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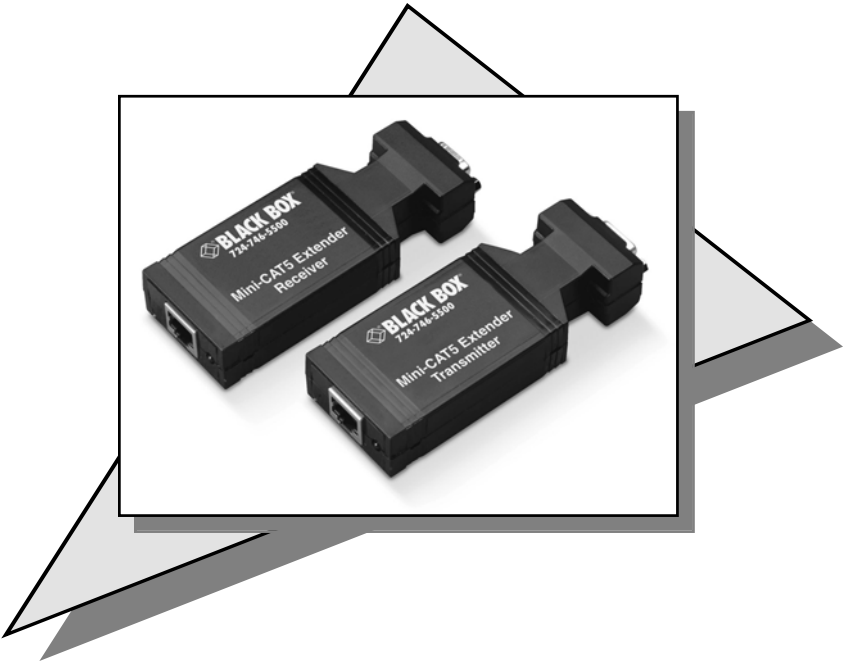
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# Mini-CAT5 Video-over-CAT5 Extension

**Model AC504A** **VGA Extension**

**Model AC504A-CP** **Component Video (RGB or Y Cb Cr) Extension**




February 15, 2006

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Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
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**UMA1031 Rev. n/c**

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## FEDERAL COMMUNICATIONS COMMISSION
## RADIO FREQUENCY INTERFERENCE STATEMENT

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 designed and found 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 his or her 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 the Canadian Department of Communications.*

## EUROPEAN UNION DECLARATION OF CONFORMITY

This product complies with the requirements of the European EMC directive 89/336/EEC

CE

## 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 objectos 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: Objectos 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.

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# 1. Introduction

## 1.1 Model AC504A … for VGA

The Model AC504A is a UTP (CAT5) VGA video extender consisting of a transmitter (AC504A-S) and a receiver (AC504A-R) sold together as a pair. The transmitter converts a PC's VGA signal into a format that can be transmitted using a single inexpensive and commonly available Category-5 Unshielded Twisted Pair (UTP) cable with RJ45 connectors, which is used in most Local Area Networks.

At the receiving (remote) end the Cat5 signal is converted back to VGA for connection to your monitor, projector or other display device.

The transmitter and receiver are each housed in a small plastic enclosure and include a HD15 video connector and a RJ45 connector for the Cat-5 cable. Included with the pair of devices are: one small universal power supply (can be powered at either end), and a short adapter cable for easy connection to the standard HD-15 connector of the PC.

The Mini-CAT5 Extender can drive CAT5 LAN cables to 500 feet (150 meters) with excellent video quality.

## 1.2 Model AC504A-CP … for Component Video (RGB or YPbPr or YCbCr)

This variation of the AC504A includes cables for each end that allow connection of the transmitter to the 3 RCA connectors of DVD-players or other video sources that output Component Video (RGB or Y Pb Pr, or Y Cb Cr). A similar cable is also provided for the receiver for connection to compatible displays such as HDTV's or high-end monitors. The actual sender and receiver units are identical to the standard AC504A and, in fact, you can use the pair to send VGA video if you substitute VGA cables.

### 1.3 Features

- Eliminates the need for bulky , expensive and hard to build multi-coaxial cables for high-resolution video extension
- Amplifies the signal for clean and crisp transmission
- Differential signaling eliminates ground loops and noise
- Handles resolutions up to 1600x1200 at any refresh rate
- Rugged, Reliable, Compact size
- Only one end requires power in most applications. Power supply can be connected at the sending or the receiving end, whichever convenient.
- Drive standard CAT5 cables to 500 feet (for VGA and Component video versions) or to 1200 feet for (Composite Video and Stereo Audio version)
- Perfect for Remote Monitoring, Video Staging, Conference Rooms, Classrooms, Home-Theatre Applications and more

# 2. Installation

1. Connect the VGA in (HD-15) connector of the AC504A Transmitter to the computer's or other equipment's video output port using the supplied cable (see figure 2.1).

