Extron® Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

FOX HD-SDI

Multi-Rate SDI Fiber Optic Transceiver

68-1384-01 **Rev. A**
11 07

Precautions

Safety Instructions • English

⚠ **This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.**

⚡ **This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.**

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

⚠ **Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).**

⚡ **Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.**

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

⚠ **Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.**

⚡ **Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.**

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

⚠ **Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.**

⚡ **Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.**

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrian implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplactment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst zu öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o al extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

Extron's 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
1001 East Ball Road
Anaheim, CA 92805, USA

Asia:

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

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Japan:

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

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 non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

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.

安全须知 • 中文

⚠️ 这个符号提示用户该设备用户手册中有重要的操作和维护说明。

⚡ 这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。 必须使用与厂家推荐的相同或相近型号的电池。 按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

Quick Start Guide — FOX HD-SDI

NOTE *The FOX HD-SDI is a transceiver that can function as a transmitter and/or a receiver. At least two units are required for a transmitter-receiver system with at least one fiber optic cable linking each two units. The FOX HD-SDI is available in single mode or multimode versions.*
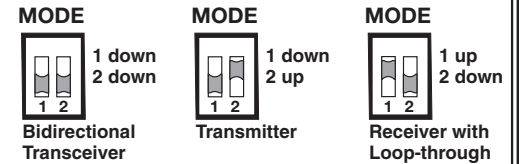
Connect and operate two or more FOX HD-SDI units as follows:

Step 1
Power off all equipment. If desired, mount the units in racks.

Step 2
Use the rear panel Mode DIP switches to configure each unit to be installed in the system as a bidirectional transceiver, a transmitter, or a receiver as shown above right.

MODE
1 down
2 down
Bidirectional Transceiver

MODE
1 down
2 up
Transmitter

MODE
1 up
2 down
Receiver with Loop-through

NOTE *The drawings below and on QS-2 show the signal flow for the three different FOX HD-SDI configurations. For more information on the various modes and their capabilities, see "Transceiver configurations" in chapter 1, "Introduction".*
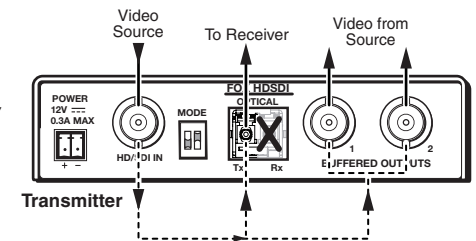
Step 3
Transmitting unit — Connect an HD-SDI, SDI, or 3G-SDI video source to the unit's HD/SDI In BNC connector.
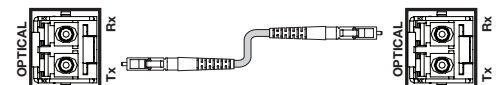
HD/SDI IN

Step 4
Transmitting unit — If the FOX HD-SDI is <u>configured as a transmitter</u>, and if desired, connect one or two local monitors to the unit's Buffered Outputs BNC connectors. These two BNCs output the same HD-SDI, SDI, or 3G-SDI video that was input in **step 3**.

Video Source

To Receiver

Video from Source

POWER
12V
0.3A MAX

FOX HDSDI
OPTICAL

MODE

HD/SDI IN

Tx   Rx

BUFFERED OUTPUTS

Transmitter

Step 5
Both units — Connect a fiber cable between the transmitting unit's Optical Tx connector and the receiving unit's Optical Rx connector.
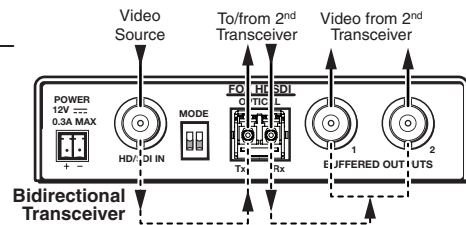
OPTICAL   Rx   Tx

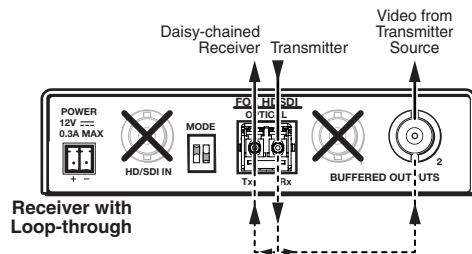OPTICAL   Rx   Tx

Quick Start Guide — FOX HD-SDI, cont'd

Step 6

Receiving unit — Connect one or two monitors to the unit's Buffered Outputs BNC connectors.

Unit configured as bidirectional transceiver — Both BNCs output the HD-SDI, SDI, or 3G-SDI video that was transmitted across the fiber cable.

Video Source   To/from 2nd Transceiver   Video from 2nd Transceiver

POWER 12V 0.3A MAX   MODE   FOX HD-SDI OPTICAL

HD/SDI IN   Tx Rx   BUFFERED OUTPUTS 1 2

Bidirectional Transceiver

Unit configured as receiver — Output 2 BNC **only** outputs the transmitted video.

