

Fiber Optic Transceivers

FOX 3G HD-SDI

Multi-Rate HD-SDI / SDI Fiber Optic Transceiver



Extron Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions

Safety Instructions • English

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ATTENTION: This symbol, , when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

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Instructions de sécurité • Français

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ATTENTION : Ce pictogramme, , lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec le matériel.

Pour en savoir plus sur les règles de sécurité, la conformité à la réglementation, la compatibilité EMI/EMF, l'accessibilité, et autres sujets connexes, lisez les informations de sécurité et de conformité Extron, réf. 68-290-01, sur le site Extron, www.extron.com.

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UWAGI: Ten symbol, , gdy używany na produkt, jest przeznaczony do ostrzegania użytkownika ważne operacyjne oraz instrukcje konserwacji (obsługi) w literaturze, wyposażone w sprzęt.

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Для получения информации о правилах техники безопасности, соблюдении нормативных требований, электромагнитной совместимости (ЭМП/ЭДС), возможности доступа и других вопросах см. руководство по безопасности и соблюдению нормативных требований Extron на сайте Extron: , www.extron.com, номер по каталогу - 68-290-01.

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경고: 이 기호 ⚠ 가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

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안전 가이드라인, 규제 준수, EMI/EMF 호환성, 접근성, 그리고 관련 항목에 대한 자세한 내용은 Extron 웹 사이트(www.extron.com)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

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NOTE: For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the [Extron Safety and Regulatory Compliance Guide](#) on the Extron website.

Class 1 Laser Product

Any service to this product must be carried out by Extron Electronics and its qualified service personnel.

CAUTION: Using controls, making adjustments, or performing procedures in a manner other than what is specified herein may result in hazardous radiation exposure.

NOTE: For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the “[Extron Safety and Regulatory Compliance Guide](#)” on the Extron website.

Produit laser de classe 1

Si ce produit a besoin d'un quelconque entretien, celui-ci doit être fait par Extron Electronics et son personnel qualifié.

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Remarque : Pour plus d'informations sur les directives de sécurité, les conformités de régulation, la compatibilité EMI/EMF, l'accessibilité, et les sujets en lien, consultez le « [Informations de sécurité et de conformité Extron](#) » sur le site internet d'Extron.

Conventions Used in this Guide

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The following notifications are used in this guide:

 **WARNING:** Potential risk of severe injury or death.
AVERTISSEMENT : Risque potentiel de blessure grave ou de mort.

CAUTION: Risk of minor personal injury.
ATTENTION : Risque de blessure mineure.

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

Extron Glossary of Terms

A glossary of terms is available at <http://www.extron.com/technology/glossary.aspx>.

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Introduction

 **WARNING:** The FOX 3G HD-SDI outputs continuous invisible light (Class 1 rated), which may be harmful to the eyes; use with caution.

Do not look into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.

Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

AVERTISSEMENT : Le FOX 3G HD-SDI émet une lumière invisible en continu (conforme à la classe 1) qui peut être dangereux pour les yeux, à utiliser avec précaution.

Ne regardez pas dans les connecteurs de câble fibre optique sur le panneau arrière ou dans les câbles fibre optique eux-mêmes.

Branchez les protections contre la poussière dans l'ensemble émetteur/récepteur lorsque le câble fibre optique est débranché.

This section introduces this manual and the FOX 3G HD-SDI transceivers.

- [About this Manual](#)
- [About the FOX 3G HD-SDI](#)
- [Features](#)

About this Manual

This manual contains information about the following Extron FOX fiber optic transceivers:

FOX 3G HD-SDI SM — A singlemode, very long distance (up to 30 km [18.75 miles]) transceiver. See figure 1.