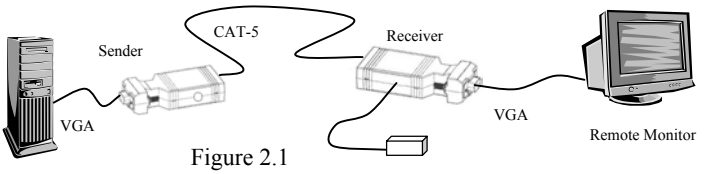



Figure 2.1

2. Connect the included power adapter to the power connector on either of the transmitter or the receiver (for more information, please see the recommendations immediately following this paragraph). Be sure to insert the power connector fully. Check the red light next to the RJ45 connector to verify unit's power. When the two units are connected Via CAT5 cable, the LED's at both ends should be lit.

## Recommended Power Supply Connection

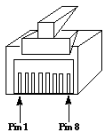
- Cat 5 cable length of 0 to 150 feet:
  It does not matter in which end you plug the power supply. Use whichever end that is most convenient for your setup.
- Cat 5 cable length of 150 to 300 feet:
  We recommend that you plug the power supply a the receiving end.
- Cat 5 cable length of 300 to 500 feet:
  Please plug the power supply at the receiving end, however, depending the grounding of the video source (PC) and the display device at the remote end, you may need to purchase an additional power supply to power up both ends.
- Cat 5 cable lengths over 500 feet:
  Purchase of an additional power supply to power up both ends is almost certainly needed.

3. Using Category-5 cable connect the AC504A-Receiver to the transmitter's RJ45 output. Connect the remote monitor to the receiver either directly (VGA) or using the HD15 to 3 RCA cable (Component Video).

## IMPORTANT

**Do not connect this unit to any LAN device such as network cards or hubs as this may cause damage. 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 |



# 3. Configuration & Operation

The Mini-CAT5 Receivers are equipped with an adjustment to improve image quality when using long cables. The adjustment is made via a single turn trim-pot located next to the power connector on the side.

When using a long cable, with no compensation, any solid horizontal line, tends to smear to the right. For example in the image shown on the right, observe the dark black line at the bottom of the window and see how it is smearing to the right (not changing to white abruptly as it should). This is the effect of long cable on the signal.

You can turn the trim-pot to eliminate these streaks as shown on the 2nd picture. If you add too much compensation to the signal, then an opposite effect may be observed, i.e. black lines smear to the right as white lines or vice-versa. The 3rd picture shows the case where too much compensation is added.

When using long cables, the image quality is a function of resolution and refresh rate. Lower resolution or refresh rate, result in best picture. Therefore it is best to set the refresh rate to 60 Hz at any resolution.

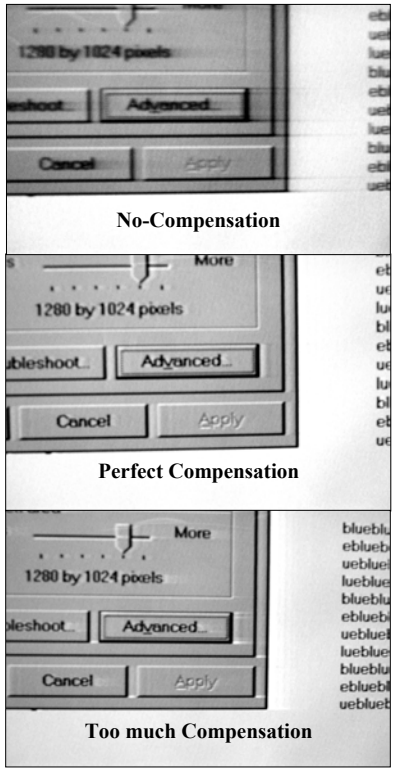



Figure 3.1

Although the Mini-CAT5 extenders are compatible with all varieties of UTP cable, for best results at long distances, use standard Category-5 Cable (instead of CAT5e or CAT6).

