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# **ACTIVE-BALANCED SERIES**

## **Installation and Operation Manual**

### **BVD-20™**

Component Video/Digital Audio Driver

### **BVR-20™**

Component Video/Digital Audio Receiver

**T**hank you for choosing an AudioControl Active-Balanced product for your video and audio distribution needs. You are installing one of the most innovative custom installation products available. These units will allow you to transmit video and audio signals over standard Category 5 wiring by using the highest quality active circuitry. Please note that these products are primarily designed for installation by professional audio video companies so if any part of this manual is not clear . . . STOP WHAT YOU ARE DOING! Contact your nearest audio video installation company or call us and we will refer you to one. Plasma monitors and DVD players are too expensive to damage so don't attempt anything you are unfamiliar with.

Now sit back, grab a cold beverage and take a moment to read through this manual before you charge off into the installation.

# **ACTIVE-BALANCED SERIES**

## **Balanced Video Series**

Here are some of the cool features for your new balanced video and audio products:

- Allows Simple Distribution of High-Quality Component Video and Audio signals up to 1000 feet (305 meters)
- Uses Standard, Inexpensive, Twisted-Pair Cat-5 type Cabling
- 300 MHz of video bandwidth - compatible with 480, 720, and 1080 formats
- Will transmit High Definition (HD) signal up to 300' via CAT-5 wiring
- Can also transmit a digital audio or composite video signal
- Standard EIA-568 RJ-45 Cat-5 Connection Jack
- Adjustable Cable Compensation Circuit
- Five Year Warranty

## **The First Step In Your Installation Procedure**

**FILL OUT AND SEND IN THE WARRANTY CARD!**

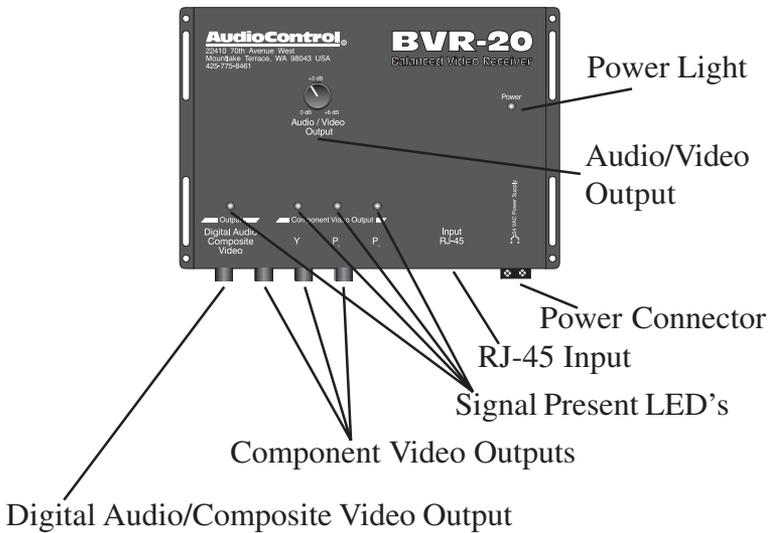
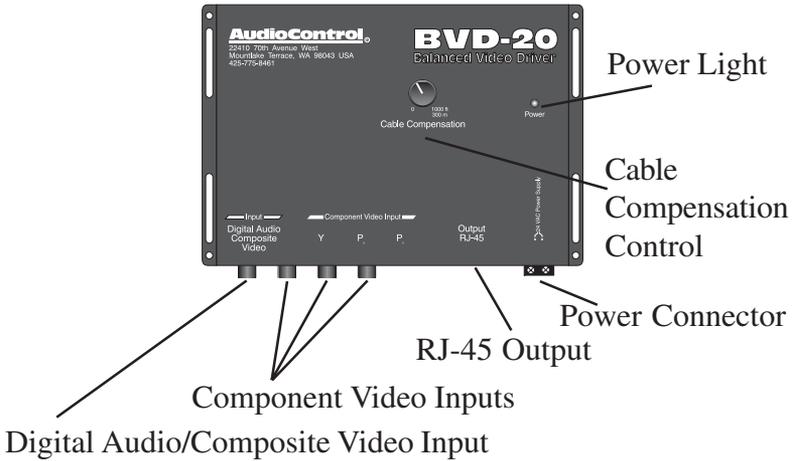
Also, save the invoice or sales slip as proof of purchase. These actions will protect this investment and help prove that such a handy piece of audio equipment was really in the system. Insurance companies can have such little imagination when you are trying to make a claim.

