Compact CAT5 Audio/Video Receiver

Converts the CAT5 signals sent from the AC154A-2 or AC154A-8 splitter back to standard VGA video and audio for connection to a standard VGA monitor and PC speakers.

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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed 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 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. This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada
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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM) Electrical Safety Statement
INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objetos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:
    a. El cable de poder o el contacto ha sido dañado; u
    b. Objetos han caído o líquido ha sido derramado dentro del aparato; o
    c. El aparato ha sido expuesto a la lluvia; o
    d. El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    e. El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

1. Specifications

Video

Gain	Unity
Impedance	75 ohms
Maximum resolution	Up to 1920x1200 and 1080p at 750 ft (234.4 m); 1280x1024 at 850 ft. (386.4)
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
Number/signal type	1 proprietary analog signal input. Standard VGA output RGBHV, RGBS, RGsB, RsGsBs, component video (bi-/tri-level sync)
Polarity	Positive or negative
Connectors	1 female RJ-45 input, 1 HD15 output

Audio

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

General

Compliance	CE, FCC Part 15 Subpart J Class A, IC Class
Cooling	Convection, vents on each end
Enclosure type	Metal
Mounting	Brackets at each end with screw hole provided for Wall or Rack mounting
Recommended cable	CAT 5/5e/6 (shielded or unshielded)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Temperature/humidity	Operating: +32 to +122 °F (0 to +50 °C); Storage: -40 to +158 °F (-40 to +70 °C)
Humidity	10% to 90%, non-condensing
MTBF	90,000 hours
Power	100 VAC to 240 VAC, 50-60 Hz, external; 5 VDC, 2 A, regulated; 2.1mm
Dimensions	1.18" H x 2.75" W x 3.85" D (3 cm H x 7 cm W x 9.8 cm D)
Product weight	0.75 lb (0.35 kg)
Shipping weight	1.5 lbs (0.70 kg)

2. Overview

2.1 Introduction

- The Compact CAT5 Audio/Video Receiver (AC155A-R3) is designed to be used with the AC154A-2 and AC154A-8 Splitters. It converts the CAT5 signals sent from the Splitter back to standard VGA video and audio for connection to standard VGA monitor and PC speakers.

- The device is housed in a compact shielded enclosure and includes a HD15 connector for the monitor, 3.5mm mini-stereo audio connector for the speakers, and one RJ45 connector for the CAT5 cable input. A small universal power supply is included with the AC155A-R3.

- The AC155A-R3 can recover the VGA and audio signals from UTP or STP (CAT5/5e/6) cables up to 1000 feet (300 meters) long with little to no degradation. The Receiver features a proprietary circuit to allow the user to compensate for signal losses in long cable runs.

2.2 Features

- Supports resolutions up to 1920x1440 at 60 Hz
- Adjustable cable length compensation to 1000 ft
- Rugged, reliable and compact size
- No software required for setup and use
- Receives audio and video on a single CATx cable

2.3 What's Included
- Compact CAT5 Audio/Video Receiver
- This user's manual
- Power Supply
- Power Supply Cord

2.4 Hardware Description
2.4.1 Side 1 Panel
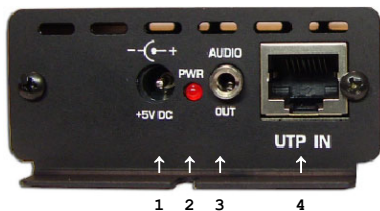Figure 2.1 shows the receivers Side 1 Panel. Table 2-1 describes its components.

Figure 2.1

TABLE 2-1		
Number	Component	Description
1	Power Connector	Power Input
2	Power LED	Illuminates when power applied
3	3.5 mm Connector	Audio Out
4	RJ-45 Connector	UTP Input

2.4.2 Side 2 Panel
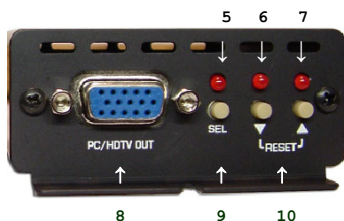Figure 2.2 shows the receivers Side 1 Panel. Table 2-2 describes its components.