# 4. Troubleshooting

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

If you have a stable image but it looks somewhat blurry (object or character edges are not sharp), try to adjust the compensation first. When the trim-pot is turned fully CCW there is no compensation. As you turn the pot clockwise you are applying compensation. Look at the screen and slowly turn the pot clockwise. Notice what happens to the right of solid horizontal lines (as in figure 3.1). If you still have a fuzzy image, try reducing first the refresh rate and then the resolution of the PC.

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

CAT5 cable employs twisted pairs to differentially transmit the signals from the transmitter to the receiver in order to reduce the amount of EMI (interference) coupled noise from external sources. However, 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 separate the Cat 5 cable of Mini-CAT5 Extender from the interfering source or use shielded CAT5 cables. Note that separating the CAT5 cable from the EMI source by a few inches is often sufficient to eliminate this problem.

**3. The PC does not recognize a Plug-and-Play monitor**

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 the PC does not produce an image due to this, disable the plug-and-play monitor detection in the PC's operating system Display Properties.

**4. Substituting power supplies**

The sender and receiver rely on the power adapter that is supplied with them. Do not substitute any other power supply or DC power source

## Contacting Black Box

If you determine that your extender is malfunctioning, do not attempt to repair the unit. Contact Black Box Tech. Support at 724-746-5500.

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.

## Shipping and Packaging

If you need to transport or ship your extender:

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

# 5. Specifications

| | |
|---|---|
| **Video Types** | Model AC504A: VGA through UXGA<br>Model AC504A-CP: RGB , YPbPr , or YCbCr |
| **Resolution** | Up to 1600 x 1200 at up to 85 Hz |
| **Bandwidth** | DC to 250 MHz |
| **Max. Distance** | Up to 500 ft. (150 m) |
| **Connectors** | HD15 female for video in and out; Shielded RJ45 |
| **Interfaces** | Standard Analog VGA; Proprietary CAT5 |
| **Compliance** | CE; FCC Part 15 Subpart B Class A, IC Class |
| **Max. Altitude** | 10,000 ft. (3048 m) |
| **Temperature** | Operating: 32 to 122°F (0 to 50°C);<br>Storage: –40 to +185°F (–40 to +85°C) |
| **Humidity** | Up to 95% non-condensing |
| **Enclosure** | Plastic ABS-94VO, UL File#56070 |
| **MTBF** | 90,000 hours (calculated estimate) |
| **Power** | From utility-power (mains) outlet, through included external power adapter. Output Voltage: 9v DC regulated Center-Positive. Power :(5 watts Max) |
| **Size** | **Transmitter & Receiver** 0.8” H x 1.7” W x 4.5” L |
| **Weight** | 2 lbs. (shipping) |

# Notes




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1000 Park Drive Lawrence, PA 15055-1018 724-746-5500 Fax 724-746-0746

## Appendix: Resources

Do you have technical questions about this product or similar technology? Check out the Resources listed below or contact our FREE Technical Support at 724-746-5500 or info@blackbox.com.

White Papers: To dowload a white paper, click on the corresponding link listed below:

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What's in the ANSI/TIA 1179 standard.
ANSI/TIA 1179 Healthcare Infrastructure Standard

Buyer beware: If the price seems too good to be true, it is.
Counterfeit cable: The dangers, risks, and how to spot it.

Using CAT 6A in 10-GBe networks.
CAT 6A F/UTP vs. UTP: What You Need to Know

When is fiber the ideal choice for your network?
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Structured Cabling Organizations and Standards

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Falling victim to these common mistakes can cost you both time and money.
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Extending the Benefits of USB

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HD Video and Peripheral Matrix Switching and Extension

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Security with the ServSwitch Wizard IP

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USB True Emulation for KVM Switches

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Power over Ethernet in Industrial Applications

Is your network ready?
Tablets in Education

Common network mistakes that cost money, cause downtime, and create frustration.
Top 10 Network Mistakes

Take these ten steps to ensure wireless success: Ten Commandments of Wireless Communications white paper.
Wireless Communications

Run wireless even in extreme environments.
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Wireless Networking: wireless standards, architecture, security and more white paper. A basic overview of standards, installation, and security.
Wireless Networking

### Network Security

The key to protecting data in motion.
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### Physical Security

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Proven Techniques and Best Practices for Managing Infrastructure Changes

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Testing Today's High-Speed Multimode Fiber Infrastructure

Use easy-to-install, standardized, plug-and-play technology.
Troubleshooting Your Industrial Network

Be sure to complete this step when installing a new local area network segment.
Validate LAN Installations for Optimal Service Delivery

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