FOX 3G HD-SDI P SM — A singlemode, very long distance (up to 30 km [18.75 miles]) transceiver that is pathologically compliant

FOX 3G HD-SDI MM — A multimode, long distance (up to 2 km [6,561 feet]) transceiver

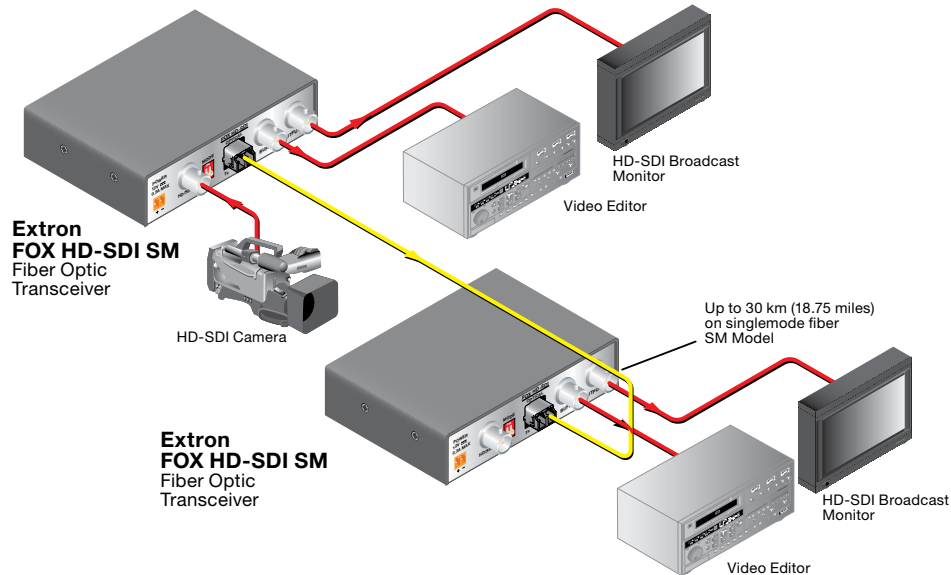


Figure 1. Typical FOX 3G HD-SDI Application

NOTE: The three products are physically and functionally identical, with the exception of the effective range of transmission and the compliance. In this manual, the term “FOX 3G HD-SDI” refers to any of the products.

About the FOX 3G HD-SDI

The Extron FOX 3G HD-SDI product family consists of three models (P SM, SM, and MM) of high performance digital (HD-SDI, SDI, or 3G-SDI) video fiber optic transceivers. The transmitted signal can include any audio or unidirectional serial data that is embedded in the input video.

NOTE: All transceivers in the system must be the same model (all singlemode, all singlemode pathologically compliant, or all multimode).

Transceiver Configurations

The transceiver can be configured via its rear panel Mode DIP switches to operate in one of three ways:

- Bidirectional transceiver
- Transmitter
- Receiver

NOTE: See [item B](#), “Mode switches,” on page 7 to set the configuration.

Bidirectional transceiver

NOTES:

- In this manual, the term “transceiver” refers to any FOX 3G HD-SDI; the term “bidirectional transceiver” refers to a FOX 3G HD-SDI configured as described in this section.
- Although the description below does allow connection of a FOX 3G HD-SDI configured as transmitter or receiver, the typical configuration is as shown: two bidirectional transceivers.

A FOX 3G HD-SDI that is configured as a bidirectional transceiver (see figure 2) inputs digital video on its SDI/HD-SDI Input BNC. The transceiver converts the video input to a proprietary signal and transmits the video over a fiber link to another FOX 3G HD-SDI that is configured as either a bidirectional transceiver or a receiver.

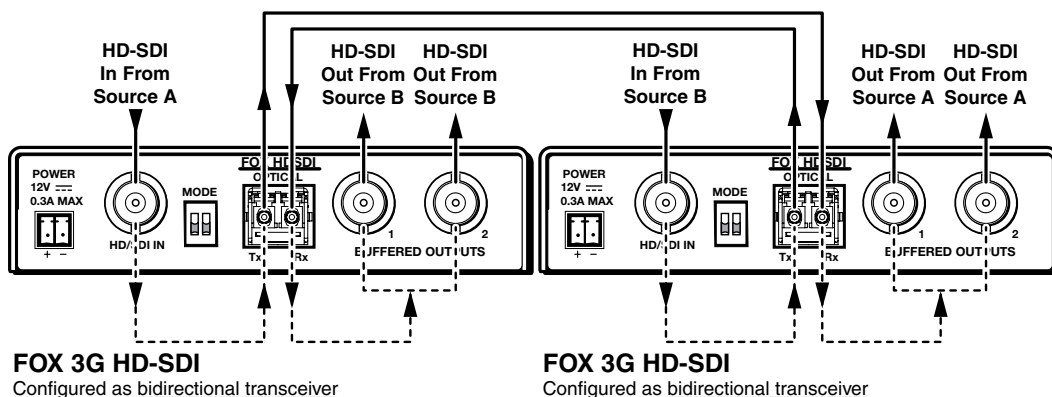


Figure 2. Bidirectional Transceiver Connections

A bidirectional transceiver can also simultaneously receive a proprietary signal from another transceiver (in any configuration) on its Optical Rx port, convert the proprietary signal back to the original format digital video, and output the video on its own two Buffered Outputs BNC connectors.

