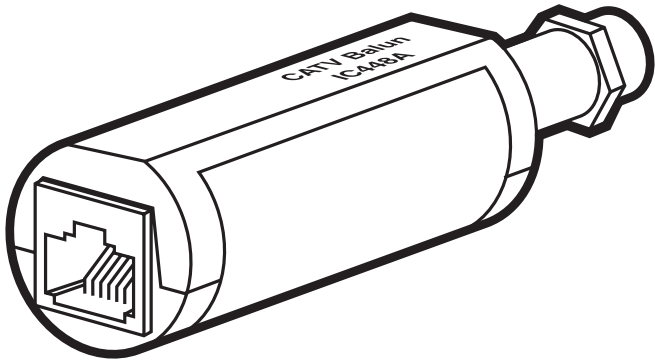




Video CATV Balun



**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

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 are required to connect this device to other Class B certified devices.

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 Industry Canada.

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 Industrie Canada.

TRADEMARKS USED IN THIS MANUAL

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**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 conectado 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 física 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 líneas de energía.
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 líquidos 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.

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1. Specifications

Cable Required:	<p>Between balun pairs: Unshielded twisted pair (UTP): Construction standard: Category 5; Gauge: 24 AWG or lower; Core: Solid; Termination: RJ-45 plugs; Pairs: 1 or more (2 wires used); Impedance: 100 to 120 ohms;</p> <p>To attached devices: Balun normally attaches directly to equipment; if cable must be used, it must be standard RG6 or RG11 coaxial cable, 75 ohms at 1 MHz, with a BNC female connector on the balun end</p>
Compliance:	FCC Class B, IC Class/classe B; CISPR Pub. 22 Class B
Transmission:	Transparent to users (automatic, no delay)
Signal Types:	Broadband cable TV (CATV), VHF, FM
Frequencies (Channels):	CATV 2 to 61, VHF 2 to 13, entire FM broadcast band
Bandwidth:	5 to 550 MHz
Insertion Loss:	Less than 3 dB for cable channels 2 through 77
Return Loss:	-18 dB or higher over the 10-MHz-to-550-MHz range
Common-Mode Rejection:	-20 dB or higher over the 40-MHz-to-500-MHz range
Maximum Distance:	At least 165 ft. (50 m) of CAT5 cable if nominal input is approximately 15 dBm; up to 330 ft. (100 m) depending on frequency (channel)—CATV channel 2 and other low frequencies should work at that distance, but higher frequencies might require a tilt amplifier
Connectors:	(1) RJ-45 female, (1) BNC “F” male
RJ-45 Pins Used:	7 (Ring) and 8 (Tip); polarity-sensitive (<i>not</i> autosensing or autocorrecting)

VIDEO CATV BALUN

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

Enclosure: EMI-shielded ABS plastic

Size: 1"H x 1"W x 2.5"D (2.5 x 2.5 x 6.4 cm)

Weight: 1 oz. (28 g)

2. Introduction

With pairs of Video CATV Baluns, you can transmit broadband cable TV (CATV), VHF TV, or FM radio signals across Category 5 unshielded twisted-pair (UTP) cable, which is already wired into most commercial sites. The balun near the video source takes a single CATV or other signal from 75-ohm coaxial cable, converts it, and transmits it over UTP cable to the other balun, which puts it back on coax and sends it to its destination. This lets you place or move your CATV equipment anywhere you have a modular wall outlet.

The Video CATV Balun is designed for use with modular equipment and flexible configurations. Compatible devices include TV monitors, CATV splitters, amplifiers, cable modems, videocassette recorders, radio tuners, and other broadband video and radio equipment, but the typical application is connecting a CATV splitter or amplifier to a TV monitor. (Note that although the baluns are designed for point-to-point connections only, you can use separate pairs of baluns to extend multipoint output from CATV splitters, etc.) The baluns are ideal for the type of broadband video systems used by schools, government or corporate offices, hospitals, financial institutions, hotels, and convention centers.

These baluns must be used in pairs.

3. Installation

To install a pair of Video CATV Baluns, follow the steps below.

CAUTION!

Do *not* attempt to open the housings of the Video CATV Baluns. There are no user-serviceable parts inside.

1. Make sure that the destination device is not too far away from the source device (refer to the **Maximum Distance** specification in **Chapter 1**). If the destination device is beyond the reach of the source balun, the signal the device receives will be weak or nonexistent.
2. Follow the manufacturer's instructions for turning off power to the equipment you will be attaching, and for disconnecting that equipment from AC power and from all other devices.
3. Make certain that the modular outlets and cross-connects to which you will connect the baluns are configured properly and are labeled so that the circuit can be identified.

CAUTION!

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

4. Verify that the twisted-pair circuit you want to use is not already being used for other LAN or telephone equipment.
5. For each balun—depending on what type of equipment you are attaching it to—either plug its BNC male connector directly into the device's BNC female connector, or plug the balun into a cable that runs to the device (this cable must have a BNC female connector on the balun end).
6. Connect one end of a UTP cable to each balun's RJ-45 modular jack, as shown in Figure 3-1. These cables must carry at least one wire pair; these wires must be on RJ-45 Pins 7 (ring) and 8 (tip).

