

3G-SDI Fiber Extender

Extend high-quality 3G-SDI video up to 10 kilometers (6.2 mi.) over secure single-mode fiber.



**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

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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 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.

NOM Statement

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 librerías o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe 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

Auto Reclocker Mode — Automatic detection: 270 Mbps/1.483 Gbps/
1.485 Gbps/2.97 Gbps/2.967 Gbps;
Automatic bypass: 177 Mbps/360 Mbps/540 Mbps

Cable Equalization — On coax connections: SD-SDI: 300 m (1000 ft.);
HD-SDI: 150 m (500 ft.);
3G-SDI: 90 m (295 ft.)

Data Rates — 270 Mbps, 1483 Mbps, 1485 Mbps, 2967 Mbps, 2970 Mbps

Distance (Maximum) — On single-mode fiber: 10 km (6.25 mi.)

Fiber Characteristics — SMPTE 297-2006 compliant;

Operating wavelength: 1310 nm;
Optical fiber: 8–10/125-micron single-mode;
Loss budget: 0–15 dB

Output impedance — 75 ohms

Protocols — SMPTE 259M (270 Mbps), SMPTE 259M (360 Mbps),
SMPTE 292M/HDTV (1.485 Gbps and 1.485/1.001 Gbps),
SMPTE 424M/HDTV (2.97 Gbps and 2.97/1.001 Gbps), DVB ASI (270 Mbps)

SDI Standards — SD/HD/3G-SDI

Video Bandwidth — 2.97 Gbps, 2.97/1.001 Gbps

Video Resolutions Supported — HD: 720p at 50/59.94/60 Hz, 1035i at
50/59.94/60 Hz, 1080i at 50/59.94/60 Hz, 1080p at 24/30/59.94/60 Hz;
SD: NTSC at 59.94 Hz, PAL at 50 Hz

CE Approval — Yes

Connectors — Transmitter: SDI input: (1) BNC M (75-ohm);
SDI loopout: (1) BNC M (75-ohm);
Fiber interconnect: (1) LC simplex on SFP;
Receiver: SDI output: (1) BNC M (75-ohm); SDI loopout: (1) BNC M (75-ohm);
Fiber interconnect: (1) LC simplex on SFP

Indicators — Transmitter: (2) LEDs: (1) Power, (1) Signal;
Receiver: (2) LEDs: (1) Power, (1) Signal

Power — Input: AC input: 100–240 VAC, 50–60 Hz, 0.3 A;
Output: 5 VDC, 4 A

Size — Each unit: 1.2"H x 1.6"W x 4.6"D (3 x 4 x 11.6 cm)

Weight — Each unit: 0.3 lb. (0.14 kg)

Chapter 2: Overview

2. Overview

2.1 Introduction

The 3G SDI Fiber Extender transmits multirate SDI video, with embedded audio and metadata, as far as 10 kilometers (6.2 mi.) over single-mode fiber. The transmitter module receives one 3G/HD/SDI electrical input, and converts a SMPTE 292M, SMPTE424M, or DVB-ASI electrical SDI signal to single-mode fiber optic SDI signals. The receiver module receives the optical fiber signal from the input SFP connector, and then converts it to an electrical SDI signal.

NOTE: Cable equalization distance depends on the characteristics and quality of the cable and the type of SDI device.

Use the extender to link an SDI camera with SDI display or recording equipment in another building. It's ideal for a number of TV broadcast, video editing, and post-production studio applications, the extender supports single-mode distances up to 10 kilometers (6.2 mi.) on its small form-factor pluggable (SFP) interfaces for simplex fiber.

Also, the extender is immune to pathological test patterns (SMPTE RP-198), which guarantees high-quality, flicker-free transmission.