Daisy-chained Receiver   Transmitter   Video from Transmitter Source

POWER 12V 0.3A MAX   MODE   FOX HD-SDI OPTICAL

HD/SDI IN   Tx Rx   BUFFERED OUTPUTS 2

Receiver with Loop-through

Step 7

Receiving unit — If desired, connect a fiber cable between the receiving unit's Optical Tx connector and another unit's Optical Rx connector.

Unit configured as bidirectional transceiver — Connect the fiber cable to the transmitting unit.

Unit configured as a receiver — Connect the fiber cable to another receiving unit for daisy chaining.

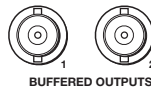**NOTE**   *Up to 10 receivers can be daisy-chained in this manner.*

Step 8

Receiving unit configured as bidirectional transceiver — Connect a video source to the unit's HD/SDI In BNC connector.

HD/SDI IN

Step 9

Transmitting unit configured as a bidirectional transceiver — Connect one or two local monitors to the unit's Buffered Outputs BNC connectors. These two BNCs output the same video that was input in **step 8**.

1 2
BUFFERED OUTPUTS

Step 10

Connect power to all FOX units and to all connected video sources and displays.

Table of Contents

All trademarks mentioned in this manual are the properties of their respective owners.

FOX HD-SDI

1

Chapter One

Introduction

About this Manual

About the FOX HD-SDI

Features

Introduction

WARNING | *The FOX HD-SDI units output continuous, invisible light, which may be harmful and dangerous 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.*

About this Manual

This manual contains information about the following Extron FOX HD-SDI fiber optic transceiver products:

- **FOX HD-SDI MM**, a multimode, long distance (up to 500 m [1,640']) transceiver

- **FOX HD-SDI SM**, a singlemode, very long distance (up to 30 km [18.75 miles]) transceiver (figure 1-1)
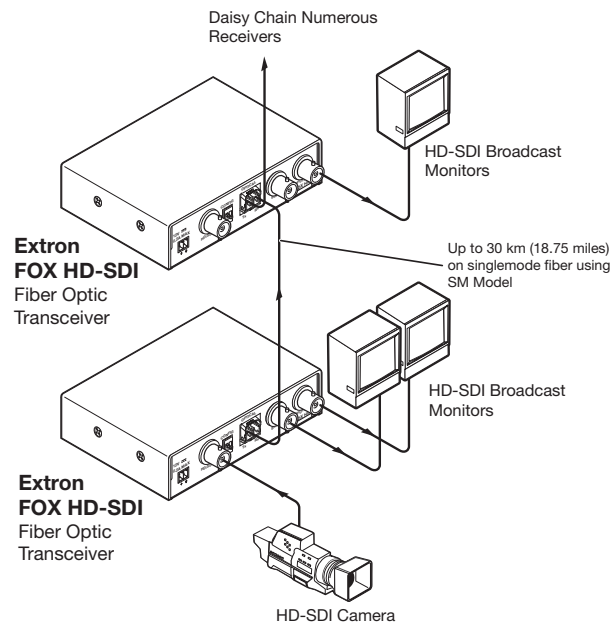

Figure 1-1 — Typical FOX HD-SDI application

NOTE | *The two products are physically and functionally identical, with the exception of the effective range of transmission. In this manual, the term "FOX HD-SDI" refers to either product.*

About the FOX HD-SDI

The Extron FOX HD-SDI product family consists of two models (MM and SM) 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 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 ②, "Mode switches", on page 2-11 to set the configuration.*

Bidirectional transceiver

NOTE | *In this manual, the term "transceiver" refers to any FOX HD-SDI; the term "bidirectional transceiver" refers to a FOX HD-SDI configured as described in this section.*

NOTE | *Although the description below does allow connection of a FOX HD-SDI configured as transmitter or receiver, the typical configuration is as shown: two bidirectional transceivers.*

A FOX HD-SDI that is configured as a bidirectional transceiver (figure 1-2) 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 HD-SDI that is configured as a bidirectional transceiver or as a receiver.
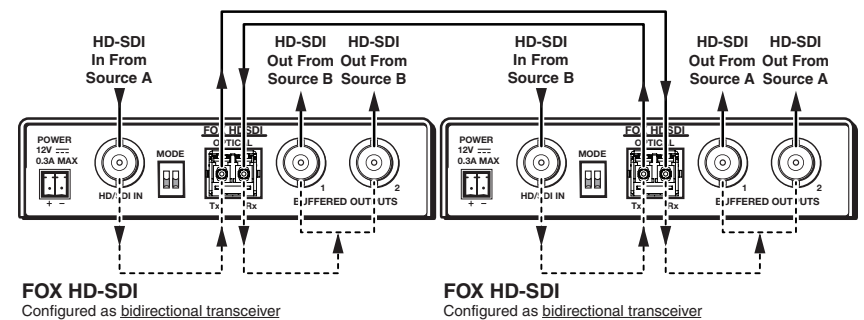

