ACTIVE-BALANCED SERIES

Installation and Operation Manual

BVD-10™

Cat-5 Balanced Video/Audio Driver

BVR-10™

Cat-5 Balanced Video/Audio Receiver

Thank you for choosing AudioControl for your video distribution needs. You are installing one of the most innovative custom installation products available. These units will make any video distribution system perform at its best by using the highest quality active circuitry, instead of lower performance passive systems.

Please take a moment to read through this manual before you charge off into the installation.

Balanced Video Series

- Allows Simple Distribution of High-Quality Video and Audio up to 1000 feet (305 meters)
- ***Active-Balanced*** Circuitry For Superior Signal Quality
- Easily Installs with Inexpensive Cat-5 UTP Wiring
- Automatically Adapts Composite to S-Video Signals
- Video Equalization and Gain for Cable Compensation
- Compatible with Composite, S-Video and Component Video

The Most Important Instruction Of All

FILL OUT AND SEND IN THE WARRANTY CARD! Also, save the invoice or sales slip as proof of purchase. These actions will protect this investment and help prove that such a handy piece of audio equipment was really in the system.

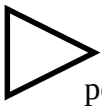
BEFORE YOU BEGIN

For the best product performance and the lowest use of pain-killers, nothing is better than a well-planned professional system installation. Before you start pulling wires, sketch out a full layout of the complete system. This will help plan the wire routing and minimize the "gotchas" later on. Happy installing.

Installation Notes

Mounting The BVD-10 / BVR-10

The small size and low power draw of these units allow them to be mounted in almost any dry indoor location. Pick mounting locations close to the units that will be connected to the BVD-10 or BVR-10. This keeps the unbalanced audio and video signal cables as short as possible since they are more susceptible to noise pickup than the balanced Cat-5 cables. There is no heat build-up problem, so it is okay to put the BVD-10/BVR-10 in a closed area. Just remember you need to at least be able to reach the units.



Important Note: When routing the 24 volt AC power wiring from the wall plug transformer; make certain that you do *not* run the power wiring near or parallel to the signal cables. You may pick up AC hum.

Wiring The System

Signal Wiring

The BVD-10 / BVR-10 system operates using standard unshielded twisted-pair (UTP) Category 5 wiring. Good wiring practices will minimize the chance of any noise pickup.

- Do not run the signal cables parallel to AC power wiring.
- If you need to cross over a power wire, try to do it at right-angles.
- Keep the signal wiring as far as possible from any noise sources such as lighting power supplies, fluorescent lights, motors, etc.

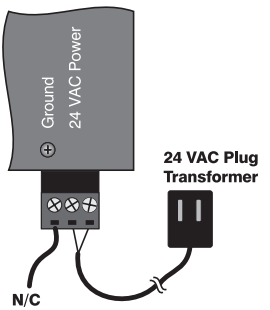
Grounding

If you use a shielded Cat-5 cable, then you need to be careful about ground loops. In some instances it is necessary to only connect the shield at the receive end of the balanced line and NOT on the other end. This provides a ground path for noise picked up by the shield, but it prevents a continuous signal ground path between the source and destination units.

Power Wiring

Important Note: Do not connect the power supply to the ground terminal.

The BVD-10 and BVR-10 operate from a 24 volt AC wall plug transformer. There is no polarity on the power wiring from the transformer so it can connect either way to the connector block on the unit. The power draw is very low on these units (each unit draws approximately 50 milliamps) so you can



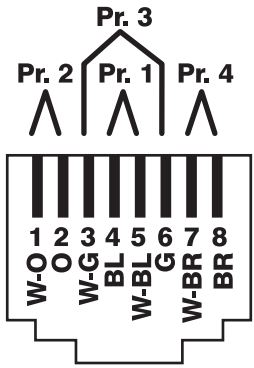
3 pin Weco with wires connected

tap the supply from another 24 VAC transformer if it's handy.

Handy Tip: For remote applications the BVD-10 and BVR-10 will work very well from a 12 volt battery supply. There is a small decrease in the maximum audio signal level headroom, but the video performance is unaffected by the reduced supply voltage.

Cat-5 Wiring

The RJ-45 connection on the BVD-10 and BVR-10 conform to the EIA-568B standard. This is the same Cat-5 cable wiring standard that a typical computer network utilizes. You can use any existing 10/100Base-T network cabling and patch bays in an installation as long as it does not run through a router or hub. The Cat-5 wiring must run directly from the BVD-10 to the BVR-10.

