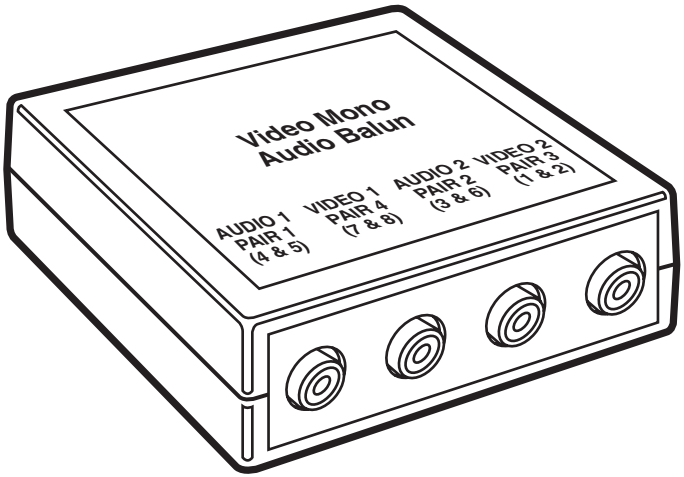
BLACK BOX
NETWORK SERVICES

FEBRUARY 1998
IC443A

Video Mono Audio Baluns



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mail order: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

Caution: **Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Contents

1. Specifications

Cable Required — Between Balun pairs: (1) Unshielded twisted pair (UTP) cable:
Construction Standard: Category 3 or higher;
Gauge: 24 AWG or lower
Termination: RJ-45 plugs;
Pairs: Four (8 wires used) to carry all video and audio channels;
Impedance: 100 ohms at 1 MHz;
Maximum Capacitance: 20 pF/ft. (6.1 pF/m);
Maximum Attenuation: 6.6 dB/1000 ft. (2 dB/km);
To attached devices:
Video: (1) Standard 75-ohm coaxial cable with a BNC male connector on the Balun end;
Audio: (2) Standard RCA phono cables

Compliance — FCC Class B, DOC Class/MDC classe B;
CISPR Pub. 22 Class B

Standard — Composite (baseband) video: NTSC, PAL, or SECAM

Impedance — Coaxial side: 75 ohms;
Phono side: 600 ohms;
UTP side: 100 ohms

Bandwidth — Video: DC to 10 MHz;
Audio: 20 Hz to 50 KHz

Maximum RF Input — 1.1 volts at 60 Hz

Insertion Loss — Less than 2 dB over the DC-to-10-MHz frequency range

Return Loss — Greater than 15 dB over the DC-to-10-MHz frequency range

Common-Mode Rejection — Greater than 40 dB at 10 MHz

VIDEO MONO AUDIO BALUNS

Maximum Distance — With Category 3 cable: 1200 ft. (365.8 m) for color video, 1500 ft. (457.2 m) for black & white video and for audio; With Category 5 cable: 2200 ft. (670.6 m) for color video, 2500 ft. (762 m) for black & white video and for audio

Connectors — (1) Shielded RJ-45 female, (1) BNC female, (2) RCA female

RJ-45 Pins Used — Pins 1 (audio right), 2 (audio right ground), 3 (audio left), 6 (audio left ground), 7 (video), and 8 (video ground)

Temperature Tolerance — Operating: 32 to 131˚ F (0 to 55˚ C); Storage: –4 to 185˚ F (–20 to 85˚ C)

Humidity Tolerance — Up to 95% noncondensing

Size — 2.3"H x 2.4"W x 1"D (5.7 x 6.1 x 2.5 cm)

Weight — 2.8 oz. (80 g, 0.2 lb., 0.1 kg)

2. Introduction

With the Video Mono Audio Balun, you can transmit two pairs of composite baseband video and mono audio signals across Category 3 or better unshielded twisted-pair (UTP) cable, which is already wired into most commercial sites. Use pairs of Baluns to transmit composite video with mono audio: In a normal two-way (full-duplex) application, the Balun on each end takes a single composite baseband video signal and a monaural audio signal from 600-ohm RCA type phono cables, converts the signals, and transmits them over UTP cable to the other Balun, which converts them back and sends them to their destination. (If your application needs both sets of signals to travel in the same direction, the Baluns can do this too.)

Connect the Video Mono Audio Balun to a site's structured cabling through a modular wall jack in the work area. Each Balun has four RCA connectors at one end and an RJ-45 jack at the other end.

The Video Mono Audio Balun is designed for use with CCTV cameras and monitors, videocassette recorders, camcorders, and other baseband audiovisual equipment, but is especially useful in two-way videoconferencing applications.

3. Installation

To install a pair of Video Mono Audio Baluns, take these steps:

CAUTION!

Do not attempt to open the housing. There are no user-serviceable parts inside the Video Mono Audio Balun. Opening the unit will void your warranty.

1. Make sure that the video devices at either end are not too far away from each other (refer to the **Maximum Distance** specification in **Chapter 1**). If either device is beyond the reach of the Balun at the other end, the signals the device receives will be weak or nonexistent.

2. Follow the manufacturer's instructions for (a) turning off power to the video and audio equipment you will be attaching and (b) disconnecting that equipment from AC power and from all other devices.

