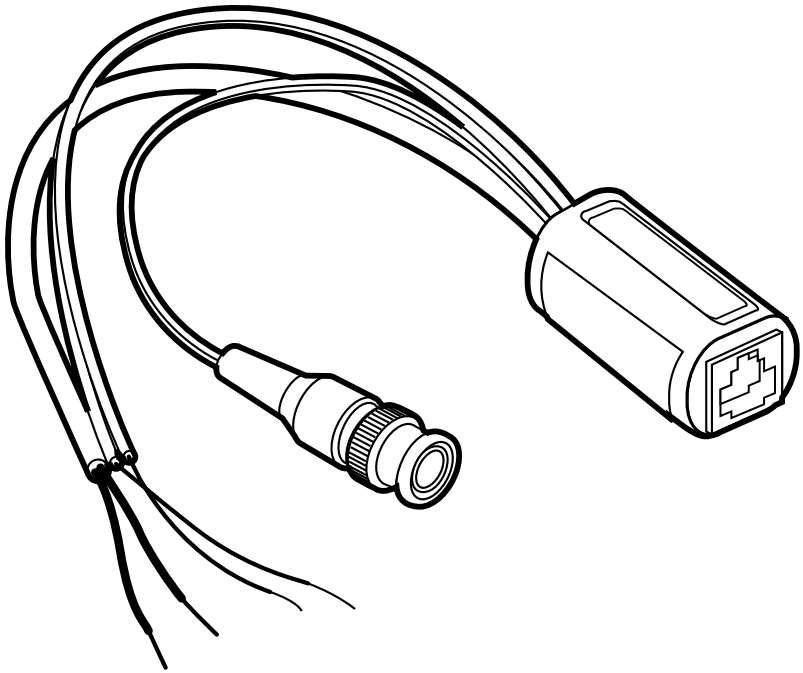
BLACK BOX®
NETWORK SERVICES

JUNE 2004
IC452A

CCTV Passthrough Balun



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS

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 B 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 his 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.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

Contents

1. Specifications

Video Type: NTSC, PAL, and SECAM

Compatible Devices: Close-circuit TV (CCTV) cameras, monitors, switchers, sequencers, multiplexors, digital video recorders (DVRs), and other CCTV equipment

Transmission: Transparent to the user

Bandwidth: Video: DC to 8 MHz

Impedance: Input: 75 ohms (BNC); Output: 100 ohms (RJ-45)

Maximum Input: 1.1 Vp-p

Insertion Loss: Less than 2 dB per balun pair over frequencies from DC to 8 MHz

Return Loss: Greater than 15 dB over the frequency range from DC to 8 MHz

Common Mode Rejection: Greater than 40 dB @ 8 MHz

Maximum Distance B&W: CAT3: 1500 ft. (457.2 m); CAT5: 2500 ft. (762 m)

Maximum Distance Color: CAT3: 1200 ft. (365.8 m); CAT5: 2200 ft. (670.6 m)*

*Maximum distance when used with DVRs is typically 1000 to 1500 ft. (304.8 to 457.2 m) via CAT5

Cable: UTP: 24 gauge or lower solid copper twisted-pair wire;
Impedance: 100 ohms @ 1 MHz;
Maximum capacitance: 20 pF/ft.;
Attenuation: 6.6 dB/1000 ft. @ 1 MHz;
BNC: Impedance: 75 ohms @ 1 MHz (RG59/U);
Maximum length of coax allowed end-to-end: 25 ft. (7.6 m)

Table 1-1. Pin configuration.

Signal	RJ-45 Pin	Cable Lead Color or Connector
Power A	1 (common with 3)	Red
Power B	2 (common with 6)	Black
Power A	3 (common with 1)	Red
Control +	4	Blue solid/white band
Control -	5	White solid/blue band
Power B	6 (common with 2)	Black
Video BNC center (Tip)	7 [T]	Mini coax
Video BNC ground (Ring)	8 [R]	Mini coax

Connectors: Combined signals: RJ-45;
Video: BNC male 8 mini coax lead;
Power: 2-wire 18 AWG lead;
Control: 2-wire, 24 AWG twisted-pair lead

Temperature Tolerance: Operating: 32 to 131°F (0 to 55°C); Storage: -4 to +185°F (-20 to +85°C)

Humidity: Up to 95%, noncondensing

Enclosure: ABS fire-retardant plastic

Size: 1.9" x 1" (4.8 x 2.5 cm) diameter plus cable leads: 8" (20.3-cm) for video, 10" (25.4-cm) for power and control leads

Weight: 1.9 oz. (54 g)

2. Overview

Use unshielded twisted-pair cable to connect close-circuit TV (CCTV) cameras, monitors, switchers, sequencers, multiplexors, digital video recorders (DVRs), and other CCTV equipment together via the CCTV Passthrough Baluns. The balun allows video, remote power, and 2-wire pan/tilt/zoom (PTZ) control signals to be transmitted via one 4-pair CAT5 cable, so you don't need to install multiple cables. The baluns are compatible with NTSC, PAL, and SECAM video.