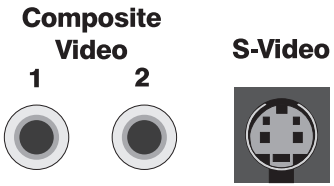


RJ-45 connector with wires

While the *Active-Balanced* video components are designed to operate with full-quality video on up to 1000 feet of CAT-5 wiring, it is possible to get a very usable image up to 2000 feet away. There will be a slight softening to the picture, but many people would not even notice this. If you require a high-quality image on an extended (over 1000 feet) run, then you should use a second pair of BVD-10/ BVR-10 as a repeater. This will provide the additional signal gain and cable compensation for the extra CAT-5 wiring.

Video Wiring

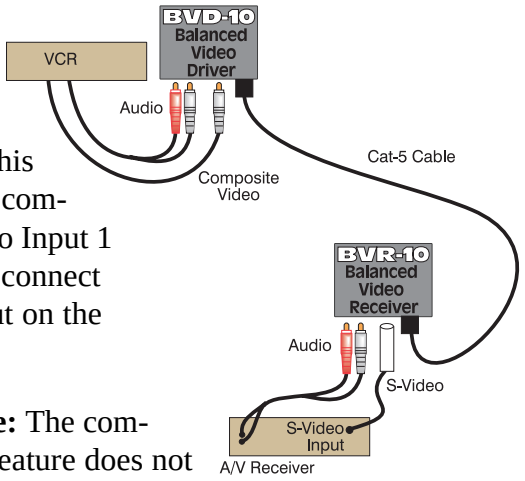
The BVD-10 and BVR-10 are capable of extending two video channels. This can be two separate composite video signals ***OR*** one S-video signal. The reason you are limited to one S-video signal is that it is actually comprised of two video signals; the Chroma and the Luminance. In applications where you need to extend a component video signal, you may use the RCA video inputs on two pairs of BVD/R. This gives you the 3 channels of video required (plus a spare).



Video connectors on BVD/R

Important Note: You cannot simultaneously use the Composite and S-video connectors on either unit.

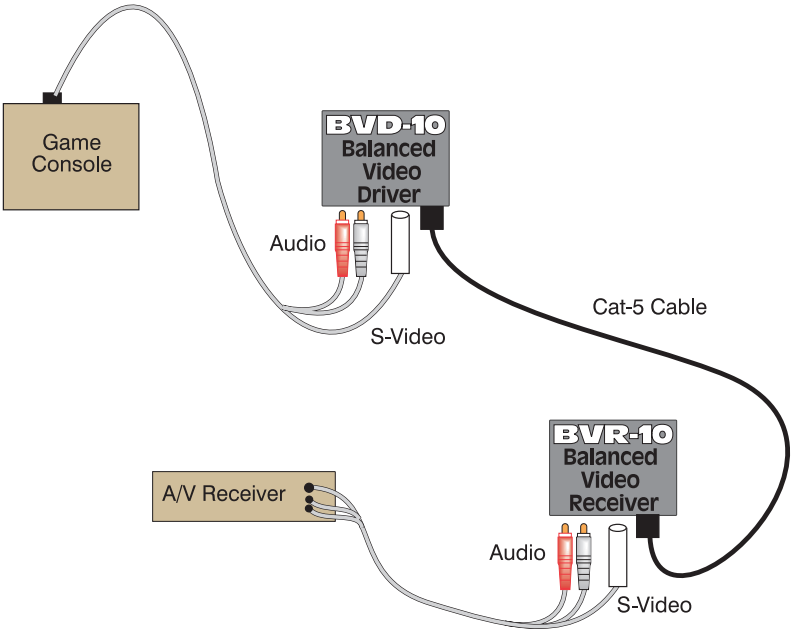
The BVD-10 and BVR-10 automatically adapt a composite video input on the BVD-10 to an S-video output on the BVR-10 (or vice versa). To use this feature, connect the composite video signal to Input 1 on the BVD-10 and connect to the S-video output on the BVR-10.