Figure 1-2 — Bidirectional transceiver connections

Introduction, cont'd

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 to 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 HD-SDI configured as a bidirectional transceiver, the typical configuration is as shown: a transmitter and one or more receivers.*

A FOX HD-SDI that is configured as a transmitter (figure 1-3) 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 HD-SDI that is configured as a receiver or as a bidirectional transceiver. The transmitter also simultaneously outputs the digital video on its two Buffered Outputs BNCs.
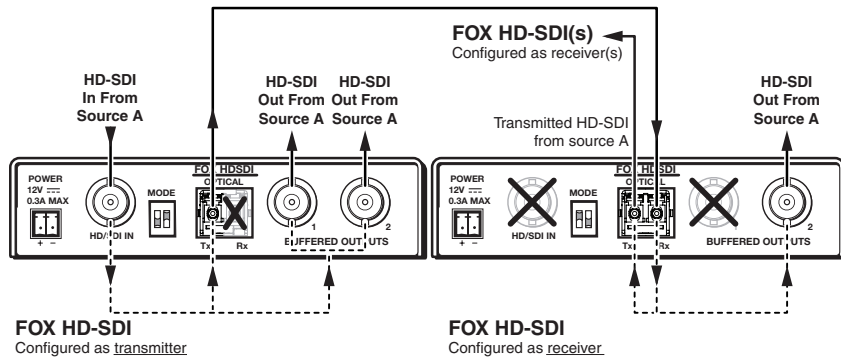

Figure 1-3 — Transmitter-to-receiver connections

A FOX 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 Rx port over a fiber link to another FOX 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

Extends HD-SDI, SDI, and 3G-SDI signals very long distances over a single fiber — The FOX 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.

Video input — When it is configured as a transmitter, the FOX 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 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 HD-SDI automatically equalizes incoming multi-rate SDI signals, and reshapes and restores signals on its buffered outputs.

Daisy chain capability — Up to 10 transceivers can be daisy chained to send the video to multiple locations when one of more units are configured as receivers.

Real-time status LED indicators for troubleshooting and monitoring

1" high, quarter rack width, metal enclosures — With low profile enclosures, the transceiver can be discreetly installed in a variety of locations, such as behind a plasma or LCD flat-panel display.

Rack mountable — The unit is rack mountable in any conventional 19" wide rack, using any of a variety of Extron's rack shelves.

Power — The unit's 100 VAC to 240 VAC, external power supply provides worldwide power compatibility.

FOX HD-SDI

2

Chapter Two

Installation and Operation

Mounting the Unit

Connections and Settings

Operation

Installation and Operation

Mounting the Unit

CAUTION *Installation and service must be performed by authorized personnel only.*

The 1" high, quarter-rack width transceiver can be placed on a tabletop, mounted on a rack shelf, mounted under a desk or tabletop, or mounted on a projector bracket.

Tabletop placement

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

Rack mounting

UL requirements

The following Underwriters Laboratories (UL) requirements pertain to the installation of the FOX HD-SDI transmitter or receiver into a rack (figure 2-1).

1. **Elevated operating ambient temperature** — 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 (Tma) specified by Extron.

2. **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.

3. **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

4. **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.

5. **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).

Mounting instructions

For optional rack mounting, mount the transceiver on any of the following rack shelves:

*   RSF 123 3.5" deep 1U VersaTools® rack shelf kit (part **#60-190-20**) (figure 2-1)
*   RSB 123 3.5" deep 1U VersaTools rack shelf (part **#60-604-20**)
*   RSU 126 6" deep 1U universal rack shelf kit (part **#60-190-10**)
*   RSB 126 6" deep 1U basic rack shelf (part **#60-604-10**)
*   RSU 129 9.5" deep 1U universal rack shelf kit (part **#60-190-01**) (figure 2-2 on the next page)
*   RSB 129 9.5" deep 1U basic rack shelf (part **#60-604-01**)

VersaTools Rack Shelf

1/4 Rack Width Front False Faceplate

Use 2 mounting holes on opposite corners.
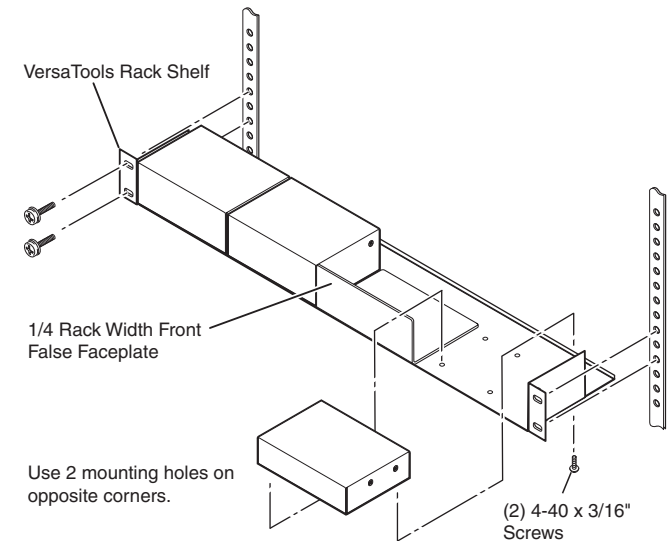
(2) 4-40 x 3/16" Screws

Figure 2-1 — Mounting the transceiver on a VersaTools rack shelf

On the non-VersaTools rack shelves, the transceiver unit can be mounted in the front or the rear of the rack.

