

UVA-4



UVA-8



UVA-4 & UVA-8

4 or 8 Channel Splitter

PC Video and Audio over Twisted-Pair

CUSTOMER SUPPORT INFORMATION

Order toll-free in the U.S. 800-959-6439
FREE technical support, Call **714-641-6607** or fax **714-641-6698**
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UMA1189 Rev. NC

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FEDERAL COMMUNICATIONS COMMISSION

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This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio communication. This equipment is designed to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are intended to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



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1. Introduction

1.1 General

This User Manual applies to model number UVA-4 and UVA-8 series of high resolution PC or HDTV component audio and video systems.

These devices are four (4) or eight (8) Channel Splitters for PC Video & audio over Twisted-Pair senders

In a typical application, they are located at the video & audio source and connected to one or more compatible receiver units.

Low-skew UTP cable (such as Hall Research's Zero-skew™ CAT5 cable) is recommended for the URA particularly if cable lengths are 200 feet or longer.

1.2 Features

- 4 channel (UVA-4) or 8 channel (UVA-8) splitter versions
- Support for local monitor and audio at transmitter
- Transmits video and audio on a single CATx cable
- Supports resolutions up to 1920x1440 at any refresh rate
- Compact & rugged metal enclosure
- Eliminates the need for bulky, expensive and hard to build multi-coaxial cables for High-Resolution A/V extension
- Amplifies the signal for clean and crisp transmission
- Differential signaling eliminates ground loops and noise
- Rugged, Reliable, Compact size
- Drive standard Cat5 cables to 1,000 feet depending on resolution

2. Installation

2.1 Package Contents

Your package should contain the following items:

- (1) UVA – 4 or UVA-8
- (1) Universal power supply (6 VDC @ 1.5A) with IEC320 Power Cord
- (1) 6 ft HD15-M-M VGA cable
- (1) 6 ft 3.5mm – MM Audio cable
- (1) User manual.



2.2 Connection to Compatible Receivers

The UVA-4 and UVA-8 units have single UTP cable connections to any of Hall Research's compatible URA receiver product line.

Some compatible receivers are:

PART NUMBER	
URA URA-SKU URA-XT	
URA-232 URA-232-XT <small>RS232 is Not Functional</small>	

Table 2 – Compatible Receivers

- ❑ Connect the UTP cable from each compatible URA receiver to the “UTP OUT” connectors of the UVA-4 or UVA-8.
- ❑ Connect the HD15 - “PC/HDTV IN” connector on the splitter to the video source. For YPbPr video sources, use a 3-RCA to HD15 cable (Hall Research P/N CHD15-RGB).
- ❑ Connect the 3.5mm - “AUDIO IN” connector to the audio source or other sound equipment.
- ❑ Connect the included power supply to the 2.5mm – center positive +6 VDC power input connector on the unit.
- ❑ **Never use any other supply as this may damage the device.**

2.3 Cable Requirements

All units can use CAT5/5e/6 or Zero-Skew™ UTP or STP (unshielded or shielded twisted pair) cables.

2.4 Typical Block Diagram for UVA-4 or UVA-8

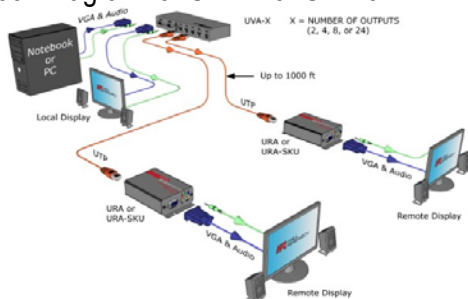


Figure 2 – UVA-4 & UVA-8 Application Diagram

3. Configuration & Operation

3.1 Why Cable Compensation?

All cables attenuate (reduce) the high-frequency components of the video signal that is being transmitted. The longer the cable, the more signal loss. If not compensated for, this signal loss will result in blurry and smeared images being displayed.

The image quality depends on the resolution and level of detail in the image. The Hall Research URA series of receivers have one of the most precise and complex equalization techniques in the industry and allow full recovery of the original signal's bandwidth.

It is best to make this adjustment using a test pattern that is designed to depict and exaggerate this effect.