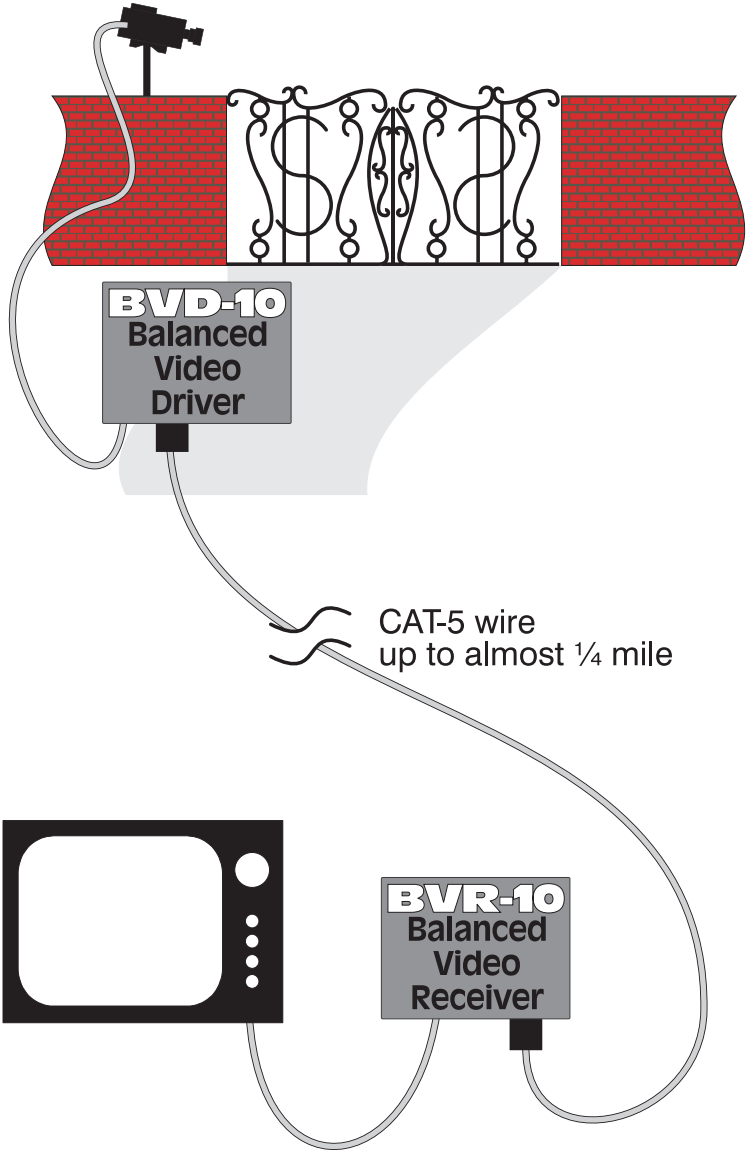
Adapting composite to S-video

Installation Note: The composite to S-Video feature does not function on Video Input #2.