Transmitter and receiver

NOTE: Although the description below does allow connection of a FOX 3G HD-SDI configured as a bidirectional transceiver, the typical configuration is as shown: a transmitter and one or more receivers.

A FOX 3G HD-SDI that is configured as a transmitter (see figure 3) inputs digital video on its HD/SDI Input BNC. The transmitter converts the video input to a proprietary signal and transmits the video over a fiber link to a FOX 3G HD-SDI that is configured as either a receiver or a bidirectional transceiver. The transmitter also simultaneously outputs the digital video on its two Buffered Outputs BNCs.

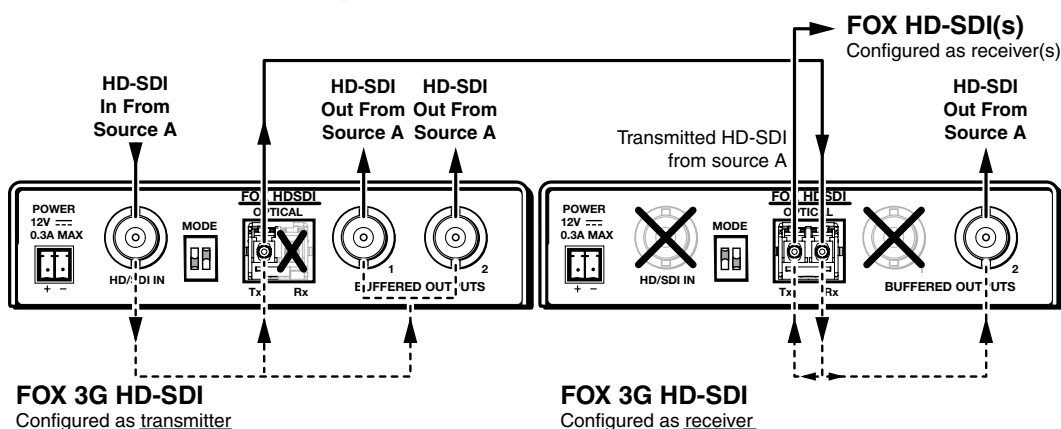


Figure 3. Transmitter-to-Receiver Connections

A FOX 3G HD-SDI that is configured as a receiver receives a proprietary signal on its Rx fiber optic port. The receiver converts the proprietary signal back to original HD-SDI, SDI, or 3G-SDI video and outputs the video on only one of its own Buffered Output BNC connectors, Output 2.

The receiver converts the second digital video signal that it created from the optical input back into a proprietary signal and outputs it on the Optical Tx port over a fiber link to another FOX 3G HD-SDI that is configured as a receiver or as a bidirectional transceiver.

NOTE: Up to 10 receivers can be daisy-chained in this manner.

Features

- **Fiber optic characteristics** — The FOX 3G HD-SDI sends and receives digital optical signals via fiber optic small form factor pluggable (SFP) modules with LC-type connectors.
- **Extends HD-SDI, SDI, and 3G-SDI signals very long distances over a single fiber** — The FOX 3G HD-SDI supports multi-rate SDI at rates up to 2.97 Gbps, and complies with SMPTE 259M-C, 292M, 424M, and ITU digital video standards.
- **(FOX 3G HD-SDI P SM only) Immunity to SDI and HD-SDI pathological signal patterns** — The FOX 3G HD-SDI P SM model adds immunity to pathological signals, including test patterns defined by SMPTE RP 178 and SMPTE RP 198 for SD-SDI, HD-SDI and 3G-SDI
- **Video input** — When it is configured as a transmitter, the FOX 3G HD-SDI inputs digital video on a BNC connector.
- **HD-SDI loop-through** — The transceiver has two Buffered SDI/HD-SDI BNC connectors that allows connection of a local monitor when the transceiver is configured as a transmitter.

