Extron® Electronics

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User's Manual

FOX 500 Tx / Rx

High Resolution Fiber Optic Transmitters and Receivers

68-1308-01 **Rev. A**
01 07

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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 especificamente 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 remplacment 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 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 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 sobrecalientamiento 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.

FCC Class A Notice

Note: 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. These 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: These units was tested with shielded cables on the peripheral devices and between the transmitter and receiver. Shielded cables must be used with the units to ensure compliance.

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的操作和维护说明。

这个符号警告用户该设备机壳内暴露的危险电压，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。 设备必用有地线供电系统供电。第三条线（地线）是安设施，不能不用或跳过。

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

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。 设备部没有用户可以更换的零件。为避免出现触电危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。必须使与厂家推荐的相同或相近型号的电池。按照生产厂的

议处理废弃电池。

Quick Start Guide — FOX 500 Tx/Rx

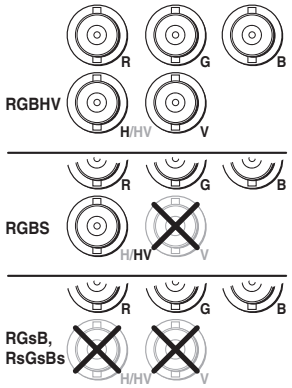
Install, connect, and operate the FOX 500 Tx/Rx as follows:

Step 1

Turn all of the equipment off or disconnect it from the power source. If desired, mount the FOX 500 units in a rack or furniture, or place them on desktops.

Step 2

Connect a VGA to UXGA source to the transmitter: **either** to the RGB Input 15-pin HD connector **or** to the RGB Input BNC connectors. See the drawing at right to wire the BNC connectors.

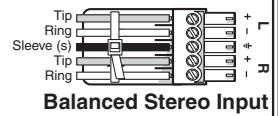


Step 3

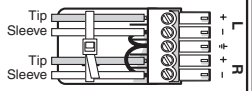
If desired, connect a local monitor to the transmitter's Buffered Loop-Through 15-pin HD connector.

Step 4

Connect a balanced or unbalanced, stereo or mono audio input to the transmitter: **either** to the Audio Inputs 3.5 mm mini jack **or** to the Audio Inputs 5-pole captive screw connector. See the drawing at right to wire the captive screw connector.



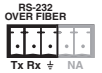
Balanced Stereo Input



Unbalanced Stereo Input

Step 5

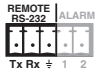
If you want the FOX 500 to pass serial signals, such as for serial control of a projector, connect the master device to the transmitter and the slave device to the receiver via three poles of the RS-232 Over Fiber captive screw connector on both units.



NOTE *For RS-232 responses (from the receiver to the transmitter), you must install fiber cable Optical 2. See Step 8.*

Step 6

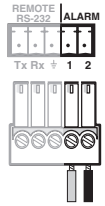
For serial control of the transmitter and receiver, connect a host device to either unit via three poles of the Remote RS-232/Alarm captive screw connector or to either unit's front panel Configuration connector.



Quick Start Guide — FOX 500 Tx/Rx cont'd

Step 7

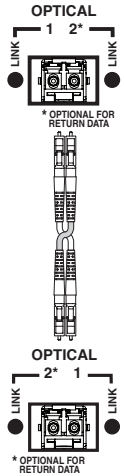
For remote monitoring of the status of the optical links, connect a locally constructed or obtained device to the two Alarm poles of the units' RS-232/Alarm 5-pole captive screw connectors. The two poles are shorted together when no light is detected.



NOTE *The transmitter's Alarm port reports the status of the Optical 2 light link.*
The receiver's Alarm port reports the status of the Optical 1 light link.

Step 8

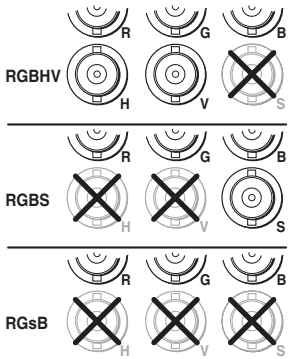
Connect the Optical 1 (required) and Optical 2 (optional) fiber cables between the transmitter and receiver.



NOTE *Only Optical 1 is required for video, audio, and serial command transmission. Optical 2 is required only to send serial data (such as commands from the receiver to the transmitter and passed responses from the controlled device (such as a projector) to the controlling device.*

Step 9

Connect 1 or 2 RGBHV, RGBS, or RGsB displays to the receiver: to the RGB Output 15-pin HD connector and/or to the RGB Outputs BNC connectors. See the drawing at right.

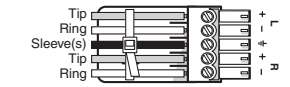


Step 10

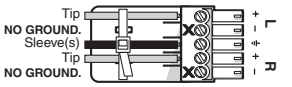
Using the menu system, select the Alt. Pixels test pattern (see chapter 3, "Operation"). Set your display's total pixel and phase for the best picture.

Step 11

Connect balanced or unbalanced stereo or mono audio devices to the receiver: to the Audio Outputs 3.5 mm mini jack and/or to the Audio Outputs 5-pole captive screw connector.