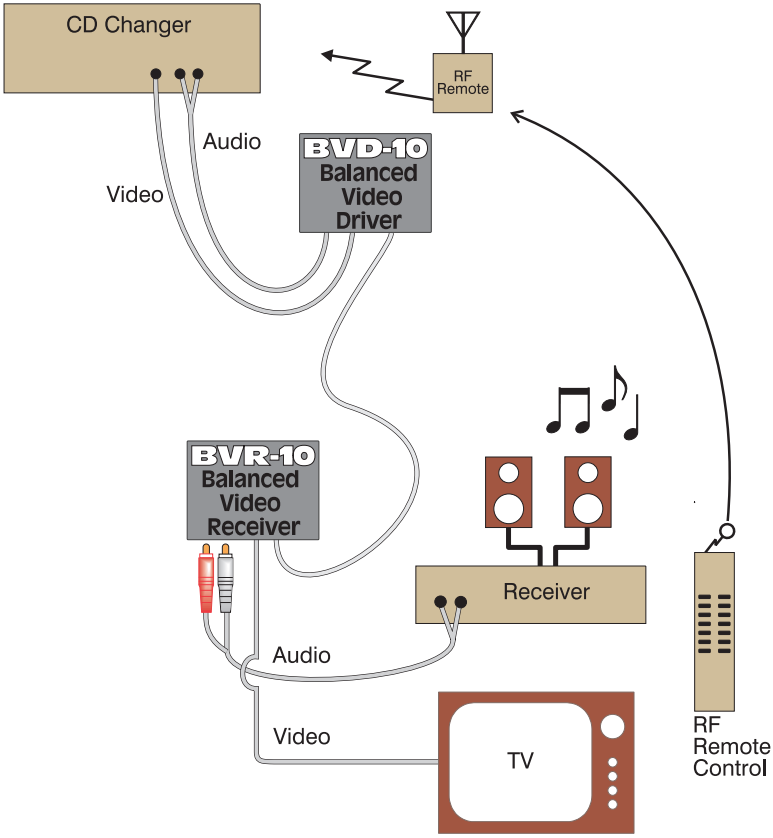
System Examples



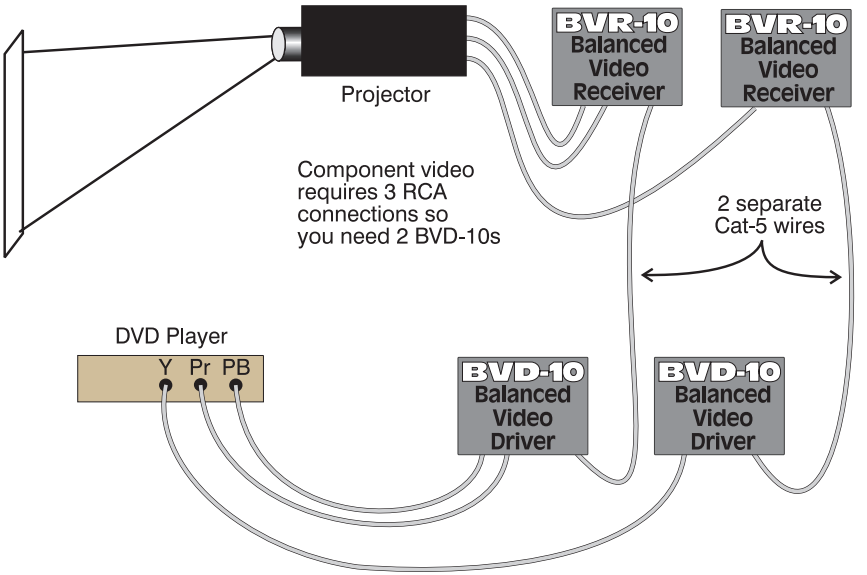
Extending the output of a high-end video gaming system



Security Cameras



Remote display of a music management system



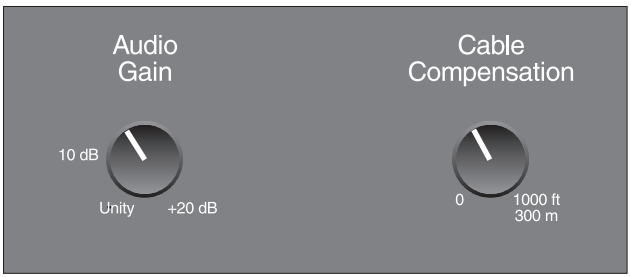
Component Video Estension

Important Note: Keep the two chroma signals (PB & PR) on the same BVD-10/BVR-10 pair

Adjusting the Controls

Properly adjusting the level controls will give you the highest headroom and the best signal to noise ratio. Please note that the BVD-10 **Audio Gain** control is capable of up to 20 dB of gain while the **Audio Output** level control on the BVR-10 is attenuate only. This minimizes the chance of system gain noise due to excessive gain at the receiving end of the balanced line. The two video adjustments work in a different manner. The **Cable Compensation** control on the BVD-10 equalizes the video signal to counteract the effect of wire capacitance. The **Video Level** adjustment on the BVR-10 increases the gain of the video signal to make up for line losses.

BVR-10 Controls



BVD-10 Controls

Audio Gain Adjustment – Simply use these controls to adjust the audio volume of the remote video source. We find that it is usually beneficial to apply some gain (about 6-10dB) at the BVD-10 driver end and then use the **Output Level** control on the BVR-10 to bring the volume back down to your desired level. This helps improve the overall signal-to-noise level of the audio system. The only time this additional gain may be a problem is using professional equipment with high (+4dBu) audio signal outputs.

Video Gain (Brightness) Adjustment – The video gain adjustment on the BLD-10 allows matching the picture brightness between the remote video signal and the local sources. As you increase the video gain, the picture becomes brighter. Toggle between a local video source and the remote source running through the BVD-10/BVR-10. Turn up the Video Gain control until there is no apparent change in picture brightness between the two sources.

