

# **BVHD-20**™

## **Active HDMI® Signal Extender For High Speed Connections**

### **Key Features:**

- Extends High Speed HDMI® signals up to 180 feet via dual Cat-6 cabling
- Supports HDMI® formats of Ethernet, audio return, 3D, 4K x 2K, and 10 bit color
- Compatible with 1080p 60/24 deep color formats
- Each unit 100% tested and individually certified for optimum performance and reliability
- Designed and manufactured by AudioControl in its USA factories
- Active and redundant signal processing for connection reliability
- Highly tolerant of Cat-6 electrical disturbances
- Includes matching RJ-45 high performance connectors for best performance
- FIVE Year Parts and Labor Warranty

**AudioControl**®

# Achieving Optimum Performance

The AudioControl BVHD-20 allows users to extend HDMI® signals over long distances (up to 180 feet) using simple Cat-6 network cabling. Given the amount of digital audio and video data that is being transferred via the HDMI® format, the wires, cables, and connectors that are used will have a huge impact on the performance and connectivity of your system. Digital signals must be continuously transmitted back and forth between the source unit (i.e. Blu Ray player) and the sink (display device). To insure these connections we strongly recommend you take following precautions:

## ⇒ Use Gigabit Rated or Higher Cat-6 Cabling

– Consistent HDMI® connectivity requires ample speed and bandwidth, therefore use Category 6 (or better) network cable (attainable distances are shorter with Cat-5). Make sure the two wires in each pair are terminated to exactly the same length. Siamese Cat-6 is a good choice but not required. Digital signals are only as strong as the weakest link so treat all cables in a kind and gentle fashion (see below) using large bend radiuses (minimum 1.25 inches).

- Avoid pulling, stretching, splicing, stapling, knotting, kinking or denting your Cat-6 cabling (or yourself

for that matter). HDMI signals are extremely sensitive to very small variations in impedance so even the slightest variance can cause your signal to drop out.

- Use a network cable tester to verify your Cat-6 cabling can support gigabit data rates.

⇒ **Cat-6 RJ-45 Push Through Connectors** – Good connectors are equally important as using good cabling, in achieving a solid HDMI connection. To assist in this we have included matching Cat-6 RJ-45 push-through connectors to optimize your connections and provide the greatest bandwidth. These connectors offers several advantages:

- Twists in the 4 pairs can be maintained right up to the plug contacts, minimizing any discontinuity of the impedance of the pair. Discontinuities create reflections in the balanced pair that reduce the signal to noise and bandwidth.

- The connectors also insure the lengths of the two wires in each pair are the same length (differences known as intra-pair skew). This is the most critical parameter in distributing HDMI video over CAT 5/6.

- The push through type connector lets the installer see the pairs are in the proper order before the crimp is applied thus eliminating mistakes.

The need for optimum bandwidth is paramount to future proof a video system. While the evolution of HDMI to 3D and 2k x 4k resolutions does not increase bandwidth, the shift from 8bit color to 10bit color to reduce banding effects will require greater bandwidth.

The enclosed and extensively tested RJ-45 plugs combined with the use of the BVHD-20 will form a reliable system solution that will continue to work even as the HDMI specifications evolve.

If the system is prewired with Cat-5 the same type of connector is available for Cat-5. The enclosed connectors should be used only with the preferred Cat-6 wiring.

*Caution: Use the strain relief (boot) always for best results. Also ensure wires are cut flush to connector for proper seating.*

⇒ **High Speed HDMI Cables** – All HDMI cables are NOT created equal! When connecting your source unit and display device to the HDD-20 sender and the HDR-20 receiver, use HDMI cables that are specifically

labeled for “High Speed”. Additionally you will want to use HDMI cables that are as short as possible. Ideally they are 1 meter or less. There are many different makes, models and brands of HDMI cables available on the market, so always use the highest quality possible. While they may appear to look the same and many are highlighted with shiny “rare metal connectors”; the quality of these cables can vary greatly. Choose quality “High Speed” HDMI cables and don’t scrimp on the cost, as you don’t want the signal to drop out when the family is enjoying a premier of the latest 3D movie!