Balanced Stereo Output



Unbalanced Stereo Output

CAUTION *Connect the sleeve to ground (Gnd). Connecting it to a negative (-) terminal will damage the audio output circuits.*

Table of Contents, cont'd

68-1308-01 **Rev. A**
01 07

1 Chapter One

Introduction

About this Manual

About the FOX 500 Tx/Rx

Features

WARNING *The FOX 500 Tx/Rx 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 two Extron FOX 500 Tx/Rx fiber optic transmitter and receiver set products:

- **FOX 500 MM Tx/Rx**, a multimode (long distance - up to 150 m [450']) transmitter/receiver pair
- **FOX 500 SM Tx/Rx**, a singlemode (very long distance - up to 30 km [18.75 miles]) transmitter/receiver pair

NOTE *The two products are physically and functionally identical, with the exception of the effective range of transmission. In this manual, the term "FOX 500" refers to either product.*

About the FOX 500 Tx/Rx

The Extron FOX 500 Tx/Rx (figure 1-1) are two models of ultra-high performance RGB video, audio, and RS-232 serial communications fiber optic transmitter/receiver pairs.

The transmitter inputs VGA - UXGA RGB video, audio, and one-way (transmitter-to-receiver) RS-232 communications (for applications such as projector control); converts them to a proprietary signal; and outputs the signal on a single fiber optic cable to the receiver. Optional return (receiver-to-transmitter) serial RS-232 communications, such as projector responses, require a second fiber optic cable. The transmitter also buffers the RGB input and loops it through on a 15-pin HD connector for use by a local monitor.

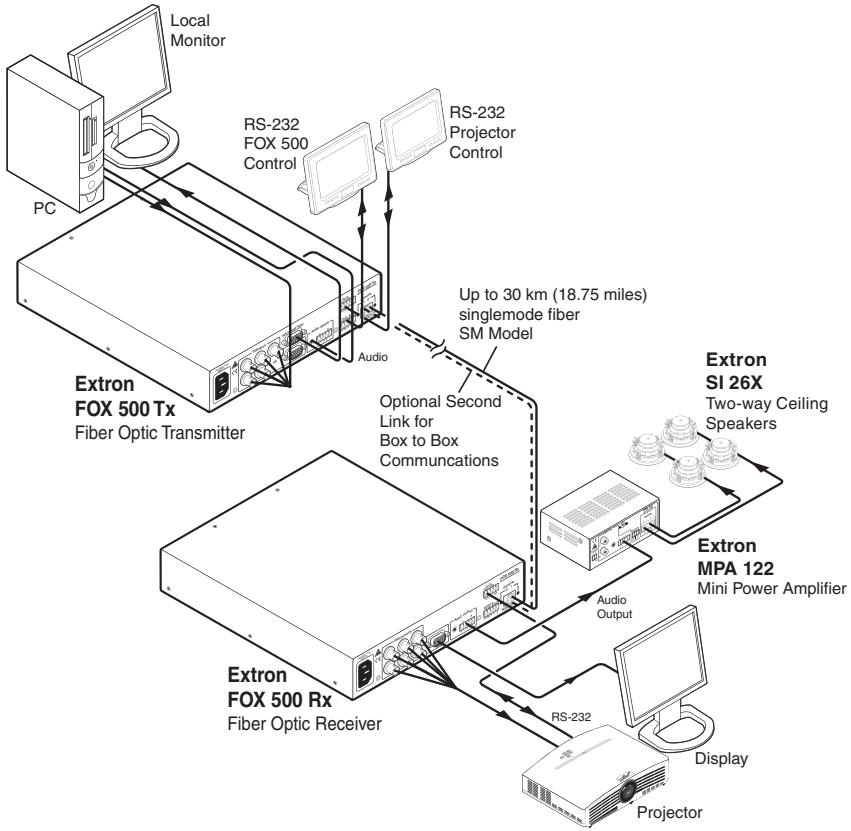


Figure 1-1 — Typical FOX 500 Tx/Rx application

The receiver converts the proprietary signal(s) back to video, audio, and serial RS-232 communication, and outputs it locally. If RS-232 return communications are implemented (a second fiber optic cable is installed), the receiver outputs a proprietary serial communication signal to the transmitter on the second fiber optic cable. For video resolutions up to 1600 x 1200, the receiver's video output is a perfect, pixel-by-pixel recreation of the video signal input to the transmitter.

The transmitter and receiver have image and audio adjustments. Both units have image, audio, and fiber light status and lost-light alarm indicators. The transmitter can handle an RGBHV, RGBS, RGsB, or RsGsBs input signal. The receiver can output RGBHV, RGBS, or RGsB, as selected by the user.

The receiver has built-in alternating pixels, Color Bars, and grayscale test patterns to assist in setting up the display equipment.

The FOX 500 transmitter and receiver are both rack mountable and have internal switching power supplies for worldwide power compatibility.

Features

Ultra high performance — Offers perfect, pixel-by-pixel RGBHV video transmission, up to 1600 x 1200 at 60 Hz. Higher resolutions can be transmitted, but with some loss of video quality.

Video input — The transmitter inputs RGBHV, RGBS, RGsB, or RsGsBs on BNC connectors **or** a 15-pin HD connector.

Analog loop-through on transmitter — The transmitter has an analog loop-through, on a 15-pin HD connector that allows connection of a local monitor.