Cable Compensation Adjustment – As the run length of a Cat-5 cable is increased, the additional cable capacitance causes a loss of picture quality. The *Active-Balanced* circuitry in the BVD-10 provides the means for correcting this with the Cable Compensation control. Note that this control is labeled in distance. Estimate approximately how long the cable run is from the BVD-10 to the BVR-10 (no need to be precise here) and adjust the **Cable Compensation** control for that distance. It is useful to have a video test signal or a television picture with strong vertical lines to make the final adjustments. Set the Cable Compensation control for minimum smearing along the vertical lines.

Troubleshooting

"No Picture or Sound."

1. Make certain the BVD-10 and BVR-10 both show power lights.
2. Verify that the Cat-5 cable is properly terminated on both ends.
3. Verify the signal connection cables.
4. Make certain the Cat-5 cable run does NOT go through an Ethernet Router or hub. It is alright to run the signal through a passive patch bay.

"No Power Light."

1. Make certain the two wires from the power supply are connected to the **24 VAC connections** on the terminal block. Do not connect the external power supply to the Ground terminal on the 3 pin connector block. This is for shielding purposes only.
2. Double-check that the power supply is plugged in and that the outlet has power.

"The video picture is dark."

1. Turn up the Video Gain adjustment on the BVR-10.

"The picture on my TV is fuzzy."

1. Adjust the Cable Compensation control on the BVD-10. This compensates for the increased capacitance on longer Cat-5 cable runs and sharpens the video image.

"There is hum in the audio signal."

1. Verify that the Cat-5 cable is properly terminated on both end.
2. Make certain that the system is wired with twisted-pair cabling.
3. Try turning up the output level on the BVD-10 driver.
4. Make certain there is not a cut in the wiring allowing a conductor to short to ground (i.e. shield, conduit, cold water pipe, plenum).

"The sound is distorted."

1. The output level on the BVD-10 may be set too high.
2. The signal level feeding into the unbalanced RCA audio inputs of the BVD-10 is too high (not likely with consumer grade equipment).

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 bullet-proof components we know how. To stand behind that quality, we provide a full FIVE YEAR parts and labor factory warranty. Our warranty returns are rigorously tracked and less than 0.5% of all 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 the BVD-10 / BVR-10 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. A completed warranty card must be returned to us within 15 days after signing off on the BVD-10 / BVR-10 installation.
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.
3. The BVD-10 / BVR-10 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 who isn't: (A) the AudioControl factory or (B) somebody authorized in writing by AudioControl to service your BVD-10 / BVR-10. If anyone other than (A) or (B) messes with your BVD-10 / BVR-10, that voids your warranty.
5. The warranty is also void if the serial number is altered or removed, or if the BVD-10 / BVR-10 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 the BVD-10 / BVR-10 to level out a bookcase); (B) improper connections (120 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 BVD-10 / BVR-10 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 BVD-10 or BVR-10.

Failure to send in a properly completed warranty card negates any service claims.

Repair Information

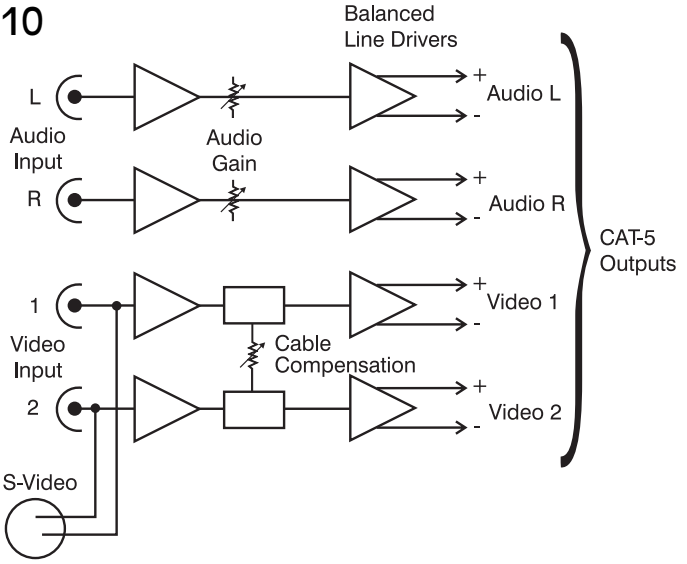
In the unlikely instance that you ever need to have your AudioControl component repaired. Please contact our factory for return instructions. All repairs are handled quickly at our factory (most take less than 2 days). You are responsible for paying the freight charges to our factory. If your unit is under warranty, we'll pay to ship it back to you the same method that you sent it into us. Please make certain that you include a note stating the problem with the unit (you'd be surprised how many people forget that) along with your name, return shipping address and a daytime telephone number.