3. Make certain that the telecommunications outlets and cross-connects to which you will connect the Baluns are configured properly and are labeled so that the circuit can be identified.

4. Verify that the twisted-pair circuit you want to use is not already being used for other LAN or telephone equipment.

CAUTION!

Do *not* connect the Video Mono Audio Balun to a telecommunication outlet wired to unrelated equipment. Making such a connection may damage the equipment and/or the Balun. Please make sure that all wiring is straight-through-pinned.

Do not mount the Video Mono Audio Balun over equipment-ventilation openings. Covering the openings may cause the equipment to overheat.

5A. *If your application is two-way (that is, one pair of audio/video signals going one direction and one pair going the other direction):* Run four RCA phono cables from each balun to the attached device: one to the device's VIDEO AUX IN port, one to the device's VIDEO AUX OUT port, one to the AUDIO IN port, and the fourth to the AUDIO OUT port. (These cables must have RCA male connectors on the Balun end.) Make sure that the VIDEO IN and AUDIO IN ports on one end are connected to the VIDEO OUT and AUDIO OUT ports on the other. Refer to Figure 3-1 on the next page.

5B. *If your application is one-way (that is, both pairs of audio/video signals going the same direction):* Run four RCA phono cables from each Balun to the attached device. On the source devices, these cables should go to the VIDEO AUX OUT and AUDIO OUT ports; on the destination devices, these cables should go to the VIDEO AUX IN and AUDIO IN ports. (These cables must have RCA male connectors on the Balun end.) Refer to Figure 3-1 below.

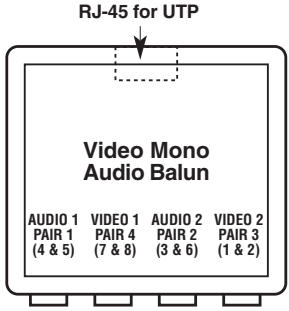


Figure 3-1. The Balun and its connectors.

6. Connect one end of a UTP cable into each Balun's RJ-45 modular jack. To carry the first video signal, these cables must carry a wire pair pinned to RJ-45 Pins 7 and 8. To carry the second video signal, the cables must carry a pair pinned to Pins 1 and 2. To carry the first audio signal, the cables must carry a pair pinned to Pins 4 and 5. To carrythe second audio signal, the cables must carry a pair pinned to Pins 3 and 6.

7. Plug the other end of each UTP cable into the appropriate video wall outlet or patch panel. When this is done, a complete cabling circuit should run between the two baluns, as shown in Figure 3-2 below.

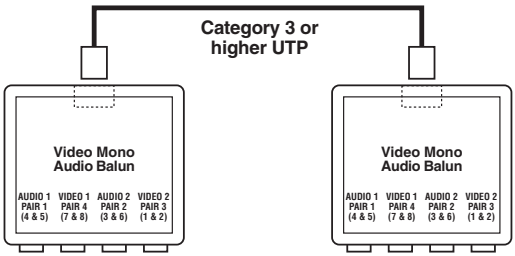


Figure 3-2. Two Baluns cabled together.

8. Reconnect and power up the video and audio equipment.

Your Video Mono Audio Balun system should be ready for continuous operation.

4. Troubleshooting

4.1 Things to Try If Problems Occur

If at any time your Video Mono Audio Balun system does not seem to be working properly, take these steps:

1. Following the manufacturer's instructions, perform diagnostics on your video and/or audio equipment, and verify that it works independently when the Baluns are not involved.

2. If this doesn't solve the problem, check all cable connections and the integrity of your site wiring. Make sure video cables go to video devices, audio cables go to audio devices, and that inputs on one end are wired to outputs on the other.

3. You might be trying to transmit the audio/video signals across too great a length of cable. The maximum distance over which the Baluns can transmit and receive video signals depends on your cable and your video and audio equipment; refer to the **Maximum Distance** specification in **Chapter 1**.

4. Make sure that the Baluns and all attached cables and equipment are well away from neon lights, generators, electric motors, high-voltage lines, and other sources of high-voltage or high-frequency electromagnetic signals.

5. Make sure that the patch cord you are running beteen the Balun and your site's wiring system is the correct cable type and is properly pinned (see the **Cable Required** specification in **Chapter 1**).

6. If possible, replace the Video Mono Audio Baluns involved in the problem with Video Mono Audio Baluns that are known to be working, one at a time. If at any point the problem goes away, there is probably a defect in the Balun you just replaced.

7. If you still cannot diagnose the problem, call Black Box for technical support as described in the next section.

4.2 Calling Black Box

If you determine that a Video Mono Audio Balun is malfunctioning, *do not attempt to alter or repair the unit.* It contains no user-serviceable parts. Contact Black Box Technical 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, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.
- the results of any testing you've already done.

4.3 Shipping and Packaging

If you need to transport or ship your Video Mono Audio Balun:

- Package it carefully. We recommend that you use the original container.
- If you ever ship the Balun back to us for any reason, contact Black Box to get a Return Materials Authorization (RMA) number.

NOTES

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