Figure 2.2

TABLE 2-2		
Number	Component	Description
5	LED Indicator	SELECT LED
6	LED Indicator	DOWN LED
7	LED Indicator	UP LED
8	HD15 Connector	VGA Output
9	Push button	SELECT Button
10	(2) Push buttons	Down/Up Buttons

3. Installation

1. At the sending end, connect the AC 154A-2 or AC154A-8 to the CPU and local monitor and keyboard per instructions given in the respective user's Manual.

2. Using Category-5 cable, connect the output of the Splitter to the AC155A-R3 Receiver's UTP IN connector (see Figure 2.1)

3. Connect a monitor and powered speakers to the Receiver's VGA and AUDIO OUT connectors (see Figure 2.2).

4. Attach the supplied power supply to the AC155A-R3 (Figure 2.1) and plug it in the AC power outlet.

5. Figure 3.1 below shows a typical installation

Local Monitor and Speakers

Remote Monitor and Speakers

VGA and Audio Source

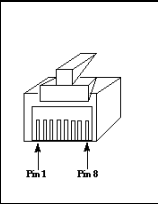Figure 3.1
Typical Installation
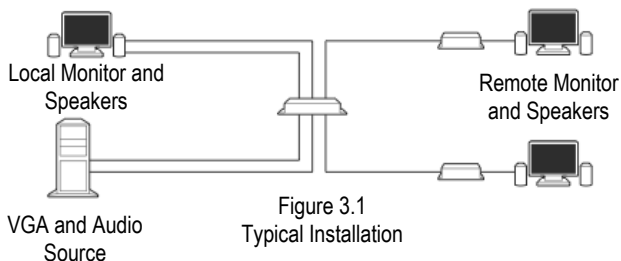
CAUTION

Before plugging in your remote monitor, 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 tolerate up to 5 v peak-to-peak ground noise between the two locations) . Failure to ensure good grounding can result in erratic operation and possible shock hazards with severe damage to your equipment.

NOTICE

Do not connect this unit to any LAN device such as network cards or hubs as this may damage the AC155A-R3 and/or the LAN device. Use EIA/TIA 568B standard straight-through patch wiring as shown below. Do not use crossover cables.

EIA/TIA 568B WIRING STANDARD	
PIN	Wire Color
1	White w/ Orange Stripe
2	Orange
3	White w/Green Stripe
4	Blue
5	White w/Blue Stripe
6	Green
7	White w/Brown Stripe
8	Brown

Pin 1   Pin 8

Tips on Cable Selection for Best Image Quality

The AC155A-R3 compensates for high frequency losses in the cable. However, due to the twist ratio differences in the UTP cable, it is recommended to use UTP cables that are specifically designed for video transmission. These cables are commonly referred to as zero or low skew cables.

Example: Belden Brilliance® VideoTwist™ 7987R/P.

If you don't have access to this type of cable, we recommend using CAT5 (or CAT5e) cable rather than CAT6 since CAT5 cables have better twist ratio match than CAT6 does.

4. Configuration & Operation

4.1 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 Compact CAT5 Audio/Video Receiver has one of the most precise and complex equalization techniques in the industry and allows for full recovery of the original signal's bandwidth.

Make this adjustment using a test pattern that is designed to depict and exaggerate this effect. Connect a PC to the video input and display a test pattern.

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

		Refresh Rate	
	60 Hz	75 Hz	85 Hz
Resolution 640x480	1,000 ft	1,000 ft	1,000 ft
800x600	1,000 ft	1,000 ft	1,000 ft
1024x768	1,000 ft	800 ft	700 ft
1280x1024	750 ft	600 ft	525 ft
1600x1200	750 ft	600 ft	525 ft

Table 4-1
Recommended maximum CATx cable length from sender to the receiver

4.2 Compensation Adjustment Procedure

- Press the **SELECT** button once to enter the adjustment-mode (that is, without first hitting SELECT button the up and down arrows are inactive).

- In adjustment-mode, all 3 LEDs on the unit will be turned on.

- 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 4-1 & 4.2 below).

- Pressing both the UP & DOWN buttons together resets the current adjustment back to zero. This is a quick way to start over.