Use the baluns in pairs or install one at the CCTV device and connect it to standard twisted-pair cross-connect devices at the remote end. The balun is also compatible with the BLACK BOX® CCTV Mini Coax Balun (IC451A). Both balun models have a mini coax connector, but the CCTV Mini Coax Balun also has an integral 8" (20.3-cm) cable. Install a CCTV Passthrough Balun directly to the CCTV device at one end of the connection and a CCTV Mini Coax Balun via its cable at the other end.

3. Installation

The CCTV Passthrough Balun supports video, remote power, and control via one four-pair twisted-pair cable. All signals need not be present; however, at least one signal must be present. To install the balun at the CCTV device, follow these steps:

Connect Video:

1. Identify the CCTV Passthrough Balun's pin configuration. One twisted pair is required for each CCTV device's video signal.

NOTE

The balun is reverse polarity sensitive. Make sure that "Ring" is connected to "Ring" and "Tip" is connected to "Tip".

2. Plug the balun into the CCTV device's BNC connector.

Connect PTZ Control (optional):

3. If pan/tilt/zoom (PTZ) control signals (that is, RS-422) are being sent to the CCTV device, first make sure that PTZ controls are turned off before making any connections.

4. Connect the blue/white-blue wires to the CCTV device's control input. Make sure that polarity is straight-through between the CCTV device and the remote control device.

Remote Low-Voltage Power (optional):

5. If remote low-voltage power is being sent to the CCTV device, make sure that the power supply is off before making any connections.

6. Connect the red and black wires to the CCTV device's power input. Make sure that polarity between the CCTV device and the remote control device is straight-through. Remote power is transmitted via two twisted pairs to the CCTV device. A guideline for maximum distance based on camera power requirements is stated in **Chapter 1**. Please consult the CCTV equipment manufacturer for more detailed performance specifications.

7. Complete the connection between the two baluns using straight-through 4-pair unshielded twisted-pair cable and cross-connect blocks as required. The balun is reverse polarity sensitive. Use only straight-through wiring.

8. At the remote end, the video, power, and control signals are ungrouped following the specified pair assignment and respecting the signal polarity. Figure 3-1 shows a Digital Video Recorder (DVR) connected to a CCTV camera.

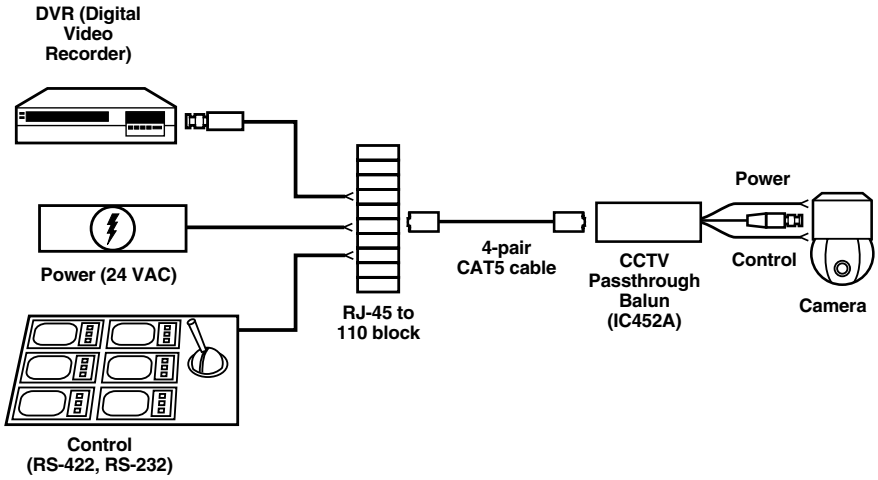


Figure 3-1. Typical configuration.

9. Power on the CCTV equipment and check the picture quality. The video should be clear and sharp within the maximum specified distances.

4. Troubleshooting

4.1 Potential Problems

Symptom: Poor picture quality, distortion, or interference.

Probable Causes/Solutions:

1. EMI interference. Make sure the wiring is not too close to transformers and ballasts.
2. Wires reversed on a signal pair on one side. Make sure the wires on the signal pair are not reversed on one side.
3. Split pair. Are the UTP pairs are split and correct? Each signal pair must be twisted.

Symptom: No video image.

Probable Causes/Solutions:

1. Power is off. Check the CCTV equipment's power supplies.
2. Wrong pin configuration. Check the pin configuration and verify straight-through wiring.
3. Defective CCTV Balun. Change CCTV baluns for another pair.

Symptom: Weak or faded picture.

Probable Causes/Solutions:

1. Exceeded the maximum distance specifications listed in **Chapter 1**. Check DC loop resistance and verify if the maximum distance has been exceeded. Reduce cable length or eliminate high-loss components.
2. Lower-grade UTP cable is introducing high signal losses. Use a signal repeater for extended distance or replace the cable with a higher-grade cable.

Symptom: No power at the CCTV device.

Probable Causes/Solutions:

1. Wrong pin configuration. Check the wiring.
2. The maximum distance has been exceeded (see **Chapter 1**). Move the CCTV device's power closer to the device.

Symptom: PTZ controls not responding.

Probable Cause/Solution: Wrong pin configuration. Check the wiring.

4.2 Calling Black Box

If you determine that your CCTV Passthrough Balun is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box 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.

4.3 Shipping and Packaging

If you need to transport or ship your CCTV Passthrough Balun:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the balun for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.

Doc. No. 94-000373-A; SE-000380-A

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