Some Hall Research senders may have a built-in test pattern generator. If your sender unit is equipped with this feature, simply activate it on the sender. Otherwise, you can connect a PC to the source and display a test pattern. A sample test pattern is available at <http://www.hallresearch.com/skew.htm> to assist in the adjustment of the compensation and to evaluate the amount of color skew in the installation.

The table below lists the recommended maximum distances from sender to the receiver depending on the resolution used.

		Refresh Rate	
		60 Hz	75 Hz
Resolution	800x600	1000 ft	1000 ft
	1024x768	1000 ft	850 ft
	1280x1024	850 ft	750 ft
	1920x1200	750 ft	700 ft

Table 3 -
Recommended maximum
CATx cable length from
sender to the receiver

3.2 Compensation Adjustment Procedure on URA Receivers

- If possible, display a video test pattern on your video source when adjusting the URA receiver. This allows the user to properly adjust the receiver to optimal conditions.
- Apply power to the receiver. Wait until all LED's are turned off
- Press the **SEL** button once to enter **Adjustment-mode**.
- In **Adjustment-mode**, all three (3) LEDs will be illuminated.
- The UP or DOWN buttons can now be used to adjust the high frequency (HF) compensation up or down until the video no longer looks smeared (see figure below).
- While using the UP and DOWN buttons, if an upper or lower limit of adjustment is reached, the LED's will blink for each continued press of the UP or DOWN button.
- Pressing both the UP & DOWN buttons together will reset the high frequency (HF) compensation back to zero.
- To exit the **Adjustment mode** at any time, press the **SEL** button until all LED's are OFF (the unit also has a built-in 1 minute timeout)

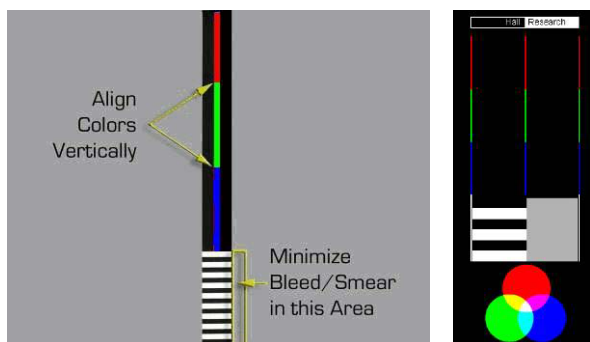


Figure 3 - Typical test patterns used for adjusting compensation

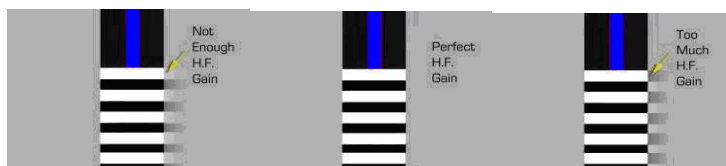


Figure 4 - Effect of adjustment on the smearing

3.3 Advanced Brightness Adjustment on URA Receivers

The URA series of devices can equalize the brightness of the video by reducing smearing.

- Apply power to the receiver. Wait until all LED's are turned off
- Press the SEL button once to enter **Adjustment-mode**.
- In **Adjustment-mode**, all three (3) LEDs will be ON solid.
- Press and hold the SEL button for at least 3 seconds to enable the **Video Brightness Adjustment Mode** (previously called Wire Gauge Mode).
- In **Video Brightness Adjustment Mode**, the GREEN and BLUE LED's will be blinking.
- The UP button raises the video brightness level.
- The DOWN button lowers the video brightness level.
- Pressing BOTH the UP and DOWN buttons at the same time will reset the Video Brightness to the default setting.
- While using the UP and DOWN buttons, if an upper or lower limit of the adjustment is reached, the brightness will no longer change with each button press.
- To exit the **Video Brightness Adjustment mode** at any time, press the SEL button until all LED's are ON solid (**Adjustment-mode**). Press the SEL button repeatedly until all LED's are OFF indicating the unit is ready for operation. (The unit will automatically return to this mode after 1 minute if no buttons are pressed).

Note

The Video Brightness adjustment may not be noticeable when only using 1 device. When products are daisy-chained using the -XT version the adjustment is easier to observe.