*Note: If you wish to utilize the Ethernet capabilities of your system, you will need to use High Speed HDMI Cable with Ethernet.*

## Connecting Your BVHD-20

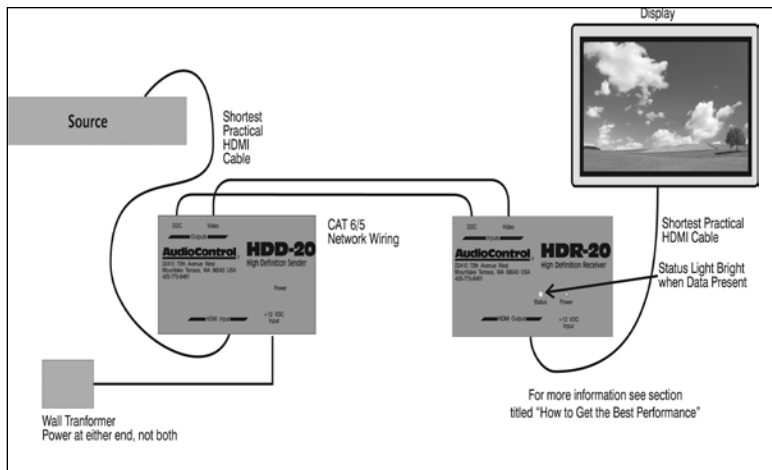
Once you have run the appropriate Cat-6 and HDMI cables, the overall cabling hookup for the BVHD-20 is simple.

1) The Driver (HDD-20) is connected to your source unit via a short, High Speed HDMI cable.

2) The Receiver (HDR-20) is connected to a display/projector (“sink” in HDMI parlance) via another short, High Speed HDMI cable.

3) Category 6 network cables should be used to connect the HDD-20 Driver and HDR-20 Receiver. ***We recommend you connect the “DDC” RJ-45 cable first to establish a good ground connection prior to connecting the “VIDEO” cable.***

4) Since BVHD-20 is an Active signal extender, we have provided an external power supply that must be plugged into a standard wall outlet. You can plug the power supply into either the HDD-20 or HDR-20, which will optimize your HDMI signal voltage.



# Troubleshooting The HDMI Signal Path

Sending HDMI signals involves the transmitting of data bits and error bits between devices. If there are more data bits than error bits, then you have music and video. If you have more error bits, then you have blank screens and quiet! Troubleshooting with HDMI is a challenge. Adding one more piece to the signal chain may mean that there is no picture and, in fact, the bulk of the problem is not coming from the last component added but another is causing most of the errors (such as the HDMI interconnect cable). While the BVHD-20 uses state of the art restoration techniques, 1080p demands the highest performance for all parts of the system; cables, connectors, etc. Here are some things you should consider with your installations:

**Firmware Updates** - The HDMI format is a very sophisticated protocol that require microprocessors in the source and displays units that operate via firmware. The complicated nature of these devices and the format can sometimes cause compatibility issues due to one device running on HDMI 1.1 and another on HDMI 1.2 etc. Fortunately electronics manufacturers regularly provide updates/upgrades for their products that will help optimize performance. You will want to contact the manufacturers of the source or display devices you are



using to make sure you have the most current firmware or visit their respective web sites. This is especially recommended if you are using cable or satellite boxes.

**Interoperability** - Not all early components with HDMI connectors are compatible with more recent components and content. This, usually, will be a problem with the display (or sink). Each HDMI component includes processors that have to handshake, negotiate and exchange EDIDs. Like the real world of politics, the negotiations are not always successful. A good practice is to hook up the source with the sink directly with a single HDMI cable before adding the BVHD-20 and check that those two devices (source and sink) are interoperable. For this test use a source and content with HDCP.

**Source Switching** - When sources are switched, there is a boot and negotiation process between source and sink microprocessors. While that is ongoing, there will be no picture for several seconds.

**HDCP Handshaking** - HDCP requires verification of digital rights continuously, not just at initiation. Any break in communication of two seconds or possibly less may require a re-initiation. Unplugging and re-plugging an HDMI cable causes that re-boot of the processors or the re-boot may happen automatically by the source and

the sink after several seconds.

**Status LED Dim or Off** - If you see this, try swapping the Cat-6 cables on either the Driver or Receiver end. Be careful that the correct Cat-6 cable plugged are plugged into the Driver end(s) and are also plugged in correctly at the Receiver end(s).

**Sparkles, Snow or Blinking Video** - This means you are right on the edge in terms of acceptable data transmission quality. Try shorter or better quality HDMI interconnects first. Then look at the section above on **Achieving Optimum Performance** from HDMI for hints. You may have this problem with more demanding content like games.

**No Picture** - Try connecting the HDD-20 and HDR-20 with shorter HDMI cables that are rated for High Speed With Ethernet. The next step may be to try a 1080i signal if you are using 1080p. To check the installed network wiring, run a new cable outside the walls on a temporary basis as a way of testing the in-wall cable.

**Cat-5 and Cat-6** - What do you do if you have one Cat 6 and one Cat 5 wire available? Use Cat-6 for Video and the Cat-5 for audio (DDC).