2.2 Features

- Works with a range of SD-SDI, HD-SDI, or 3G-SDI devices.
- Features equalization on SDI input for extended distances.
- Also has video loopout ports for local and remote SDI connections.
- Automatically reclocks SDI signals to reduce video jitter.
- Boasts immunity to SMPTE RP-198 pathological test patterns.
- Transmits over just a single strand of single-mode fiber cable.
- Great for any TV broadcast, video editing, or post-production studio application.
- Also use to reach SDI devices in high-level EMI/RFI environments.
- Autodetects SDI standard on its 75-ohm coax connectors.
- Handles higher SDI bandwidth of 2.97 Gbps (3G-SDI).
- Also works over multimode fiber at shorter distances.
- Wallmountable for space-saving installation.
- No software or driver installation required.

2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- (1) Transmitter
- (1) Receiver
- (1) single-mode simplex transmit SFP module (mounted in Transmitter)
- (1) single-mode simplex receive SFP module (mounted in Receiver)
- (2) power supplies with cords
- (4) mounting screws
- This user manual

2.4 Hardware Description

2.4.1 Transmitter

Figure 2-1 shows the front and back panels of the transmitter. Table 2-1 describes its components.

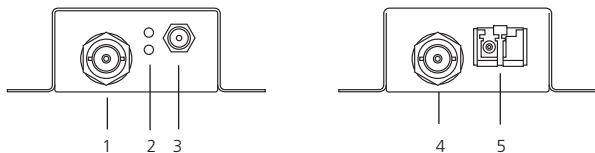


Figure 2-1. Transmitter's front and back panels.

Chapter 2: Overview

Table 2-1. Transmitter components.

Number	Component	Description
1	(1) BNC connector	3G/HD/SD-SDI input
2	(1) Power LED (1) Signal LED	Power LED lights when power is active on 3G/HD/SD-SDI output connector Signal LED lights when a signal is present on the 3G/HD/SD-SDI output connector
3	+5 VDC power connector	Connects to a 5-VDC power supply.
4	(1) BNC connector	3G/HD/SD-SDI loop out
5	(1) LC simplex on SFP	Optical output

2.4.2 Receiver

Figure 2-2 illustrates the front and back panels of the receiver. Table 2-2 describes its components.

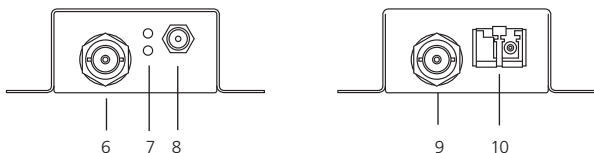


Figure 2-2 Receiver's front and back panels.

Table 2-2. Receiver components.

Number	Component	Description
6	(1) BNC connector	3G/HD/SD-SDI output
7	(1) Power LED (1) Signal LED	Power LED lights when power is active on 3G/HD/SD-SDI input connector Signal LED lights when a signal is present on the 3G/HD/SD-SDI input connector
8	+5 VDC power connector	Connects to a 5-VDC power supply.
9	(1) BNC connector	3G/HD/SD-SDI output
10	(1) LC simplex on SFP	Optical input

Chapter 3: Typical Installation

3. Typical Installation

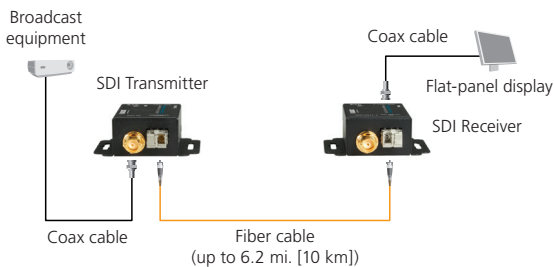


Figure 3-1. Sample application.

Appendix. Troubleshooting

A.1 Contacting Black Box

If you determine that your extender 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 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, 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.

A.2 Shipping and Packaging

If you need to transport or ship your extender:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, make sure you include everything you received with it. Before you ship for return or repair, contact Black Box to get a Return Authorization (RA) number.

Black Box Tech Support: FREE! Live. 24/7.

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way it should be.



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About Black Box

Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

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