1. If installed, remove the feet from the bottom of the unit.

2. Mount the unit on the shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the unit to the shelf.

3. Install false faceplate(s) or other unit(s) to the rack shelf.

4. Insert the shelf into the rack, aligning the holes in the shelf with those of the rack.
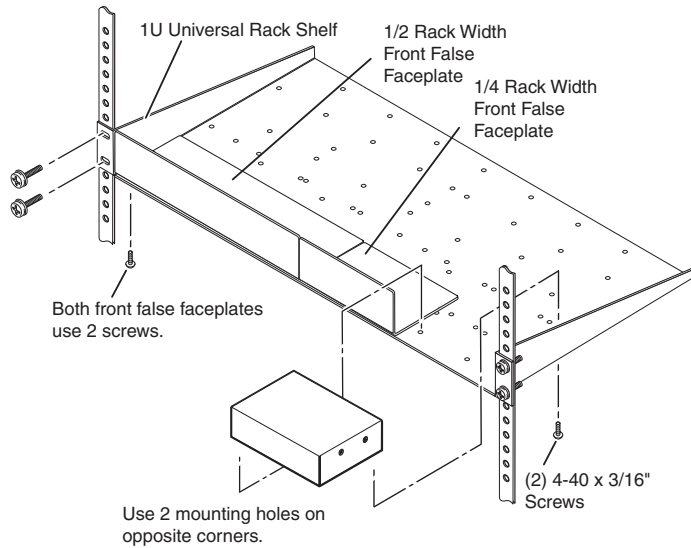
Figure 2-2 — Mounting the transceiver on a standard rack shelf

5. Secure the shelf to the rack using the supplied machine screws.

Furniture mounting

The transceiver can be mounted under a horizontal surface using an optional MBU 125 under-desk mounting kit (part #**70-077-01**). Mount the unit under a desk or table as follows:

1. If rubber feet were previously installed on the bottom of the unit, remove them.

2. Secure the under-desk mounting brackets to the transceiver with the four machine screws provided in the mounting kit (figure 2-3).

3. Hold the transceiver with attached brackets against the underside of the desk or other furniture. Mark the location of holes for screws on the desk.

4. Drill 1/4" (6.4 mm) deep, 3/32" (2 mm) diameter pilot holes in the table or desk at the marked screw locations from the underside or inside (the concealed side) of the furniture, where the transceiver will be located.

5. Insert the four wood screws into the pilot holes. Fasten each screw into the installation surface until just less than 1/4" of the screw head protrudes.
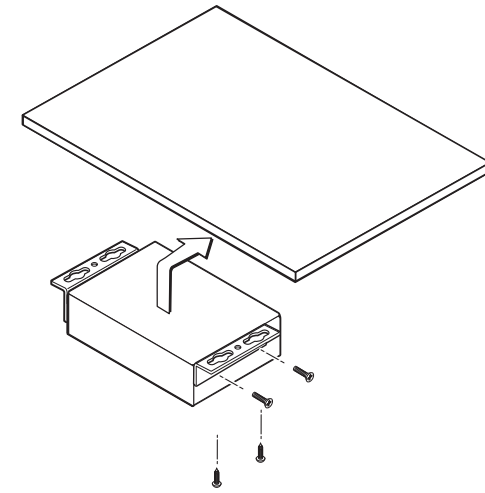

Figure 2-3 — Under-desk mounting

6. Align the installed screws with the slots in the mounting brackets, and place the transceiver against the surface, with the screws through the bracket slots.

7. Slide the transceiver slightly forward or back, then tighten all four screws to fasten it in place.

Through-desk mounting

The transceiver can be mounted through a desk or other furniture using an optional Extron MBD 129 through-desk mounting kit, part #**70-077-02**. Mount the transceiver through a desk or table as follows (figure 2-4):
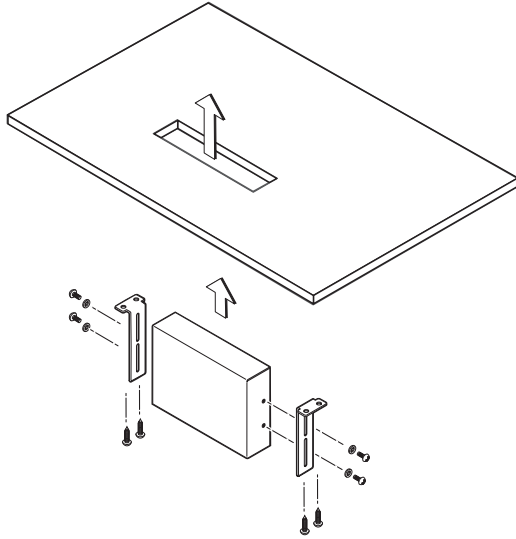
Figure 2-4 — Through-desk mounting

1. Loosely attach the mounting brackets to the transceiver using the four machine screws and washers supplied with the mounting kit.