3.4 Why Skew Adjustment?

UTP cables have 4 twisted pairs inside. The Hall Research UVA/URA video transmission on UTP uses 3 individual pairs for each color (Red, Green, & Blue).

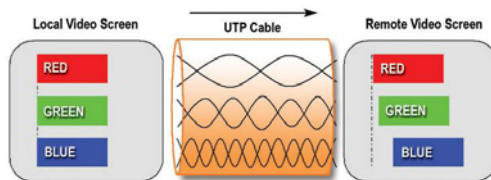


Figure 5 - skew mechanism, example

As shown in the figure above, a characteristic of CAT5/5e/6 cable is that the pairs of wires twist at different rates.

Therefore, for a given length of CAT5/5e/6 cable the total length of any particular pair could be longer than other pairs in the same cable. Since the signals travel along the length of each pair at a fixed speed, the arrival times of signals will be skewed in a long cable (those that have to travel farther arrive later and the corresponding color shifts to the right). This is viewed on the monitor as separation, or lack of convergence in colors. For example, a vertical white line on the screen may look to have a red tinge on the left edge and blue tinge on the right edge. This effect gets worse at high resolutions, high refresh rates, long cables (in excess of 200 feet), and depends on the cable construction itself.

If you are using special UTP cables that are specifically designed for video transmission (such as Hall Research Zero-Skew™), then there should be no shift in color alignment regardless of the cable length. However, in many applications standard and common CAT5/5e/6 cables can be utilized, this will necessitate a receiver that can also move each color component to the left and right in order to realign them.



300 ft of CAT6 (1280x1024 source)

* actual zoomed photo of screen *



After skew adjustment



Figure 6 – Example of Skew manifested

3.5 Skew Adjustment for URA-SKU and URA-XT Receivers

URA-SKU and URA-XT receivers have the ability to adjust for cable skew in the individual colors.

- Apply power to the receiver. Wait until all LED's are turned off
- Press the SEL button once to enter **Adjustment-mode**.
- In **Adjustment-mode**, all three (3) LEDs will be ON.
- Press the SEL button once to enter the **Adjustment mode**. Press the SEL button again to light only one of the (3) Red, Green or Blue LEDs. As you press SEL the Red, Green, and Blue LEDs will light up one at a time.
- The **UP** and **DOWN** buttons are used to move the selected color component to the left and right. Pressing both buttons at the same time resets all skew adjustments.
- While using the UP and DOWN buttons, if an upper or lower limit of adjustment is reached, the LED's will blink for each continued press of the UP or DOWN button.
- To exit the **Adjustment mode** at any time, press the SEL button until all LED's are OFF (the unit also has a built-in 1 minute timeout).

3.6 Signal Adjustment for the Daisy Chain

There are no specific procedures for adjusting the URA-XT's other than the order of adjustment.

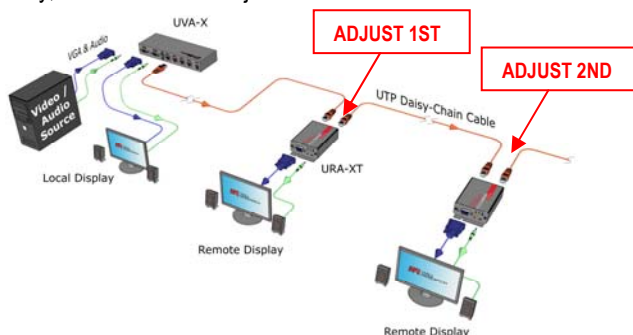
The URA-XT's RJ45 (CATx) output is the video signal AFTER IT HAS BEEN ADJUSTED.

The receiver unit closest to the sender must be adjusted first.

Set the high frequency compensation first and then adjust the skew. Since the effects in the daisy chain are cumulative, we recommend that you adjust the brightness (see section 3.3 above).

Remember, if the calibration is off on a URA-XT in the middle of a daisy chain and you adjust the device settings you must then check the rest of the downstream devices and if necessary; make additional adjustments on those devices as well.

Figure 7 –
Daisy-Chain
adjustment



4. Troubleshooting

There are no field serviceable parts or circuits in the device.