Video output — The receiver outputs RGBHV, RGBS, or RGsB (user-selectable) on BNC connectors **and** a 15-pin HD connector.

Audio input — Balanced or unbalanced stereo audio is input to the transmitter on a 3.5 mm, 5-pole captive screw terminal **or** a 3.5 mm mini jack.

Audio input gain/attenuation — The input audio level can be adjusted within a range of (-18 dB attenuation to +10 dB gain) via the front panel or the RS-232 link.

Audio output — Balanced or unbalanced stereo audio is output from the receiver on a 3.5 mm, 5-pole captive screw terminal **and** a 3.5 mm mini jack.

Links monitoring — Both units' front panels have indicators for monitoring image and audio transmission and both fiber optic links.

Loss-of-light alarms — Both units' rear panels have discrete outputs that indicate if either of the fiber optic links have suffered a loss of the light signal.

Windows-based control program — For RS-232 remote control from a PC, the Extron Windows-based control software provides a graphical interface and drag-and-drop/point-and-click operation.

Simple Instruction Set (SIS™) — The transmitter and receiver both use Extron's SIS for easy remote control operation.

Audio level — The audio output can be set to either the consumer level (-10 dBV) or professional level (+4 dBu) from the front panel or under RS-232 control.

Upgradable firmware — The firmware that controls each unit's operation can be upgraded in the field via an RS-232 link, without taking the unit out of service. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and they can be installed using the Windows-based control program.

Memory presets — 30 memory presets are a time-saving feature that lets you store input size and position settings relative to a specific input resolution. You can then recall those settings, when needed, with a few simple steps.

Rack mounting — Both units are rack mountable in any conventional 19" wide rack, using Extron's full size rack shelf.

Front panel security lockout (Executive mode) on receiver — If a receiver is installed in an open area, where operation by unauthorized personnel may be a problem, a security lockout feature can be implemented. When the front panel is locked, an SIS command is required to unlock the unit before it can be operated from the front panel.

(The transmitter has no front panel controls.)

Power — Each unit's 100 VAC to 240 VAC, autoswitchable, internal power supply provides worldwide power compatibility.

Chapter Two

Installation

Mounting the Unit

Connections

Mounting the Unit

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

Either 1U high, half-rack width unit can be placed on a tabletop, mounted on a rack shelf, or mounted under or through a desk or other furniture.

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 500 transmitter or receiver into a rack (figure 2-1).

1. **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 maximum ambient temperature (Tma) specified by the manufacturer.
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 either unit on either of the following rack shelves:

- RSU 129 9" 1U universal rack shelf kit (part #**60-190-01**) (figure 2-1)
- RSB 129 9" 1U basic rack shelf (part #**60-604-01**)

1. If installed, remove the feet from the bottom of the unit.
2. Mount the unit on either the left or right side of the shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the unit to the shelf.
3. Install a false faceplate or another to the rack shelf.
4. Insert the shelf into the rack, aligning the holes in the shelf with those of the rack.
5. Secure the shelf to the rack using the supplied machine screws.

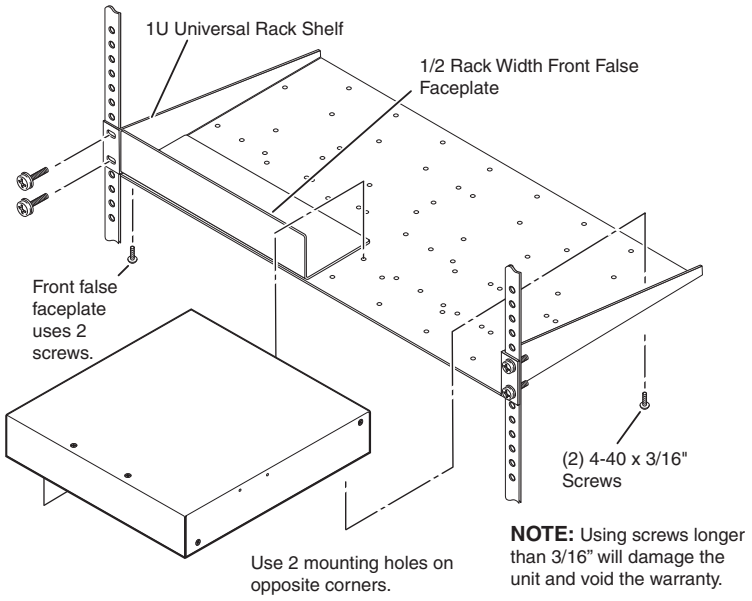


Figure 2-1 — Mounting the unit on a standard rack shelf

Furniture mounting

Mount either unit under a desk or podium using the optional Extron MBU 125 under desk mounting kit (part #**70-077-01**) as follows:

1. If rubber feet were previously installed on the bottom of the unit, remove them.
2. Affix the mounting brackets to the unit with the machine screws provided (figure 2-2).