2. Hold the transceiver against the inside of the surface through which it will be mounted. Mark the four screw holes on the inside of the surface to which you are mounting the device.

3. Drill four pilot holes, each 3/32" in diameter by 1/4" deep, where you made marks.

4. Using the provided four wood screws, secure the brackets to the mounting surface.

5. Slide the transceiver up and down in the mounting brackets until the face of the transmitter or receiver is at the desired height. Tighten the screws that secure the brackets in place.

   If the screws are inaccessible to a screwdriver:

   a. On the transceiver, mark the location of the brackets relative to the screws.

   b. Remove the transceiver from inside the furniture.

c. Tighten the screws.

d. Replace the unit inside the surface (step **4**).

Projector mounting

The transceiver can be mounted on a projector bracket using either of the following optional Extron projector mounting kits:

- PMK 300 projector mounting kit (part #**70-374-01**)

- PMK 350 low profile projector mounting kit (part #**70-563-02** [black] or part #**70-563-03** [white])

PMK 300 mounting

Mount the transceiver to a PMK 300 bracket as follows:

1. If necessary, remove the feet from the bottom of the transceiver.

2. Mount the transceiver to one of the bracket's three mounting plates using two of the supplied 4-40 x 3/16" screws in opposite (diagonal) corners to secure the device to the bracket. It can be vertically mounted facing either up or down (figure 2-5).

NOTE *On the side mounting plates, the device is typically mounted on the outside of the bracket.*
On the front mounting plate, the device is typically mounted on the inside of the bracket.
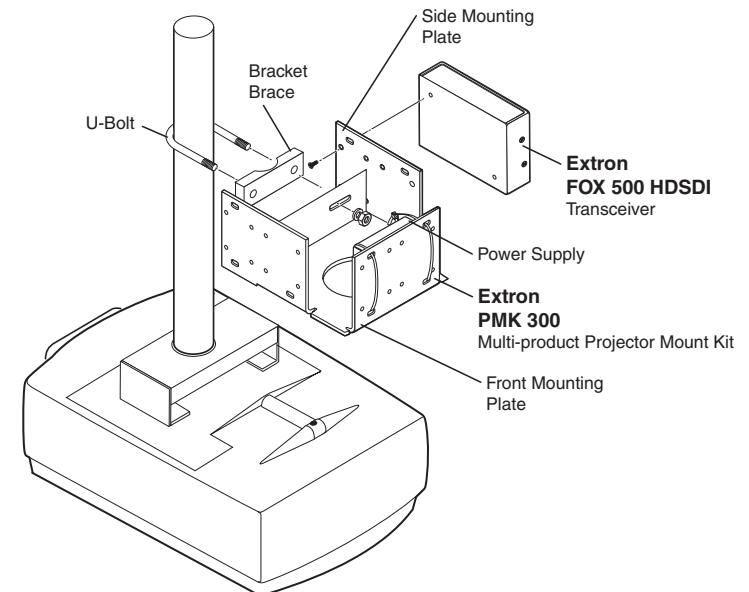
Figure 2-5 — PMK 300 projector mounting a transceiver

3. Use the two included tie wraps to strap the power supply to one of the brackets.

> **NOTE** *The PMK 300 has a hole in the bottom plate that allows the projector pole to be inserted through the center of the plate (figure 2-6), rather than outside of the plate (figure 2-5). To install the PMK 300 in this configuration, slide the bracket up from the bottom of the pole before the projector is installed on the pole.*
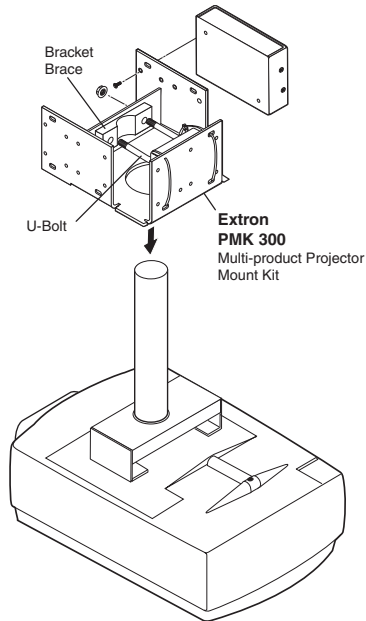

Figure 2-6 — Projector pole on the inside

4. Place the contoured bracket brace against the pole and opposite the back plate. The pole should fit snugly into the depression in the center of the bracket brace.