Our Repair Address is:

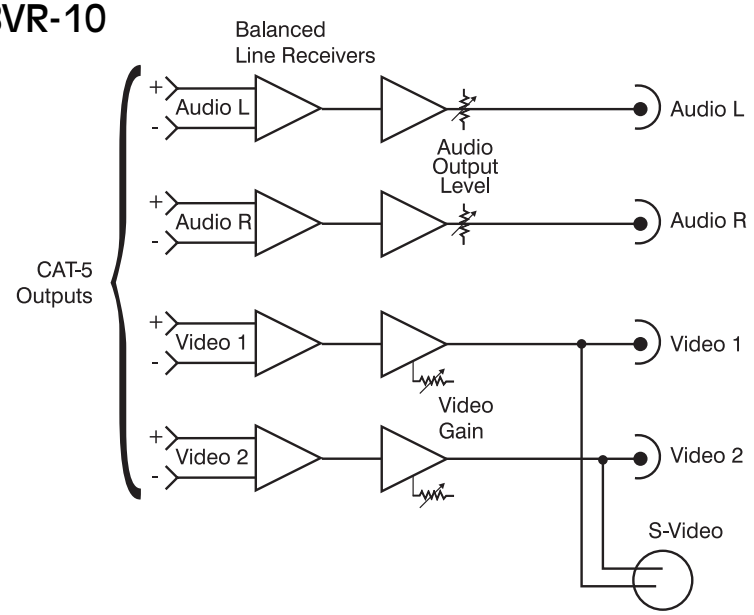
AudioControl
Attn: Service Department
22410 70th Avenue West
Mountlake Terrace, WA 98043
Phone 425-775-8461
Email: service@audiocontrol.com

Block Diagrams

BVD-10

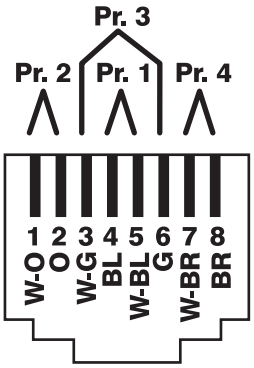


BVR-10



EIA-568 RJ-45 Pin Connection Diagram

Pair 1	White-Blue (W-BL) Blue (BL)	Audio Left – Audio Left +
Pair 2	White-Orange (W-O) Orange (O)	Video 1 + Video 1–
Pair 3	White-Green (W-G) Green (G)	Audio Right + Audio Right –
Pair 4	White-Brown (W-BR) Brown (BR)	Video 2+ Video 2 –



Specifications

Configurations	
BVD-10 Balanced Video/Audio Line Driver	
BVR-10 Balanced Video/Audio Line Receiver	
Video Channels	2
Video Bandwidth	100 MHz @ -3 dB
Video Output Voltage	2 V_{rms} maximum
Video Slew Rate	800 V/uS
Video Input Impedance	75 ohms (BVD-10)
Video Output Impedance	75 ohms (BVR-10)
Video Connections	RCA x 2, S-Video x 1
Audio S/N	95 dB ref. 1 Volt
Audio Channels	2
Audio Signal Level	3 V_{rms} maximum
Audio Input Impedance	20 Kohms (BVD-10)
Audio Output Impedance	150 ohms (BVR-10)
Audio Connector	RCA x 2
Channel Separation	> 75 dB @1 kHz
Cat-5 Cable Connection	RJ-45 EIA-568 Standard
Maximum Cat-5 Cable Run	1000’ (305 Meters)
Power Supply	24 VAC
Power Draw	50 mA
Dimensions	4”H x 5.2”W x 1.2”D
Warranty	5 Years

Units are supplied with 24 VAC wall plug transformer

AudioControl®

22410 70th Avenue West
Mountlake Terrace, WA 98043 USA
Phone 425/775-8461 • FAX 425/778-3166
Internet http://www.audiocontrol.com

P/N 9130670