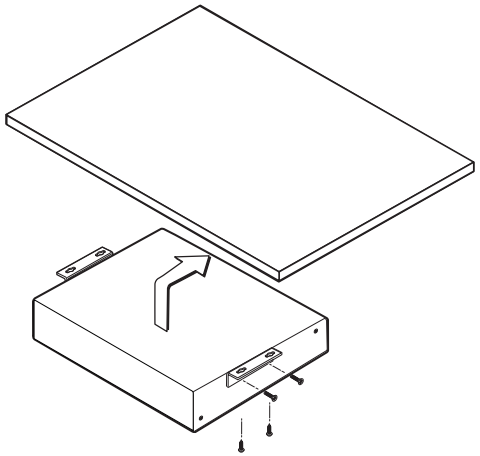


Figure 2-2 — Under-desk mounting the unit

3. Hold the unit with the brackets attached against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.
4. Drill four pilot holes, each 3/32" (2 mm) in diameter by 1/4" deep (6.3 mm) deep in the mounting surface at the marked screw locations.
5. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" (6.3 mm) of the screw head protrudes.
6. Align the mounting screws with the slots in the brackets and place the unit against the surface, with the screws through the bracket slots.
7. Slide the unit slightly in or out, then tighten all four screws to secure the unit in place (figure 2-2).

Through-desk mounting

Mount the unit through a desk or podium using the optional Extron MBD 129 through desk mounting kit (part #**70-077-02**) as follows:

1. If rubber feet were previously installed on the bottom of the unit, remove them.
2. Secure the brackets to the unit with the provided machine screws (figure 2-3). Leave the screws slightly loose.

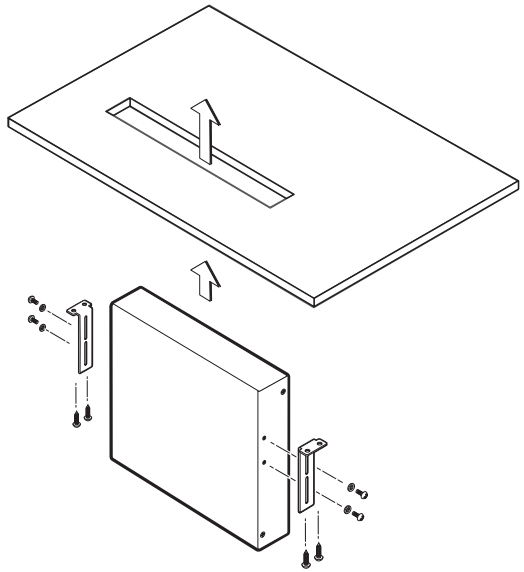


Figure 2-3 — Through-desk mounting the unit

3. Hold the unit and brackets on the underside of the surface to which you are mounting the device and mark the four screw holes and the table material to be removed.
4. Remove the table material. Test the fit by inserting the front of the device through the hole. If necessary, use a rasp or coarse file to enlarge the hole.
5. Drill four pilot holes, each 3/32" (2 mm) in diameter by 1/4" deep (6.3 mm) deep , as marked on the template.
6. Using the four wood screws provided, attach the brackets to the mounting surface.
7. Slide the device in or out until it is in the desired position. Tighten the screws installed in step **2**.

   If the screws are inaccessible to a screwdriver:

   a. Mark the location of the brackets relative to the screws.

b. Remove the transmitter or receiver from inside the furniture.

c. Tighten the screws.

d. Replace the unit inside the surface (step **6**).

Connections

Transmitter rear panel connections

All connectors except the Configuration port are on the rear panel (figure 2-4).

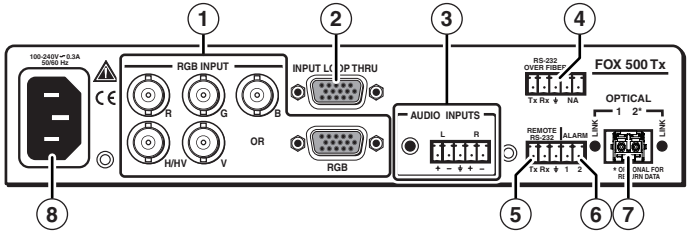
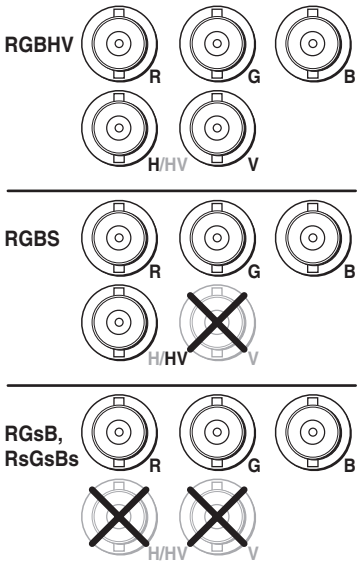


Figure 2-4 — FOX 500 Tx transmitter's connectors

① **RGB Input connectors** —

NOTE *Connect an input to **only** the BNC connectors **or** the 15-pin HD connector, **not both**.*



BNC connectors — Connect an RGBHV, RGBS, RGsB, or RsGsBs video source to these BNC connectors. Connect the cables as shown at right.

15-pin HD connector — Connect an analog VGA - UXGA RGB video source to this 15-pin HD female connector.

② **Buffered Loop-through connector** — If desired, connect a local monitor to this 15-pin HD connector.

③ **Audio Input connectors** —

3.5 mm mini jack —Plug a stereo mini plug into this connector.