5. Place the U-bolt around the ceiling pole and insert the two legs of the U-bolt through the round holes on the contoured bracket brace and then through the slotted holes on the bracket's mounting plate.

> **NOTE** *The supplied U-bolt fits a typical (1.5" to 2.0" diameter) ceiling pole.*

6. Secure the bracket to the U-bolt with the included hex nuts, washers, and lock washers. Tighten the hex nuts just enough that they can be loosened by hand.

PMK 350 mounting

Mount the transceiver to a PMK 350 bracket as follows:

1. Remove the front and back plates from the PMK 350 (figure 2-7), using an Extron Tweeker or a #2 Philips screwdriver. Retain the screws to reattach the plates when you are finished.

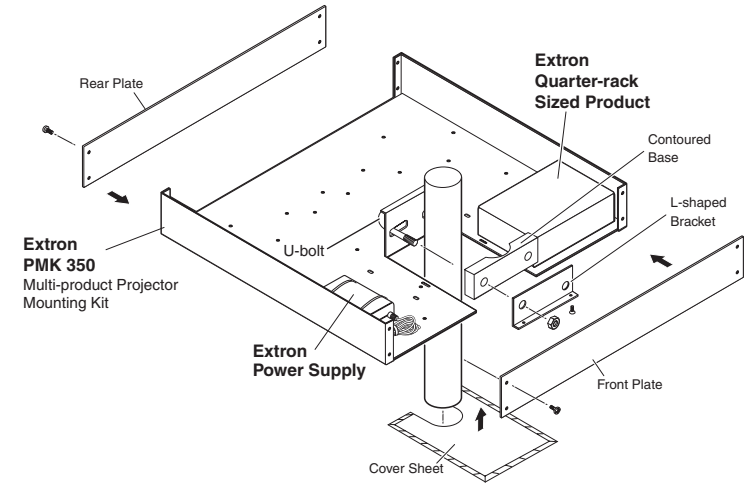*Figure 2-7 — PMK 350 projector mounting a transceiver*

2. If necessary, remove the feet from the bottom of the receiver.

3. Secure the transceiver to one side of the mounting tray, using two of the supplied 4-40 x 3/16" screws in opposite (diagonal) corners.

4. Use the two included tie wraps to strap the power supply to the bracket.

5. Place the PMK 350 around the projector ceiling mounting pole (figure 2-7, above).

6. Assemble the U-bolt and the following parts in the following order (figure 2-8):
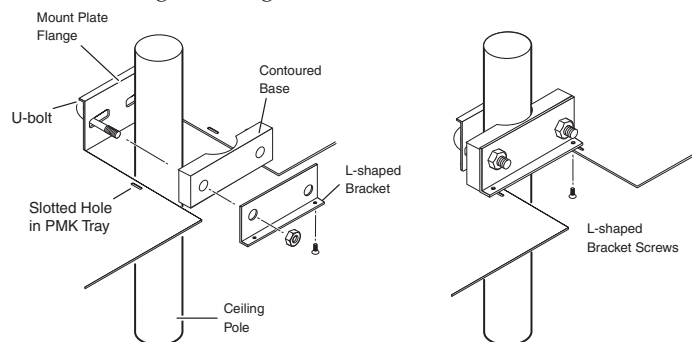

Figure 2-8 — Hanging the tray on the pole

a. Pass the legs of the U-bolt through the slotted holes on the mount plate flange.

b. Place the legs around the projector pole.

c. Pass the legs through the holes in the contour base.

NOTE *The pole fits snugly into the depression in the center of the contoured base.*

d. Pass the U-bolt legs through the holes in the L-shaped bracket.

NOTE *The supplied U-bolt fits a typical (1.5" to 2.0" diameter) ceiling pole.*

7. Align the two slotted holes in the bottom of the L-shaped bracket with the two slotted holes in the base of the tray. Secure the L-shaped bracket to the base by inserting two provided 6-32 x 5/16" screws through the aligned slots.

8. Move the PMK 350 up to the desired location on the ceiling pole, as close to the ceiling as desired.

9. Secure the L-shaped bracket to the U-bolt using the included hex nuts, washers, and lock washers. Tighten the hex nuts securely.

NOTE *Be sure to tighten the hex nuts securely enough that the PMK 350 does not slide down the ceiling pole. A socket wrench is recommended to tighten the hex nuts.*

10. Secure the front panel to the mounting tray with four of the included #6 screws.

11. If desired, choose one of the provided four sizes of self-adhesive cover sheets, and apply it to the underside of the mounting tray.

Connections and Settings

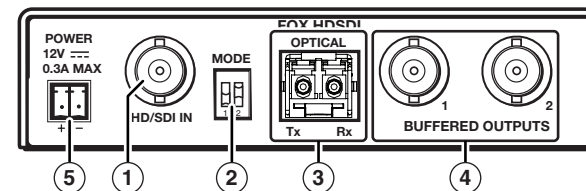All connectors are on the rear panel (figure 2-9).

