply are adequate to provide at least the minimum power to the distant device. e.g. A 10 volt power supply and a 24 AWG twisted pair will not be adequate at 200 feet due to cable losses.

If AC power is used it must be ungrounded (one side of power can not be connected to the coax shield).

Mechanical Specifications

Dimensions: DL-HDCX: 2.20" x 4.40" x 0.65" (56 x 112 x 16.5 mm) (LxWxH)



Power Supply Jack: Two pin Phoenix connector (not polarity specific)
Liberty supplied power supply is 12 VAC 600mA. Unit can accommodate a wide range 10-32 VDC or 10-28 VAC from alternative power supplies.

PWR LED: Green LED Power Indicator. Both Units require this LED to be functioning.

Clip: Clip to provide strain relief for power supply cable

SOURCE ON LED: Green LED. Indicates Source is Powered up and connected.

DISPLAY ON LED: Amber LED (TX unit) Green LED (RX unit). Indicates the Sink (Display) is Powered up and connected.

BNC JACK (1-5)

CH 1 – Red (note: signal is not Red this is just a quick guide for standard hook up)

CH 2 – Green (note: signal is not Green this is just a quick guide for standard hook up)

CH 3 – Blue (note: signal is not Blue this is just a quick guide for standard hook up)

CH 4 – White (or Gray) (note: signal is not only clock this is just a quick guide for standard hook up)

Power IN – Yellow (or Black)

SOURCE: HDMI from digital media source

DISPLAY: HDMI to digital video display

Technical Specifications

Frequency Bandwidth: 6.2 Gbps
Supporting Graphic Resolution: 1080p /60 deep color, or equivalent computer resolution

Transmitter
- Input: HDMI Type A receptacle 1 port
- Output: BNC Jack 5 ports
- Power: 2 pin Phoenix style connector

Receiver
- Input: BNC Jack 5 ports
- Outputs: HDMI Type A receptacle 1 port
- Power: 2 pin Phoenix style connector

Power Supply: External power from DC Adapter
HDCP (High-bandwidth Digital Content Protection) Compliant
CEC Compliant
DDC Compliant

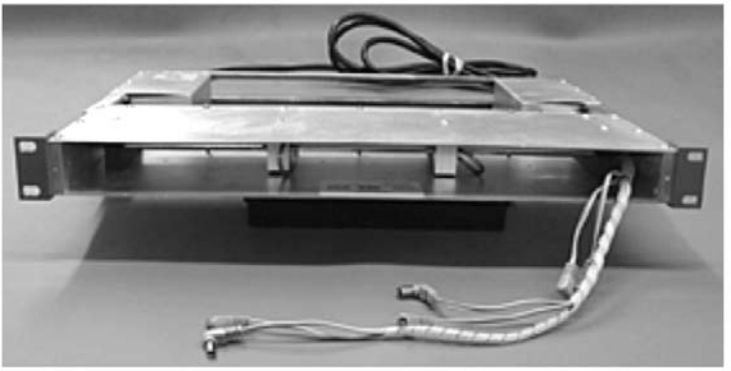
Connector Pin Assignment for HDMI Type A Receptacle

Pin #	Description
1	TMDS Data 2 +
2	TMDS Data 2 shield
3	TMDS Data 2 -
4	TMDS Data 1 +
5	TMDS Data 1 shield
6	TMDS Data 1 -
7	TMDS Data 0 +
8	TMDS Data 0 shield
9	TMDS Data 0 -
10	TMDS Clock +
11	TMDS Clock shield
12	TMDS Clock -
13	CEC
14	RESERVED
15	SCL
16	DDC DATA
17	DDC/CEC GROUND
18	+5VDC POWER
19	HOT PLUG DETECT

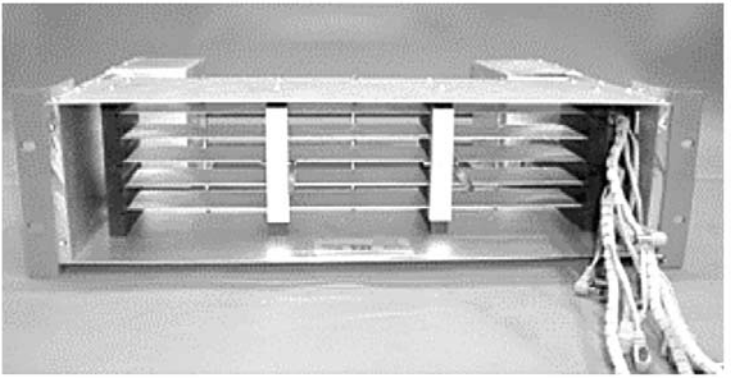
Powered rack mounts in 1, 2, and 3 RU heights are available for switching systems and HDMI distribution

Part #:	Family	Height	Capacity
52-111-000	ProSeries	1U	6 single layer full, Basic Block, or ProSeries Bricks. Or 3 double layer ProSeries Bricks full or half size.
52-121-000	ProSeries	2U	12 single layer full, Basic Block, or ProSeries Bricks. Or 6 double layer ProSeries Bricks full or half size.
52-131-000	ProSeries	3U	18 single layer full, Basic Block, or ProSeries Bricks. Or 9 double layer ProSeries Bricks full or half size.