5-pole captive screw connector — Connect a balanced or unbalanced stereo or mono audio input to this connector. The connector is included with FOX 500, but you must supply the audio cable. See figure 2-5 to wire a captive screw connector for the appropriate input type and impedance level. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

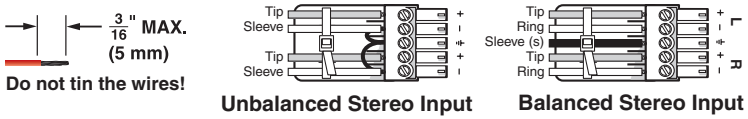


Figure 2-5 — Captive screw connector wiring for stereo audio input

NOTE *The length of exposed wires is critical. The ideal length is 3/16" (5 mm).*

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

NOTE *See figure 2-6 to identify the tip, ring, and sleeve when you are making connections for the transmitter from existing audio cables. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 2-5 and figure 2-8.*

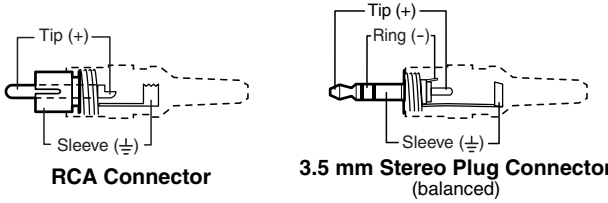
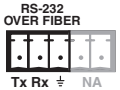


Figure 2-6 — Typical audio connectors

The input's audio level can be individually set via the front panel or RS-232 control. See chapter 3, "Operation", and chapter 4, "Remote Control".

④ **RS-232 Over Fiber port —** If you want the FOX 500 to pass serial command signals to the receiver, for serial control of a projector for example, connect the host device to the transmitter via three poles of this 5-pole captive screw connector. See "Rear panel serial ports connections" on page 2-14 to wire this connector.



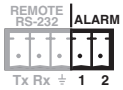
NOTE *If you connect only one fiber optic cable (item ⑦, on the next page), you will not receive reports from the controlled device. To receive responses from the controlled device, you must install two fiber optic cables.*

NOTE *The FOX 500 can pass RS-232 commands and responses at rates up to 38400 baud.*

⑤ **Remote RS-232 port —** For serial control of the transmitter, connect a host device, such as a computer, touch panel control, or RS-232 capable PDA, to the transmitter via three poles of this 5-pole captive screw connector. See "Rear panel serial ports connections" on page 2-14 to wire this connector.

See chapter 4, "Remote Control", for definitions of the SIS commands (serial commands to control the transmitter via this connector).

⑥ **Alarm outputs port** — For remote monitoring of the status of fiber optic link 2, connect a locally-constructed or furnished device to the transmitter via two poles of this 5-pole captive screw connector. When the transmitter does not detect a light link on fiber cable Optical 2 (optional), pin 1 and pin 2 of this port are shorted together.



⑦ **Fiber optic connectors and LEDs** —

WARNING *These units output 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 transmitter/receiver pair. Typically, singlemode fiber has a yellow jacket and multimode cable has an orange jacket.*

NOTE *Only one fiber optic cable, Optical 1, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will **not** receive RS-232 reports from the controlled device, and there will be **reduced** front panel, Windows-based control program, and RS-232 command functionality on the RX unit. To receive responses from the controlled device and for full functionality, you will need to install both fiber optic cables.*

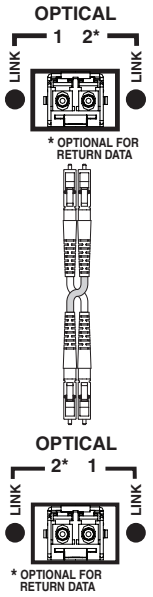
Optical 1 — For all one-way video, audio, and serial communications from the transmitter to the receiver, connect a fiber optic cable to the Optical 1 LC connector.

Connect the free end of this fiber optic cable to the Optical 1 connector on the FOX 500 Rx receiver (item ⑭ in "Receiver rear panel connections").

Optical 2 — For all one-way serial communications from the receiver to the transmitter, connect a fiber optic cable to the Optical 2 LC connector.

Connect the free end of this fiber optic cable to the Optical 2 connector on the FOX 500 Rx receiver (item ⑭ in "Receiver rear panel connections").

Link 1 and Link 2 LEDs — When lit, the link is active (light is received).



⑧ **AC power connector —** Plug a standard IEC power cord into this connector to connect the transmitter to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

Receiver rear panel connections

All connectors except the Configuration port are on the rear panel (figure 2-7).

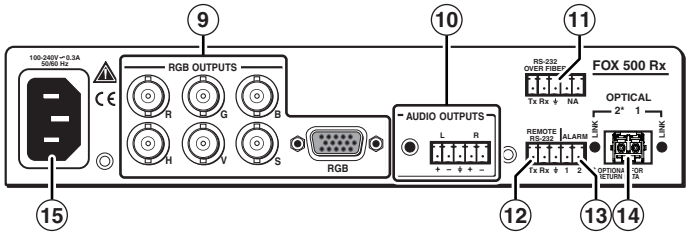
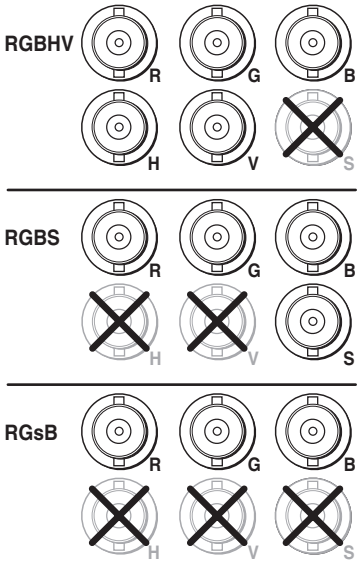


Figure 2-7 — FOX 500 Rx receiver's connectors

⑨ **RGB Outputs connectors —**

BNC connectors — Connect an RGBHV, RGBS, RGsB, or RsGsBs video display to these BNC connectors. Connect the cables as shown at right.