Figure 2-9 — FOX HD-SDI transceiver's connectors

① **HD-SDI Input connector — If the FOX 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.

② **Mode switches —** Set these DIP switches to the positions shown in the table below to select the transceiver configuration. See "Transceiver configurations" on page 1-3 for more information.

MODE	SW1	SW2	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)

③ **Fiber optic connectors —**

WARNING *This unit outputs continuous invisible light, which may be harmful and dangerous to the eyes; use with caution. For additional safety, plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.*

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 jacket. Also, see "Fiber Compatibility Indications" on page 2-14 to determine the transceiver's compatibility.*

Tx — In any FOX 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 connector on another FOX HD-SDI transceiver that is configured as a bidirectional transceiver or as a receiver.

Rx — If the FOX 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 connector.

If the FOX HD-SDI is configured as a bidirectional transceiver, connect the free end of this fiber optic cable to the Optical Tx connector on the transmitting FOX HD-SDI.

If the FOX HD-SDI is configured as a receiver, connect the free end of this fiber optic cable to the Optical Tx connector on the next FOX HD-SDI in the daisy chain.

④ **Buffered Outputs connectors — In any FOX HD-SDI configuration**, connect a digital display to these BNC connectors. See "Transceiver configurations" on page 1-3 for more details.

If the FOX 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 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 HD-SDI is configured as a transmitter, the video is output on both connectors 1 and 2 and is looped through from the same transceiver's HD/SDI Input connector, item ①.

⑤ **Power connector —** Plug the included external 12 VDC power supply into this 2-pole captive screw connector. See "Power supply wiring", on the next page, to wire the connector.

Power supply wiring

Figure 2-10 shows how to wire the power connector.

Figure 2-10 — Power connector wiring

CAUTION *Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the FOX HD-SDI. Identify the power cord negative lead by the ridges on the side of the cord (figure 2-10).*

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

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

CAUTION *The length of the exposed (stripped) copper wires is important. The ideal length is **3/16" (5 mm)**. Longer bare wires can short together. Shorter wires are not as secure in the connectors and could be pulled out.*

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

Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

Alternatively, an optional Extron PS 123 Universal 12 VDC Power Supply, part **#60-814-01**, can power multiple Extron 12 VDC devices using only one AC power connector.

Operation

Front panel indicators

All indicators are on the front panel (figure 2-13).

Figure 2-13 — FOX HD-SDI's transceiver's indicators

① **Power indicator** — When lit, this light emitting diode (LED) indicates that the FOX HD-SDI transceiver is receiving power.

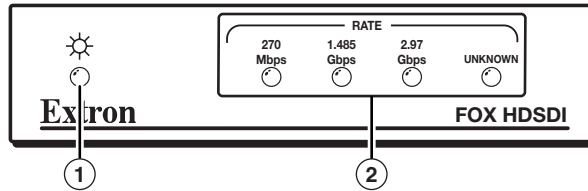② **Rate indicators** — These LEDs light to indicate the detected input video rate, either on the HD/SDI input BNC (if configured as a transmitter) or on the Optical Rx connector (if configured as a receiver or bidirectional transceiver). The recognized rates are 270 Mbps, 1.485 Gbps, or 2.97 Gbps.

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 HD-SDI does not recognize the rate.

NOTE *All four Rate LEDs blink repeatedly if a fiber optic connector module on the rear of the unit is unseated.*

NOTE *The FOX 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.

NOTE *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 jacket.*

NOTE *All transceivers in the system **must** be the same model (all singlemode or all multimode). Mixed transmission mode units **will not work together**.*

System 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.

FOX HD-SDI

A

Appendix A

Reference Information

Specifications

Part Numbers

Reference Information

Specifications

The FOX HD-SDI is a transceiver that can function as a transmitter and/or as a receiver. Two units are required for a transmitter-receiver system with one fiber optic cable linking the two units. The FOX HD-SDI is available in single mode or multimode versions.

These transceivers are class 1 laser products. They meet the safety regulations of IEC-60825, FDA 21, CFR 1040.10, and FDA 21 CFR 1040.11.

Optical fiber interconnection between transmitter and receiver

Number/type .... 1 fiber optic

Only one fiber is required to transmit video and embedded audio and unidirectional data.

Connectors .... 1 LC connector

Operating distance........................ 30 km (18.75 miles) with singlemode (SM) cables with a FOX HD-SDI SM
500 m (1640') with multimode (MM) cables with a FOX HD-SDI MM

Operating distance is approximate. These are typical distances. The maximum distance may be greater than these typical numbers depending on factors such as fiber type, fiber bandwidth, connector splicing, losses, modal or chromatic dispersion, environmental factors, and kinks.