- **Video output** — The transceiver outputs digital video on one or two Buffered SDI/HD-SDI BNC connectors when it is configured as a bidirectional transceiver or a receiver.
- **Dual buffered outputs** — When the FOX 3G HD-SDI is configured as a transmitter, the SDI/HD-SDI BNC output connectors can be used for previewing the video on a local monitor.
- **Input equalization and reclocking on buffered outputs** — The FOX 3G HD-SDI automatically equalizes incoming multi-rate SDI signals, and reshapes and restores signals on its buffered outputs.
- **Daisy chain capability** — Up to 3 transceivers can be daisy chained to send the video to multiple locations when one or more units are configured as receivers.
- **Real-time status LED indicators for troubleshooting and monitoring**
- **1-inch high, quarter rack width, metal enclosures** — With low profile enclosures, the transceiver can be discreetly installed in various locations, such as behind a plasma or LCD flat-panel display.
- **Rack mountable** — The unit is rack mountable in any conventional 19-inch wide rack, using any of a variety of Extron rack shelves.
- **Power** — The 100 VAC to 240 VAC external power supply provides worldwide power compatibility.

Installation and Operation

This section details the installation of the FOX 3G HD-SDI, including:

- [Installation Overview](#)
- [Connections and Settings](#)
- [Operation](#)

Installation Overview

Follow these steps to install and set up an Extron FOX 3G HD-SDI for operation:

ATTENTION:

- Installation and service must be performed by authorized personnel only.
- L'installation et l'entretien doivent être effectués par le personnel autorisé uniquement

1. Turn off all of the equipment. Ensure that the video sources and the output display are all turned off and disconnected from the power source.
2. Mount the transceivers. See [Mounting the Transceiver](#) on page 11.
3. Connect the cables and configure the transceivers. See “Connections and Settings.”
4. Plug in the power supplies, then turn on the display devices and the input devices.

Connections and Settings

All connectors are on the rear panel (figure 4).

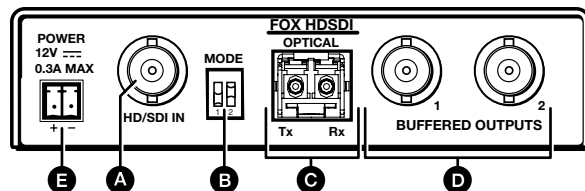


Figure 4. FOX 3G HD-SDI Transceiver Connectors

- | | |
|---|---|
| A HD-SDI Input BNC (see page 7) | D Buffered Outputs BNC (see page 8) |
| B Mode switch (see page 7) | E Power connector (see page 8) |
| C Fiber optic connectors (see page 7) | |

- A HD-SDI Input connector** (see [figure 4](#) on the previous page) — **If the FOX 3G HD-SDI is configured as either a bidirectional transceiver or as a transmitter**, connect an HD-SDI, SDI, or 3G-SDI video input to this BNC connector.
- B Mode switches** (see [figure 4](#)) — Set these DIP switches to the positions shown in the table below to select the transceiver configuration. See [Transceiver Configurations](#) on page 2 for more information.

	SW1	SW2	Mode
MODE 	Down	Down	Bidirectional transceiver (default position)
	Down	Up	Transmitter with local monitor outputs
	Up	Down	Receiver with daisy chaining
	Up	Up	Spare (functions as receiver with daisy chaining)

- C Fiber optic connectors** (see [figure 4](#)) —



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Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

AVERTISSEMENT : Le FOX 3G HD-SDI émet une lumière invisible en continu (conforme à la classe 1) qui peut être dangereux pour les yeux, à utiliser avec précaution.

Ne regardez pas dans les connecteurs de câble fibre optique sur le panneau arrière ou dans les câbles fibre optique eux-mêmes.

Branchez les protections contre la poussière dans l'ensemble émetteur/récepteur lorsque le câble fibre optique est débranché.

NOTE: Ensure that you use the proper fiber cable for your transceivers. Typically, singlemode fiber cable has a yellow jacket and multimode fiber cable has an orange or aqua jacket. Also, see [Fiber Compatibility Indications](#) on page 10 to determine the compatibility of the transceiver.