## **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 and punching holes in the walls, sketch out a full layout of the complete system. This will help plan the wire routing and minimize the “gotchas” later on.

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## A Quick Tour Of The BVD-20 and BVR-20



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## Installation Information

### Mounting The BVD-20 / BVR-20

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 audio or video components that will be connected to the BVD-20 or BVR-20. This keeps the unbalanced audio and video signal cables as short as possible since they are much 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-20/BVR-20 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. Tests have shown however that you will not pick up songs from the group AC/DC.

### Signal Wiring

The BVD-20 / BVR-20 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.

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## **Grounding**

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

## **Power Wiring**

▶ **Important Note:** The BVD-20 and BVR-20 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 150 milliamps) so if necessary you can run as many as two AudioControl BVD-20/BVR-20s from one 24 VAC transformer.

▶ **Handy Tip:** For remote applications the BVD-20 and BVR-20 will work 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:**

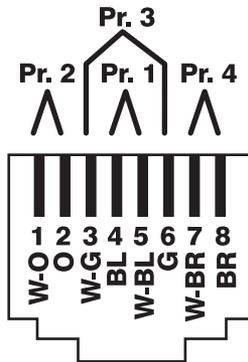
The RJ-45 connection on the BVD-20 and BVR-20 conform to the EIA-568B standard. This is the same Cat-5 cable wiring standard that a typical computer network utilizes. You can use any existing 10/100Base-T network cabling and patch bays in an installation as long as it does not run through a router or hub. The Cat-5 wiring must run directly from the BVD-20 to the BVR-20.

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**Note:** *You cannot split or “Y-off” the video signal coming out of your BVD-20 into multiple BVR-20s as the video signal will be compromised.*

## Video Wiring:

The BVD-20 and BVR-20 has 4 high bandwidth inputs and outputs that are capable of extending one component video signal (3 connector) plus a composite video signal on the remaining RCA connector. Each RJ-45 connector uses 2 wires of the Cat-5 bundle for a total of eight for the four video channels. As an option, you can use the fourth RCA connector on your BVD-20 and BVR-20 to transmit a digital audio signal such as Dolby Digital or DTS. The following system drawings reflect just a few of the potential systems:

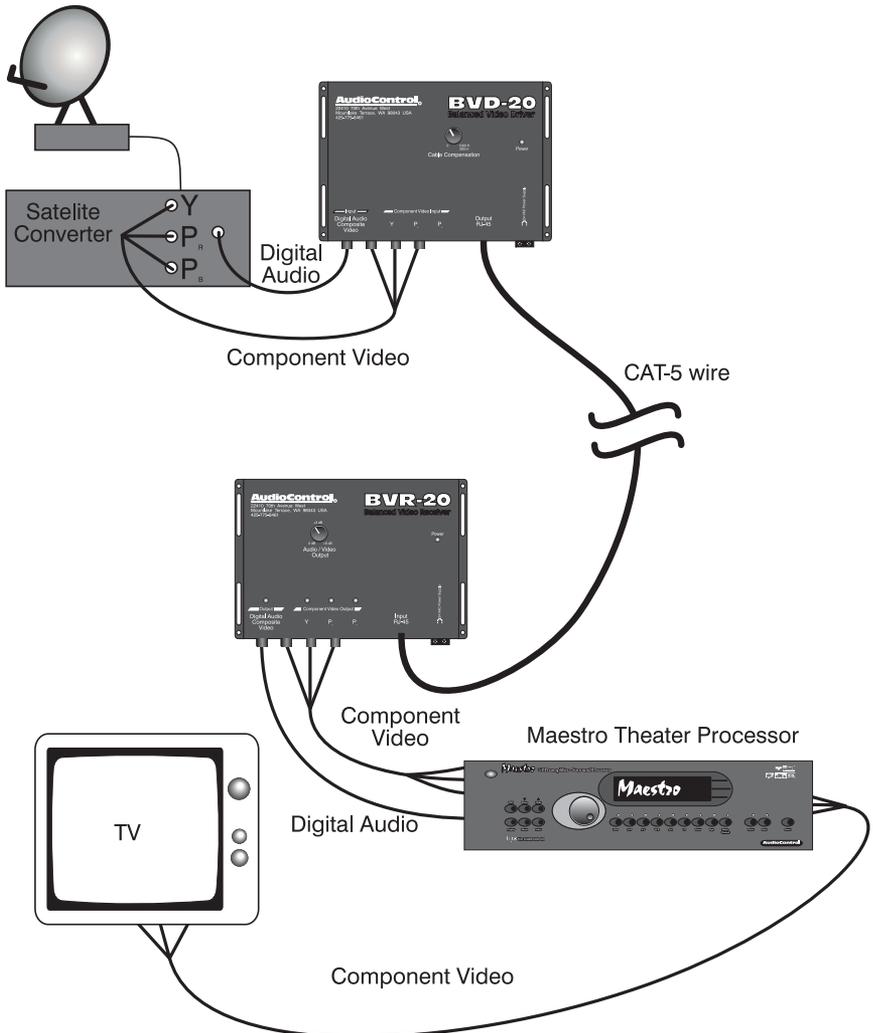


*RJ-45 connector with wires*

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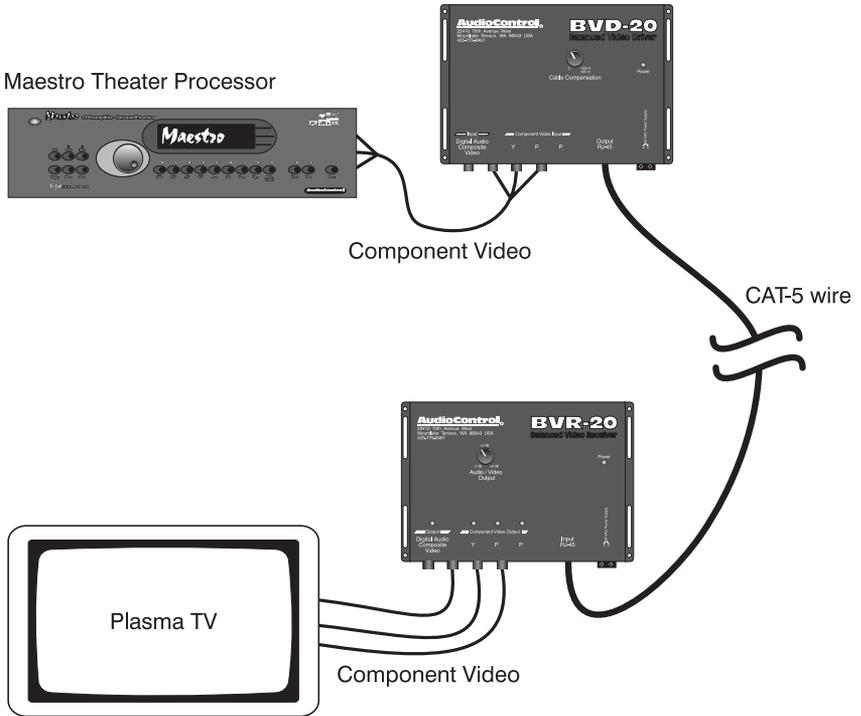
## System Examples

**System 1:** Sat Receiver sending component video and digital audio to Maestro via BVD-20 to BVR-20



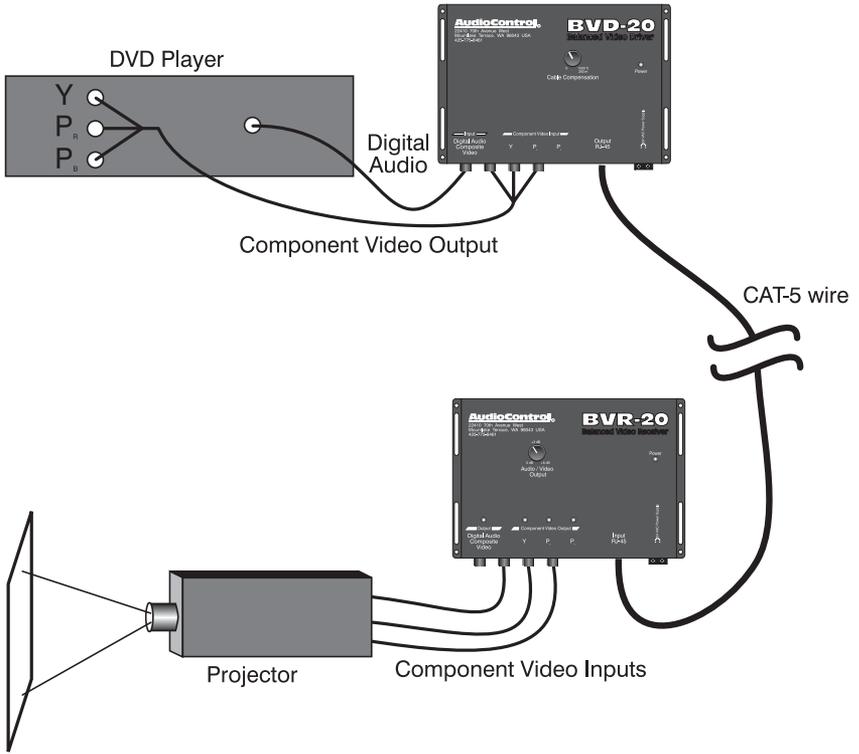
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**System 2:** Theater processor sending component video to video projector/plasma display via BVD-20 to BVR-20 to projector.