Opening the unit will void the warranty.

If you think the device is malfunctioning (or you have no picture output), please try to use the methods described in Section 4.3 below to obtain a picture first.

4.1 Contacting Hall Research

If you determine that the UVA-4 or UVA-8 is malfunctioning, do not attempt to repair the unit instead, contact Hall Research Technical Support at 714-641-6607.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description.

4.2 Shipping and Packaging

If you need to transport or ship your unit:

- Package it carefully. We recommend that you use the original container.
- Before you ship the units back to Hall Research for repair or return, contact us to get a Return Authorization (RMA) number.

4.3 Problem Solving FAQ

1. **Fuzzy, blurry, or ghosting image at remote location**

If you have a stable image but it looks somewhat blurry (edges are not sharp), make sure that you have adjusted the receiver unit's HF compensation correctly. In addition, check the recommended table of max distance vs. resolution to see that you have not exceeded the maximum recommended cable lengths. If you still have a fuzzy image, try reducing the refresh rate and/or resolution of the video source.

2. **Image exhibits steady or rolling horizontal color "hum" bars**

This is usually an indication of improper grounding at the sending end, the receiving end, or both. Verify that the AC line is properly wired and that a protective ground (green) wire is established with NO potential difference between both the sender and receiver locations. The UTP splitter can handle up to 5 volts peak-to-peak of ground noise between the two locations, but ground potential differences more than this can show up on video.

3. **Shaking image or periodically blanking monitor**

Inherently, balanced signal transmission over twisted pair offers good immunity to EMI coupled noise from other external sources. However, a strong electromagnetic noise field can cause instability in the signal. Usual sources are high power AC lines or data and/or control cables that run adjacent to and parallel with a substantial length of the CAT5 cable. To eliminate this, either place a distance between the CAT5 cables from the sender and the interfering source, or use shielded twisted pair (STP) CAT5 cables.

4. **Poor audio quality at the receiving end**

Only use powered speakers with the splitter and receivers. It is also good practice to set the audio level (volume) output of the PC about 1/2 to 2/3 from the maximum and use the volume knob of the speakers to adjust the volume to the desired level. A low volume signal output from the PC reduces the signal-to-noise (S/N) ratio, whereas too high output amplitude can cause saturation and clipping to occur.

5. Specifications

Video

Gain	Unity
Number/signal type	1 analog signal input. Standard VGA output RGBHV, RGBS, RGsB, RsGsBs, component video (bi-/tri-level sync)
Connectors	(4 or 8) female RJ-45 output (1) HD15 video input (1) HD15 local video output
Nominal amplitude	1 V p-p for Y of component video 0.7 V p-p for RGB and for Pr and Pb of component video 4.0 V to 5.0 V p-p, for TTL Sync signals of RGBHV, RGBS
Impedance	75 ohms
Maximum resolution	Up to 1920x1200 and 1080p dependent on cable length
Sync Polarity	Positive or negative

Audio

Gain	Unbalanced output: 0 dB
Connectors	(1) 3.5mm Audio Input (1) 3.5mm local Audio Output
Frequency response	20 Hz to 20 kHz, ± 1 dB
Connector	(1) 3.5 mm connector
Type	Monaural, Simulated Stereo
THD + Noise	0.2% @ 1 kHz, 0.3% @ 20 kHz at nominal level

General

Recommended cable	Varies by model, Model URA greater than 200 ft should use - Hall Research's Zero-skew™ CAT5 cable
Power Supply	100 VAC to 240 VAC, 50-60 Hz, external; 6 VDC regulated
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, non-condensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, non-condensing
Enclosure type	Steel
Dimensions	1.66" H x 8.42" W x 2.60" D - Depth excludes connectors (42.2 mm H x 214 mm W x 66 mm D)
Product weight	1.5 lb (0.68 kg)
Shipping weight	3.0 lbs (1.36 kg) (UVA-4) 4.0 lbs (1.81 kg) (UVA-8)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Safety	CE
EMI/EMC	CE, FCC Class A
MTBF	90,000 hours (Calculated Estimate)
Warranty	2 years parts and labor

Specifications are subject to change without notice



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