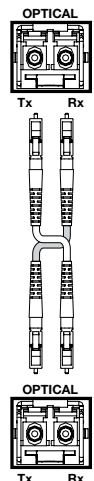
Tx — In any FOX 3G HD-SDI configuration, for all one-way HD-SDI, SDI, or 3G-SDI transmission, connect a fiber optic cable to the Optical Tx LC connector.

Connect the free end of this fiber optic cable to the Optical Rx LC connector on another FOX 3G HD-SDI transceiver that is configured as either a bidirectional transceiver or a receiver.

Rx — If the FOX 3G HD-SDI is configured as a bidirectional transceiver or as a receiver, for one-way communications from the transmitting unit, connect a fiber optic cable to the Optical Rx LC connector. Connect the free end as detailed below:

In a 2-transceiver system, connect the free end of this fiber optic cable to the Optical Tx LC connector on the transmitting FOX 3G HD-SDI, which is configured as a transmitter.

In a daisy-chained system, connect the free end of this fiber optic cable to the Optical Tx LC connector on the previous FOX 3G HD-SDI in the daisy chain.



- D Buffered Outputs connectors** (see [figure 4](#) on page 6) — In any FOX 3G HD-SDI configuration, connect a digital display to these BNC connectors. See Transceiver Configurations for more details.

If the FOX 3G HD-SDI is configured as a bidirectional transceiver, the video is output on both connectors 1 and 2 and is the video signal sent from the other transceiver.

If the FOX 3G HD-SDI is configured as a receiver, the video is output on connector 2 only and is the video sent by the transmitting unit.

If the FOX 3G HD-SDI is configured as a transmitter, the video is output on both connectors 1 and 2 and is looped through from the HD/SDI Input connector, [item A](#) on the previous page, on the same transceiver.

- E Power connector** (see [figure 4](#)) — Plug the included external 12 VDC power supply into this 2-pole captive screw connector. Figure 5 shows how to wire the power connector. Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

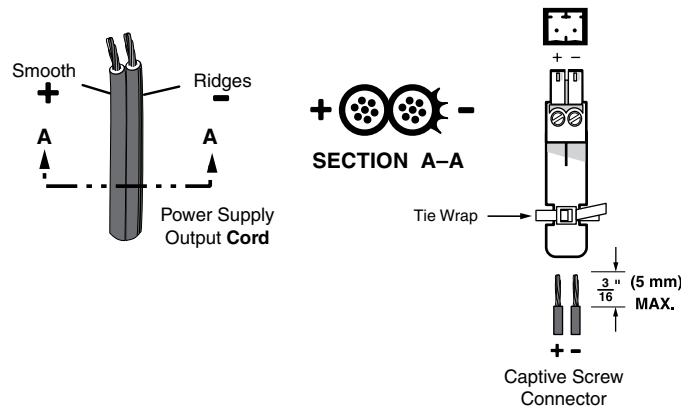


Figure 5. Power Connector Wiring

CAUTION: The length of the exposed wires in the stripping process is important. The ideal length is 3/16 inch (5 mm).

- Any longer and the exposed wires may touch, causing a short circuit between them.
- Any shorter and the wires can be easily pulled out even if tightly fastened by the captive screws.

ATTENTION : La longueur des câbles exposés est importante lorsque l'on entreprend de les dénuder. La longueur idéale est de 5 mm (3/16 inches).

- S'ils sont trop longs, les câbles exposés pourraient se toucher et provoquer un court-circuit.
- S'ils sont trop courts, ils peuvent être tirés facilement, même s'ils sont correctement serrés par les borniers à vis.

NOTE: Do not tin the power supply leads before installing them in the direct insertion connector. Tinned wires are not as secure in the connectors and could be pulled out.

**WARNING:**

The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

AVERTISSEMENT :

Les deux cordons d'alimentation doivent rester séparés tant que l'alimentation est branchée. Coupez l'alimentation avant de faire les raccordements.

CAUTION:

- If not provided with a power supply, this product is intended to be supplied by a power source marked "Class 2" or "LPS" and rated 12V DC, 0.5 A minimum. Always use a power supply supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to a building structure or similar structure.
- Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the unit. The ridges on the side of the cord ([figure 5](#) on the previous page) identify the power cord negative lead.