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**System 3:** DVD server sending component video and digital audio to processor via BVD-20 and BVR-20



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## **Adjusting the Controls**

Properly setting the controls on your BVD-20 and BVR-20 will give you the maximum performance. Although they do come “pre-set” from the factory with many of the internal enhancements at optimum levels, we have no way of knowing the exact length of cabling that you will be using. Therefore we have provided a few simple controls for you to assist in the optimization of your system:

**Cable Compensation:** The **Cable Compensation** control on the BVD-20 equalizes the video signal to counteract the effect of wire capacitance. 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-20 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-20 to the BVR-20 (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.

**Audio/Video Output:** Simply, this control on the BVR-20 adjusts the output level or gain on all four of the RCA connections. This level control helps make up for any “wire resistance” signal losses that may occur due to the length of the Cat 5 wiring.

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## Troubleshooting

### *“No Picture or Sound.”*

1. Make certain the BVD-20 and BVR-20 both show power lights.
2. Verify that the RJ-45 termination on both ends of the Cat-5 is correct.
3. Verify that the Signal Present LEDs are lit on the BVR-20.
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.

### *“Video picture scrambled or colors incorrect”*

1. Confirm that the “Y”, “P<sub>B</sub>”, and “P<sub>R</sub>” connections are correct.
2. Check the Cat-5 wire configurations

### *“No Power Light.”*

1. Confirm that the power supply is plugged in and that the outlet has power.

### *“The picture on my TV is fuzzy.”*

1. Adjust the Cable Compensation control on the BVD-20. This compensates for the increased capacitance on longer Cat-5 cable runs and sharpens the video image.
2. Confirm the cable length. It is important to note that the BVD-20 and BVR-20 were designed for cabling no longer than 1000’ for standard component video or 300’ for a High Definition signal.

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*“There is hum in the audio signal.”*

1. Verify that the Cat-5 cable is properly terminated on both ends.
2. Make certain that the system is wired with twisted-pair cabling.
3. 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).
4. If it is being used, make sure the shield wire is not connected only at the receiving end.

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*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 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 the BVD-20 / BVR-20 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-20 / BVR-20 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-20 / BVR-20 must have originally been purchased from or installed by an authorized AudioControl

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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-20 / BVR-20. If anyone other than (A) or (B) messes with your BVD-20 / BVR-20, that voids your warranty.

5. The warranty is also void if the serial number is altered or removed, or if the BVD-20 / BVR-20 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-20 / BVR-20 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-20 / BVR-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 BVD-20 or BVR-20.

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

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## **Repair Information**

In the unlikely instance that you ever need to have your AudioControl component repaired. Please contact our factory for return instructions. Repairs are handled quickly at our factory. 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:

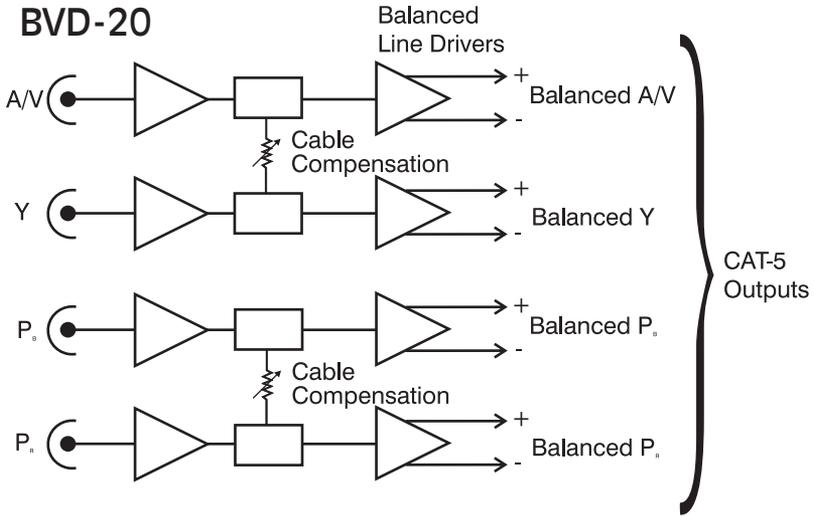
AudioControl  
Attn: Service Department  
22410 70th Avenue West  
Mountlake Terrace, WA 98043  
Phone 425-775-8461  
Email: [service@audiocontrol.com](mailto:service@audiocontrol.com)



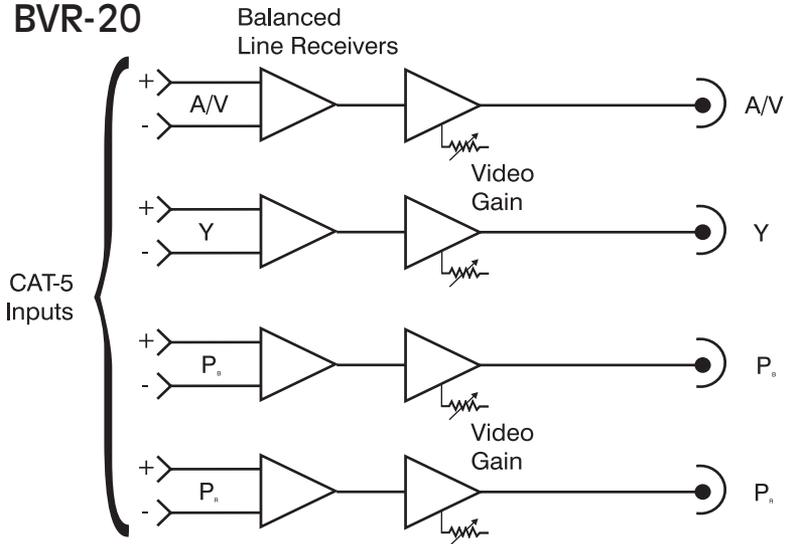
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## Block Diagrams

### BVD-20



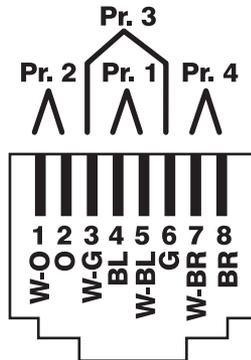
### BVR-20



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## EIA-568 RJ-45 Pin Connection Diagram

Pair 1	White-Blue (W-BL) Blue (BL)	Video 4 – : <i>Audio/Video</i> Video 4 + : <i>Audio/Video</i>
Pair 2	White-Orange (W-O) Orange (O)	Video 1 + : <i>Component Y</i> Video 1 – : <i>Component Y</i>
Pair 3	White-Green (W-G) Green (G)	Video 2 + : <i>Component P<sub>B</sub></i> Video 2 – : <i>Component P<sub>B</sub></i>
Pair 4	White-Brown (W-BR) Brown (BR)	Video 3 + : <i>Component P<sub>R</sub></i> Video 3 – : <i>Component P<sub>R</sub></i>



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## **BVD-20/BVR-20 Specifications**

All specifications are measured with supplied 110 to 24 VAC wall lug transformer. As technology advances, AudioControl reserves the right to continuously change our specifications, like our weather.

<b>Video Channels</b>	<b>Component</b>
Video Bandwidth	300 MHz @ -3 dB
Component Video Connections	RCA
Video Slew Rate	1600 V/uS
Video Input Impedance	75 ohms (BVD-20)
Video Output Impedance	75 ohms (BVR-20)
Digital Audio Input Impedance	75 ohms
Digital Audio Output Impedance	75 ohms
Digital Audio Connector	RCA
Cat-5 Cable Connection	RJ-45 EIA-568 Standard
Optimum Cat-5 Cable Run	
Component video	1000'
HD (1080i/29)	300'
Power supply	24 VAC
Power draw	50 mA
Dimensions	4"H x 5.2"W x 1.3"D
Warranty	5 Years

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