- To exit the adjustment mode at any time, press the **SELECT** button (the unit also has a built-in timeout to exit this mode).
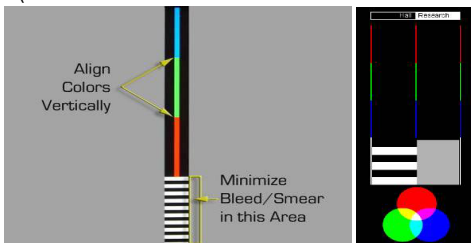

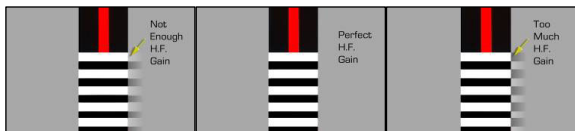Figure 4.1 - Typical test patterns used for adjusting compensation

Figure 4.2 – Effect of adjustment on the smearing

4.3 Advanced Adjustment (CATx AWG)

The AC155A-R3 automatically equalizes the brightness of the video as the smearing is reduced. This automatic adjustment is based on the assumption that typical 24 AWG CATx cable is being used. When using 23 AWG CATx cable, then when the smearing is minimized, your image may be brighter than normal. In many installations, this is not critical and usually requires no adjustment. There is a setting for the cable type (23 vs. 24 AWG) that can be changed for different performance.

- While in the adjustment-mode, press and hold the **SELECT** button for at least 3 seconds to enable the WIRE SIZE selection mode between 23-gauge wire and 24-gauge wire.
- The **UP** button is used to select 24-gauge wire. The **DOWN** button is used to select 23-gauge wire.
- To exit the adjustment mode at any time, press the **SELECT** button (the unit also has a built-in timeout to exit this mode).

5. Troubleshooting

5.1 Problems/Solutions

Problem: Fuzzy, blurry, or ghosting image at remote location
Solution: If you have a stable image but it looks somewhat blurry (e.g. the 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 distances vs. resolution and ensure 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.

Problem: Image exhibits steady or rolling horizontal color "hum" bars
Solution: This is usually an indication of improper grounding either 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 tolerate up to 5 v peak-to-peak of ground noise between the two locations, but no more**.**

Problem: Shaking image or periodically blanking monitor
Solution: Although CAT5 cable uses twisted pairs to transmit the signals from the Splitter to the Receivers to reduce the amount of EMI coupled noise from other external sources, a strong electromagnetic noise field can cause instability in the signal. Usual sources of this form of noise coupling are high current AC lines or other high-density 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 Splitter and the interfering source, or use STP shielded CAT5 cables.

Problem: The PC does not recognize a Plug-and-Play monitor
Solution: If the PC's Operating System is setup to detect a plug-and-play monitor (usually in Display Properties Advanced Settings), it may have trouble finding a monitor if no local monitor is hooked up to the Splitter (at the sending end). Only the ID information of the local monitor is passed to the PC. If the PC does not produce an image due to this, either connect a monitor to the local VGA output port, or disable the plug-and-play monitor detection in the PC's operating system.

Problem: Faint shadows or ghosts at the remote monitor
Solution: The Splitter at the sending end has multiple RJ45 output connectors. When a long CAT5 cable is plugged in any of the outputs, the Splitter expects a Receiver at the other end for proper termination. Therefore it is a good idea to unplug the un-terminated CAT5 cables from the Splitter unit. Please refer to item 1 above for other possible causes.

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Problem: Poor audio quality at the Receiver
Solution: Only use powered speakers with the Receiver. 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.

5.2 Calling Black Box

If you determine that your Receiver is malfunctioning, do not attempt to repair the unit. Contact Black Box Tech. Support at 724-746-5500 or info@blackbox.com

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.
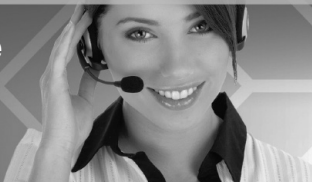
5.3 Shipping and Packaging

If you need to transport or ship your Receiver:

• Package it carefully. We recommend that you use the original container.

• Before you ship the unit back to Black Box for repair or return, contact us to get a Return Authorization (RA) number.