Nominal peak wavelength........... 850 nm for FOX HD-SDI MM,
1310 nm for FOX HD-SDI SM

Transmission power
    Singlemode......................... -5 dBm, typical
    Multimode.......................... -5 dBm, typical

Maximum receiver sensitivity
    Singlemode......................... -18 dBm, typical
    Multimode.......................... -12 dBm, typical

Optical loss budget
    Singlemode......................... 13 dB, maximum
    Multimode.......................... 7 dB, maximum

Video

Signal type..................................... HD-SDI, SDI, and 3G-SDI digital video signals

Gain .... Unity

Resolution...................................... 8 or 10 bits, automatic

Data rates....................................... 270 Mbps, 1.485 Gbps, 2.970 Gbps

Operation standards .... SMPTE 259M-C, SMPTE 292M, SMPTE 424M, ITU-R BT.601, ITU-R BT.1120, DVB-ASI

Auto data rate lock........................ Yes

Video input— transmitter

Number/signal type..................... 1 single link SDI, HD-SDI, or 3G-SDI digital component video

Connectors .... 1 female BNC

Data rates....................................... 19 Mbps to 2.97 Gbps

Nominal level .... 0.8 Vp-p

Minimum/maximum levels........ 0.5 V to 1 Vp-p with no offset

Impedance .... 75 ohms

Return loss .... <-15 dB @ 5 MHz to 2.97 GHz

DC offset (max. allowable)........... 5 V

Input coupling .... AC

Input cable equalization............... Automatic for up to -30 dB of cable loss
    HD-SDI .... 120 m (400') using Extron RG6 cable
90 m (300') using Extron RG59 cable
    SDI...................................... 150 m (500') using Extron RG6 cable
120 m (400') using Extron RG59 cable

The transmission distance varies depending on the signal resolution and on the type of cable, graphic card, and display used in the system.

Video output — receiver

Number/signal type..................... 2 single link SDI, HD-SDI, or 3G-SDI digital component video

Connectors .... 2 female BNC

Reclocking..................................... Automatic for 270 Mbps, 1.485 Gbps, 2.97 Gbps, or bypassed for unrecognized rates

Nominal level .... 0.8 Vp-p

Minimum/maximum levels........ 0.5 V to 1.0 Vp-p

Impedance .... 75 ohms

Reference Information, cont'd

Return loss .... <-25 dB @ 100 MHz

DC offset .... ±5 mV with input at 0 offset

General

External power supply .... 100 VAC to 240 VAC, 50/60 Hz, 6 watts, external; to 12 VDC, 2 A, regulated

Power input requirements........... 12 VDC, 0.3 A

Temperature/humidity................ Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing
Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing

Cooling .... Convection, unvented

Rack mount .... Yes, with optional 1U, 9.5" deep rack shelf, part #60-190-01 or 60-604-01;
1U, 6" deep rack shelf, part #60-190-10, 60-604-10;
or VersaTools® 1U, 3" deep rack shelf, part #60-190-20 or 60-604-20.
Also furniture mountable with optional Through-Desk Mounting Kit, #70-077-02, or Under-Desk Mounting Kit, #70-077-01; or attachable to a projector mount using optional kit #70-526-02 or 70-077-04.

Enclosure type .... Metal

Enclosure dimensions................... 1.0" H x 4.3" W x 3.0" D
(quarter rack wide)
2.5 cm H x 10.9 cm W x 7.6 cm D
(Depth excludes connectors.)

Product weight .... 0.5 lb (0.3 kg) per each unit

Shipping weight .... 3 lbs (2 kg) per each unit

Vibration .... ISTA 1A in carton
(International Safe Transit Association)

Listings... UL, CUL

Compliances................................... CE, FCC Class A, VCCI, AS/NZS, ICES, FDA Class 1

MTBF... 30,000 hours

Warranty .... 3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers

FOX HD-SDI part numbers

NOTE *The FOX HD-SDI is a transceiver that can function as a transmitter and/or as a receiver. At least two units are required for a transmitter-receiver system with one fiber optic cable linking the two units.*
Additional transceivers configured as receivers can be added to the system for daisy-chaining.

The FOX HD-SDI is available in singlemode (SM) and multimode (MM) models:

FOX HD-SDI Models	Part number
FOX HD-SDI SM	60-901-01
FOX HD-SDI MM	60-900-01

Included parts

These items are included in each order for a FOX HD-SDI:

Included parts	Replacement part number
12 VDC power supply	70-055-01
Tweeker (small screwdriver)	
User's guide	
(1) 10' LC-LC duplex patch cables (SM or MM, depending on the model)	

Reference Information, cont'd

Optional accessories

Accessories	Part number
RSU 129 9.5" 1U universal rack shelf kit	60-190-01
RSB 129 9.5" 1U basic rack shelf	60-604-01
RSU 126 6" deep 1U universal rack shelf kit	60-190-10
RSU 126 6" deep 1U universal rack shelf	60-604-10
RSF 123 3.5" deep 1U VersaTools® rack shelf kit	60-190-20
RSB 123 3.5" deep 1U VersaTools rack shelf	60-604-20
MBD 129 through desk mounting kit	70-077-02
PMK 300 projector mounting kit	70-374-01
PMK 350 low profile projector mounting kit, black (white)	70-563-02 (03)