15-pin HD connector — Connect an analog VGA - UXGA RGB video display to this 15-pin HD female connector.

NOTE *You can set the receiver to output the desired video format, RGBHV, RGBS, or RGsB. RGBHV is the default. See "Format submenu" in "Output Configuration menu" in chapter 3, "Operation".*

⑩ **Audio Outputs connectors —**

3.5 mm mini jack —Plug a stereo mini plug into this connector.

5-pole captive screw connector — This 5-pole, 3.5 mm captive screw connector outputs the transmitted unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers.

See figure 2-8 to properly wire a captive screw output connector. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

Figure 2-8 — Captive screw connector wiring for stereo audio output

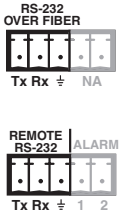
CAUTION *Connect the sleeve to ground (Gnd). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

NOTE *The length of exposed wires is critical. The ideal length is 3/16" (5 mm).*

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

The volume level for the output can be set to either the consumer level (-10 dBV) or the professional level (-4 dBu) via the front panel or Ethernet or RS-232 control. See chapter 3, "Operation", and chapter 4, "Remote Control", for details.

⑪ **RS-232 Over Fiber port —** If you want the FOX 500 to pass serial command signals to the receiver, for serial control of a projector for example, connect the host device to the transmitter via three poles of this 5-pole captive screw connector. See "Rear panel serial ports connections" on page 2-14 to wire this connector.



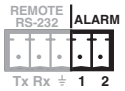
NOTE *If you connect only one fiber optic cable (item ⑭, below), you will not receive reports from the controlled device. To receive responses from the controlled device, you will need to install two fiber optic cables.*

NOTE *The FOX 500 can pass RS-232 commands and responses at rates up to 38400 baud.*

⑫ **Remote RS-232 port —** For serial control of the receiver, connect a host device, such as a computer, touch panel control, or RS-232 capable PDA, to the transmitter via three poles of this 5-pole captive screw connector. See "Rear panel serial ports connections" on page 2-14 to wire this connector.

See chapter 4, Remote Control, for definitions of the SIS commands (serial commands to control the transmitter via this connector).

⑬ **Alarm outputs port** — For remote monitoring of the status of fiber optic link 1, connect a locally-constructed or furnished device to the receiver via two poles of this 5-pole captive screw connector. When the receiver does not detect a light link on fiber cable Optical 1, pin 1 and pin 2 of this port are shorted together.



⑭ **Fiber optic connectors and LEDs —**

WARNING *These units output 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 transmitter/receiver pair. Typically, singlemode fiber has a yellow jacket and multimode cable has an orange jacket.*

NOTE *Only one fiber optic cable, Optical 1, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will **not** receive RS-232 reports from the controlled device, and there will be **reduced** front panel, Windows-based control program, and RS-232 command functionality on the RX unit. To receive responses from the controlled device and for full functionality, you will need to install both fiber optic cables.*

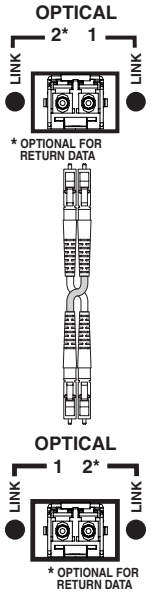
Optical 1 — For all one-way video, audio, and serial communications from the transmitter to the receiver, connect a fiber optic cable to the Optical 1 LC connector.

Connect the free end of this fiber optic cable to the Optical 1 connector on the FOX 500 Tx transmitter (item ⑦ in "Transmitter rear panel connections").

Optical 2 — For all one-way serial communications from the receiver to the transmitter, connect a fiber optic cable to the Optical 2 LC connector.

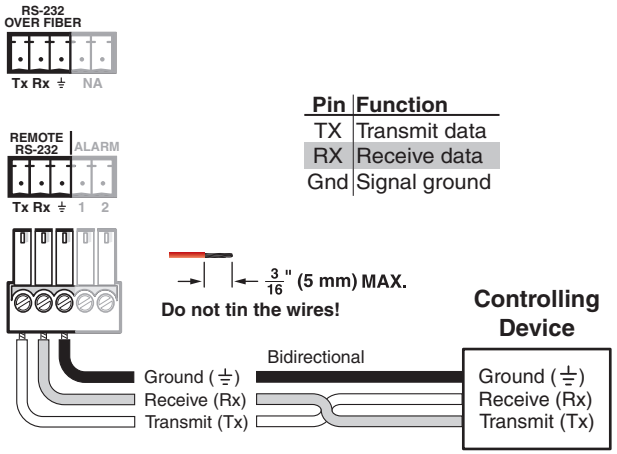
Connect the free end of this fiber optic cable to the Optical 2 connector on the FOX 500 Tx transmitter (item ⑦ in "Transmitter rear panel connections").