## Check Out HD Sleuth – AudioControl’s Ultimate Troubleshooting App



Given the complicated nature of HDMI protocols and signal extension, the rain-forest dwellers of AudioControl have created an “app” that can be used on most of today’s Smartphones. This clever app will walk you through all of the steps required so that you can achieve maximum performance and connectivity with your HDMI signals. For more information go to [www.audiocontrol-toolbox.com](http://www.audiocontrol-toolbox.com) and download accordingly. There is a small charge involved, but it will assist you in identifying many of the HDMI headaches that keep you up at night.

## A Brief Introduction to HDMI

HDMI® (High Definition Multimedia Interface) is a digital transmission protocol for video and audio built on the DVI format. Another example of an audio/video digital transmission protocol is Display Port. HDMI is usually paired with HDCP or High-bandwidth Digital Content Protection, which is a form of digital rights management.

The specifications of HDMI are tightly regulated and owned by a private group, the HDMI consortium. HDMI is a registered trademark of this group that charges fees for licensing.

*And now, a word from the legal department...*

## **CONDITIONAL FIVE YEAR WARRANTY**

Custom electronics installations are an invisible element of many modern homes. You don't appreciate what they do for you unless something goes wrong.

AudioControl recognizes this fact and engineers the most bulletproof components we know how. We stand behind that quality, with full FIVE-YEAR parts and labor factory warranty when our components are installed by an authorized AudioControl dealer in the United States. Otherwise your warranty is one year. You will be happy to know that our warranty returns are rigorously tracked and very few of the units we build ever need to be repaired.

Conditional doesn't mean anything ominous. The Federal Trade Commission tells all manufacturers to use the term to indicate that certain conditions have to be met before they'll honor the warranty. If you meet all of these conditions, we will warrant all materials and workmanship on your AudioControl Active Balanced product for FIVE YEARS from the date you bought it, and we will fix or replace it, at our option, during that time.

Here are the conditional conditions:

1. You need to register your purchase of this AudioControl component by going to the AudioControl web site ([www.audiocontrol.com](http://www.audiocontrol.com)), click on the "Distributed Audio" tab,

and then go to the “Warranty Registration” department by clicking on the appropriate text. Follow the directions and complete all of the information.

2. A sales receipt is required for proof of purchase showing when and from whom the unit was bought. We’re not the only ones who require this, so it’s a good habit to get into with any major purchase of consumer electronics.

3. Your AudioControl product must have originally been purchased from or installed by an authorized AudioControl professional. This warranty is transferable. You do not have to be the original owner, but you do need a copy of the original sales slip.

4. You cannot let anybody (A) who isn’t: the AudioControl factory or (B) somebody authorized in writing by AudioControl, service your product. If anyone other than (A) or (B) messes with your AudioControl product, that voids your warranty.

5. The warranty is also void if the serial number is altered or removed, or if the unit has been used improperly. Now that sounds like a big loophole, but here is all we mean by it:

Unwarranted abuse is: (A) physical damage (don’t use your AudioControl product to play fetch with your dog or level your kitchen table, jack up your car or keep the rain off your head); (B) improper connections (500 volts into the power jack can fry the poor thing); (C) sadistic things. This is the best product we know how to build, but if you mount

it to the filter pump of a hot tub, something will probably go wrong.

Assuming you conform to 1 through 5, and it really isn't all that hard to do, we get the option of fixing your old unit or replacing it with a new one.

### **Legalese Section**

This is the only warranty given by AudioControl. This warranty gives you specific legal rights that vary from state to state. Promises of how well your BVHD-20 will perform are not implied by this warranty. Other than what we have covered in this warranty, we have no obligation, express or implied. Also, we will not be obligated for direct or indirect consequential damage to your system caused by hooking up the AudioControl BVHD-20.

Failure to complete the warranty registration process negates any service claims.

# BVHD-20 Specifications

All specifications subject to change without notice, like the Pacific Northwest weather and HDMI versions.

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Video Format Supported	1080p(24/60)/1080i/720p/576p/480p/576i/480i
HDMI Features	Ethernet & Audio Return
Maximum Distances using CAT-6 Cabling	
1080p 60 Hz 10 bit color	100 feet
1080p 30 Hz 8 bit color w 3D	180 feet
1080p 60 Hz 8 bit color	180 feet
1080i/720p	250 feet
480p	350 feet
Signaling Rate	2.25Gbit/s
Maximum Deep Color	12 bit
Audio Formats Supported	DTS-HD, Dolby TrueHD
Output Video	HDMI 1.4
Input DDC Signal	5 volts p-p
CEC	Yes
Bandwidth	340 MHz
Dimensions	4" w X 2.2" d X 1.2" h
Weight (driver and receiver)	2 lbs
Country of Origin	USA
Power transformer	12 vdc 300 ma

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This manual was conceived, written and created during a cold, snowy, and icy week in the Pacific Northwest. Music was cranking, coffee was hot and the kids were sleeping.

**AudioControl**®

For Those Who Consider Perfection Possible®

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