ATTENTION :

- Si le produit n'est pas fourni avec une source d'alimentation, il doit être alimenté par une source d'alimentation certifiée UL de classe 2 ou LPS, avec une tension nominale 12 Vcc, 0.5 A minimum. Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que le produit final.
- Sauf mention contraire, les adaptateurs CA/CC ne conviennent pas à une utilisation dans les espaces d'aération ou dans les cavités murales. Cette installation doit toujours être conforme aux dispositions applicables du Code américain de l'électricité (National Electrical Code) ANSI/NFPA 70, article 725, et du Code canadien de l'électricité, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à la structure de bâtiment ou à d'autres structures similaires.
- La polarité de la source d'alimentation est primordiale. Une polarité incorrecte pourrait endommager la source d'alimentation et l'unité. Repérez le pôle négatif du cordon d'alimentation grâce aux stries sur le côté du cordon ([illustration 5](#)).

Operation

After the transmitting and receiving units and all of their connected devices are powered up, the system is fully operational. If any problems are encountered, ensure all traditional and fiber cables are routed and connected properly.

Front Panel Indicators

All indicators are on the front panel (figure 6).

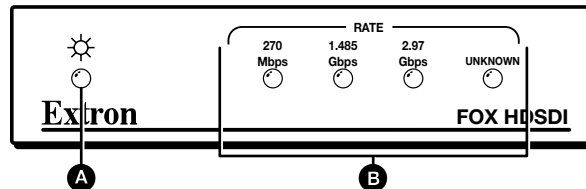


Figure 6. FOX 3G HD-SDI transceiver indicators

- A HD-SDI Input connector** — When lit, this light emitting diode (LED) indicates that the FOX 3G HD-SDI transceiver is receiving power.
- B Mode switches** — These LEDs light to indicate the detected input video rate, either on the HD/SDI input BNC (if configured as a transmitter) or on the Optical Rx connector (if configured as a receiver or bidirectional transceiver). The recognized rates are 270 Mbps, 1.485 Gbps, or 2.97 Gbps.

When the Rate Unknown LED lights, this indicates that an input is detected, either on the HD/SDI input BNC (if configured as a transmitter) or on the Optical Rx connector (if configured as a receiver or bidirectional transceiver), but that the FOX 3G HD-SDI does not recognize the rate.

NOTES:

- All four Rate LEDs blink repeatedly if a fiber optic connector module on the rear of the unit is unseated.
- The FOX 3G HD-SDI equalizes and distributes the input whether it recognizes the rate or not.

Fiber Compatibility Indications

You must use the proper fiber cable for your transceivers. Each transceiver indicates its fiber compatibility, singlemode or multimode, at power-up by blinking the four **Rate** indicators.

Multimode — The Rate LEDs blink once.

Singlemode — The Rate LEDs blink twice.

NOTES:

- To determine the fiber cable type, observe the cable jacket. Typically, singlemode fiber cable has a yellow jacket and multimode fiber cable has an orange or aqua jacket.
- All transceivers in the system **must** be the same model (all singlemode or all multimode). Mixed transmission mode units **will not work together**.

Unit Mounting

Mounting the Transceiver

ATTENTION:

- Installation and service must be performed by authorized personnel only.
- L'installation et l'entretien doivent être effectués par le personnel autorisé uniquement.

The 1-inch high, quarter rack width FOX 3G HD-SDI can be placed on a tabletop. It can also be mounted on any of the following ways:

- On a rack shelf
- Through a desk or tabletop
- Under a desk or tabletop
- On a projector bracket

Tabletop Use

Affix the included rubber feet to the bottom of the unit and place it in any convenient location.

Mounting Kit

Mount the unit using any compatible rack, furniture, or projector mounting kit, listed on the Extron website (www.extron.com), in accordance with the directions included with the kit. For rack shelf mounting, also see "UL Rack-Mounting Guidelines."

UL Rack-Mounting Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the FOX 3G HD-SDI into a rack.

- **Elevated operating ambient** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the +122 °F (+50 °C) maximum ambient temperature (T_{ma}) specified by Extron.
- **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876
Asia: 65.6383.4400

Europe: 31.33.453.4040
Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.