Link 1 and Link 2 LEDs — When lit, the link is active (light is received).



⑮ **AC power connector —** Plug a standard IEC power cord into this connector to connect the receiver to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

Rear panel serial ports connection



NOTE *For the RS-232 Over Fiber port, only cross the Tx and Rx lines once between the source and the target.*

Figure 2-9 — RS-232 connectors

NOTE *The RS-232 Over Fiber port is for transmission of serial signals, such as projector control signals, between the transmitter and receiver.*
The Remote RS-232 port is for remote control of the transmitter and receiver.

NOTE *The length of exposed wires is critical. The ideal length is 3/16" (5 mm).*

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

NOTE *The rear panel Remote RS-232 port is active only if the front panel Configuration port is not in use. If a front panel configuration connection is made, the Remote RS-232 port becomes inactive and the front panel Configuration port is active.*

Alarm outputs connection

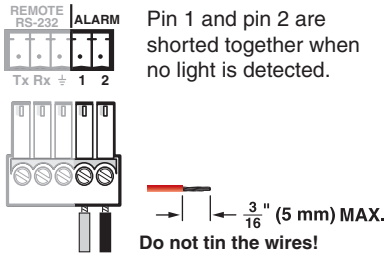


Figure 2-10 — Alarms connector

NOTE *The length of exposed wires is critical. The ideal length is 3/16" (5 mm).*

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

Front panel Configuration ports

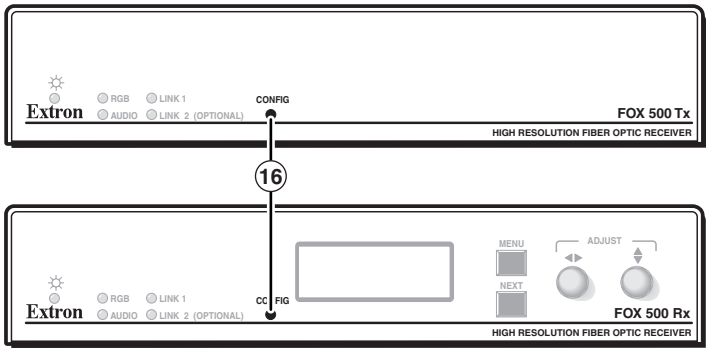
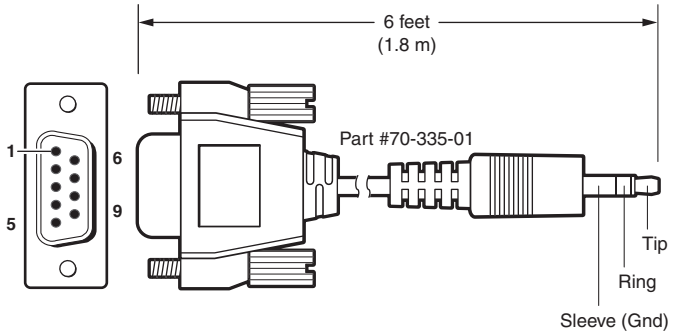


Figure 2-11 — FOX 500 Tx/Rx front panels

NOTE *These ports are for remote control of the transmitter or receiver, **not** for the over fiber RS-232 link.*

⑯ **Configuration port** — These 2.5 mm mini stereo jacks serve the same serial communications function as the rear panel Remote RS-232 ports, but are easier to access than the rear ports after the units have been installed and cabled. The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part **#70-335-01** (figure 2-12), can be used for this connection.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 2-12 — Optional 9-pin TRS RS-232 cable

NOTE *These ports parallel the rear panel Remote RS-232 ports. If a front panel configuration connection is made, the rear panel Remote RS-232 port becomes inactive and the front panel Configuration port is active.*

This port is RS-232 only, with the following protocols:

- 9600 baud
- 1 stop bit
- no parity
- no flow control
- 8 data bits

NOTE *The maximum distances from the transmitter or receiver to the controlling device can vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the unit and the controlling device) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases, the unit may be capable of serial communications via RS-232 up to 250 feet (76 m) away.*

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Front Panel Controls and Indicators

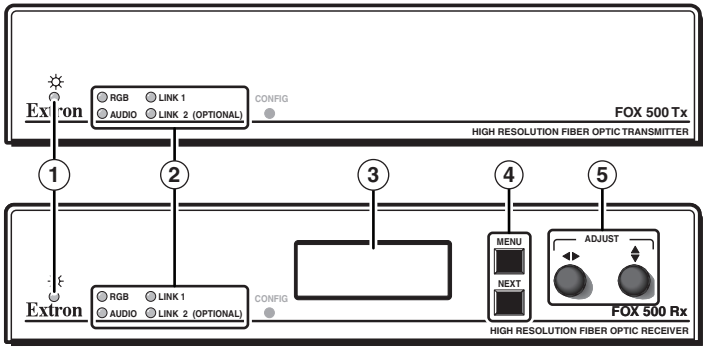


Figure 3-1 — FOX 500

NOTE *Only one fiber optic cable, Optical 1, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will **not** receive RS-232 reports from the controlled device, and there will be **reduced** front panel functionality. To receive responses from the controlled device and for full functionality, you will need to install both fiber optic cables.*

① **Power LED —** This LED lights to indicate the power is applied to the unit.