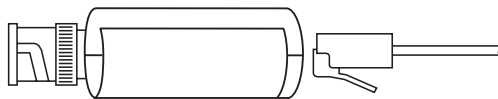


Figure 3-1. Attaching UTP cable to the balun.

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

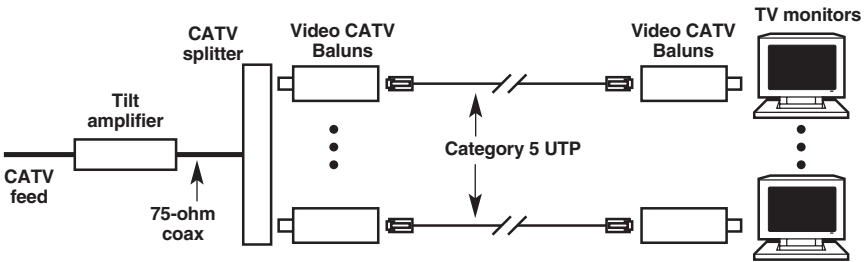


Figure 3-2. Baluns cabled together for video distribution (not to scale).

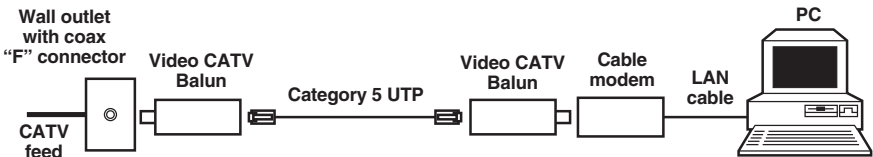


Figure 3-3. Baluns cabled together for cable-modem extension (not to scale).

8. Reconnect and power up the source and destination equipment.

Your balun system should be ready for continuous operation.

4. Application Tips

When you use your Video CATV Baluns in a CATV (superband or hyperband), VHF, or FM application, you can normally reach as far as 165 ft. (50 m) without amplification if the nominal input is about 15 dBm. In some applications, or if you try to go farther, you might need a tilt amplifier because UTP's losses are higher than those of coax cable at higher frequencies. Linear gain compensation of 20 to 25 dB at 750 MHz is usually adequate. Conversely, if you use overall amplification to compensate for losses at higher distances or frequencies, you might need to attenuate the lower frequencies or any shorter-distance links to avoid overdriving the TV monitors at the other end. You can use the baluns with tilt/gain amplifiers, CATV splitters, and splitters with built-in amplifiers. Here are some guidelines you might find useful as you plan your cabling:

1. Try for 10 dBmV of signal level on each television channel. Use a little more if your monitors are big-screen TVs. Measure the signal level at both the high and low ends of the spectrum to determine whether a tilt amplifier is needed.
2. When you lay out your CATV system, keep in mind that you'll have approximately 5 dB of signal loss for each 100 ft. (30 m) of RG6 coax cable involved.
3. Be sure that all of your splitters and amplifiers are broadband. Any splitters that output into the baluns and UTP cable should have a bandwidth of at least 5 to 550 MHz with a bidirectional filter at 5 to 50 MHz.
4. Make sure that all of your TV monitors are set for the proper frequency spectrum (VHF or cable). (If you're driving FM signals to radio tuners, make sure they're set to receive FM rather than AM.)
5. If extra channels are available, allow one or two channels of spacing between "modulated" and "active" channels.
6. Always compensate for insertion loss with a good amplifier. The signal strength will always drop when you combine a modulator's signal with an existing system signal due to insertion loss from the combiner.
7. When you combine an existing signal with a modulated signal, try to make sure that the signals are equally strong going into the combiner so that one signal doesn't degrade the other.
8. When possible, use the lowest frequencies available for the modulated channels. Lower-frequency channels have lower signal loss on the cable runs.

9. When in doubt, run the signal a little high to the TV monitor and use an attenuator to lower the signal strength going into the TV. You can combine attenuators; for example, you can use two -3 dBm attenuators to get a total attenuation of -6 dBm.
10. Combine the modulator's signal into your video-distribution system as far upstream (as close to the video source) as possible.
11. If the system needs to be amplified, use the amplifier as far upstream (as close to the video source) as possible. For example, place one amplifier at the head end and one tilt amplifier in each wiring closet where the baluns are located.

5. Troubleshooting

5.1 Things to Try If Problems Occur

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

1. Following the manufacturer's instructions, perform diagnostics on your video equipment.
2. If this doesn't solve the problem, check all cable connections and the integrity and pinning of your site wiring.
3. You might be trying to transmit the 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 CAT5 cabling, the signal's strength and frequency, and the devices at either end of the link; refer to the **Maximum Distance** specification in **Chapter 1**.
4. Make sure that the patch cord you are running between 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**).
5. If possible, replace the baluns involved in the problem with 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.
6. If you still cannot diagnose the problem, call Black Box for technical support as described in the next section.

5.2 Calling Black Box

If you determine that the Video CATV 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; and
- the results of any testing you've already done.

5.3 Shipping and Packaging

If you need to transport or ship your Video CATV 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 Authorization (RA) number.



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