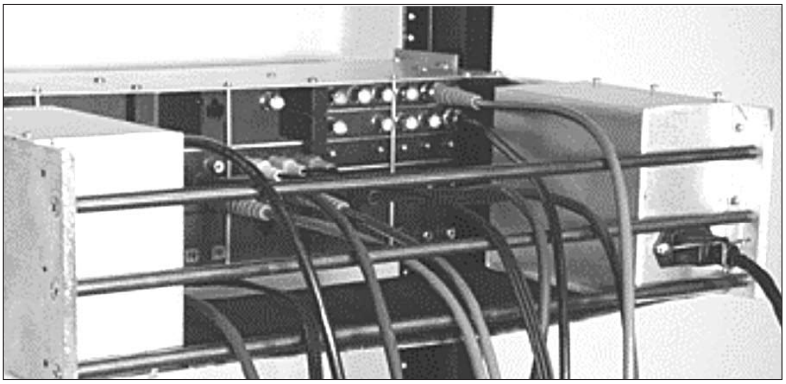
1 RU Rack Mount
Front View



3 RU Rack Mount
Front View



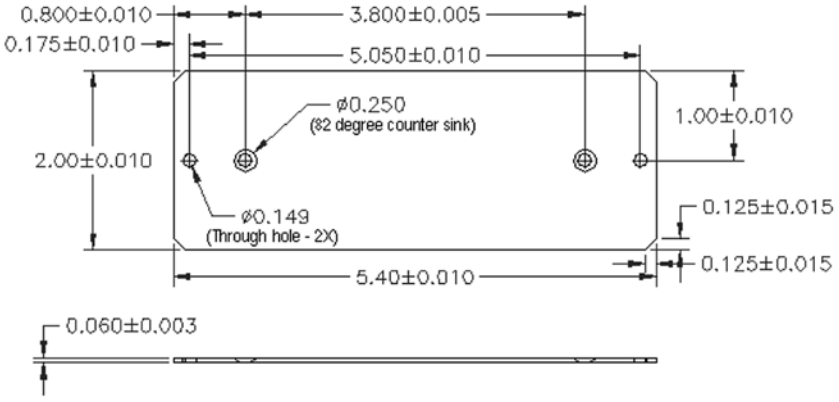
3 RU Rack Mount
Rear View



A manufactured steel plate to provide lateral ears is another mounting option.

Ears:

52-000-002	Brick Bracket Plate	Plate, 2 Screws



1 (One) Year Warranty

Liberty Wire & Cable warrants this DigitaLinx™ HDMI™ Coax Transmission System to be free from defects in workmanship and materials, under normal use and service, for a period of one (1) year from the date of purchase from Liberty Wire & Cable or its authorized resellers.

If a product does not work as warranted during the applicable warranty period, Liberty Wire & Cable shall, at its option and expense, repair the defective product or part, deliver to the customer an equivalent product or part to replace the defective item, or refund the customer the purchase price paid for the defective product.

All products that are replaced will become the property of Liberty Wire & Cable. Replacement products may be new or reconditioned.

Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

Liberty Wire & Cable shall not be responsible for any software, firmware, information, or memory data loss of customer contained in, stored on, or integrated with any products returned to Liberty Wire & Cable for repair under warranty or not.

Warranty Limitation and Exclusion
Liberty Wire & Cable shall have no further obligation under the foregoing limited warranty if the product has been damaged due to abuse, misuse, neglect, accident, unusual physical or electrical stress, unauthorized modifications, tampering, alterations, or service other than by Liberty Wire & Cable or its authorized agents, causes other than from ordinary use of failure to properly use the product in the application for which said product is intended.

Troubleshooting

The DigitaLinx™ HDMI™ Coax Transmission System is designed for years of trouble free service, please reference the troubleshooting steps below if you are having difficulties.

Recommendation:
Due to variations in the implementation of the HDMI standard by manufacturers of source and display equipment, it is highly recommended that any system be mocked up and tested with appropriate cable lengths prior to installation. There are many compatibility issues with HDMI equipment that become more apparent as cable extenders are added to the equation. This system goes to great lengths to minimize those problems. However, after wire is installed, the walls finished and the display is hung, it's a little late to find that the source isn't compatible with the switching equipment, transmission equipment and the display.

- All cables must be properly connected for any signal to be transmitted.
- If no image is displayed, confirm that all coax cables are properly connected, red to red, green to green etc.
- If there is still no image, confirm that all cable are continuous and not shorted between the center conductor and the shield.
- Some VGA cables use a twisted pair for the H and V signals. This device requires a coax cable for channels 1-4.
- Cables should be similar in length and of the same part number and manufacturer. CATV/MATV style cables with Copper Clad Steel conductors and Aluminum braid shields are not recommended.
- Signals on these cables are bi-directional so the coax signals will not function if connected to intermediate electronics (such as an RGBHV switcher).
- If the system does not function try lower resolutions from the source
- All LEDs will be on with a properly connected system. All LEDs being on does not indicate a properly connected system.
- The Yellow power channel can be used to determine if the cables are properly constructed. Disconnect all Coax cables. One at a time connect each cable to the yellow BNC connector with the power supply connected. If the Power LED on the unit not connected to the power supply illuminates, the cable is not open, nor does it have a short. Return it to its proper connectors beginning at end that has the power supply.

Customer Service

If you have issues, questions, or require assistance with the use of this device please contact Liberty Wire and Cable with any of the following contact points:

Liberty Wire and Cable
11675 Ridgeline Drive
Colorado Springs, CO 80921

Phone: (800) 530-8998 and ask for technical assistance.
Email: Sales@libertycable.com and indicate in Subject Line "Technical Assistance"

Liberty Wire & Cable
11675 Ridgeline Drive
Colorado Springs, CO 80921

800-530-8998

www.libertycable.com