② **Signal monitoring LEDs —**

RGB LEDs — This LED lights on both units when the transmitter detects a sync signal on its video input:

- Horizontal sync (H) (for RGBHV video)
- Composite sync (S) (for RGBS video)
- Green (Sync on green) (G) (for RGsB or RsGsBs video)

Audio LEDs — This LED lights on both units when the transmitter detects a low level audio signal for a short period of time. This LED goes dark if the audio signal drops below the minimum threshold for a short period of time.

Link 1 LEDs — This LED lights on the receiver when the receiver detects light on the fiber optic cable Optical 1.

This LED lights on the transmitter when the receiver detects light on the fiber optic cable Optical 1 and the fiber optic cable Optical 2 is installed.

Link 2 LEDs — This LED lights on the transmitter when the transmitter detects light on the fiber optic cable Optical 2.

This LED lights on the receiver when the transmitter detects light on the fiber optic cable Optical 2 and the fiber optic cable Optical 1 is installed.

③ **Status display —** The 12-column by 2-line LCD displays configuration menus and status information. See "Front Panel Operations" in this chapter for details.

④ **Menu button —** The Menu button enters and moves through the main menu system in the FOX 500 Rx receiver. See "Front Panel Operations" in this chapter for details.

Next button — The Next button steps through the submenus in the FOX 500 receiver menu system. See "Front Panel Operations" in this chapter for details.

⑤ **Adjust ◄► (horizontal) and Adjust ▲▼ (vertical) knobs —** The Adjust ◄► and Adjust ▲▼ knobs change settings when used in conjunction with the menu system. Rotate these knobs to scroll through the selection options and make adjustments.

Front Panel Operations

The following paragraphs detail the power-up process and then describe input selection, preset selection, Auto-Imaging, and then details the menu system, the picture adjustments, and selection of executive mode.

Power-on indications

Power is automatically applied when the power cord is connected to an AC source. When AC power is applied, both units perform self-tests. When the self-test completes satisfactorily, both units' signal monitoring LEDs (item ② on figure 3-1) light as appropriate for the connections. The receiver's LCD displays the input vertical and horizontal rates (or No Input).

FOX 500 MM
*nn.nk nn*Hz

- or -

FOX 500 SM
*nn.nk nn*Hz

Menu system overview

Figure 3-2 shows a flowchart of the main menus in the menu system.

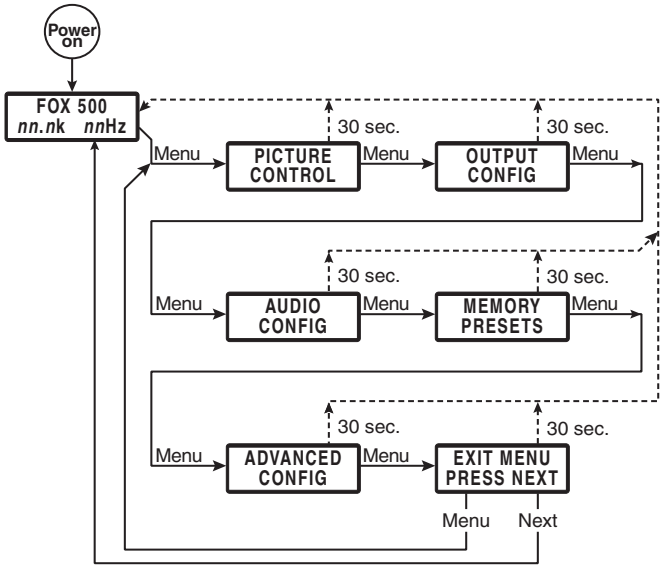


Figure 3-2 — Menu system flowchart

Menu button — Press the Menu button to activate the menu system and to scroll through the five main menus.

Next button — Press the Next button to move between the submenus of a selected main menu, to activate one for viewing or configuration, and to save a selection.

Adjust ◄► and Adjust ▲▼ knobs — When in a submenu, rotate the Adjust ◄► knob and Adjust ▲▼ knob to scroll through the submenu options and select a setting. Refer to the flowcharts in this chapter and to specific sections for explanations on knob adjustments.

NOTE *If you press the Menu button while a main menu is active, the next main menu becomes active.*
If you press the Menu button while a submenu is active, the LCD backs up to display that submenu's main menu.

NOTE *To return to the default screens, let the receiver remain idle for 30 seconds until the selected screen times out, or press the Menu button until the Exit Menu appears, then press the Next button.*

NOTE *From any menu or submenu, after 30 seconds of inactivity, the receiver saves all adjustment settings and times out to the default (FOX 500) LCD display.*

Picture Control menu

Figure 3-3 is a flowchart that shows an overview of the Picture Control menu, its submenus, and the available settings.

NOTE *The Horizontal Start and Total Pixels/Pixel Phase submenus are only available when both fiber cables are installed between the transmitter and receiver.*

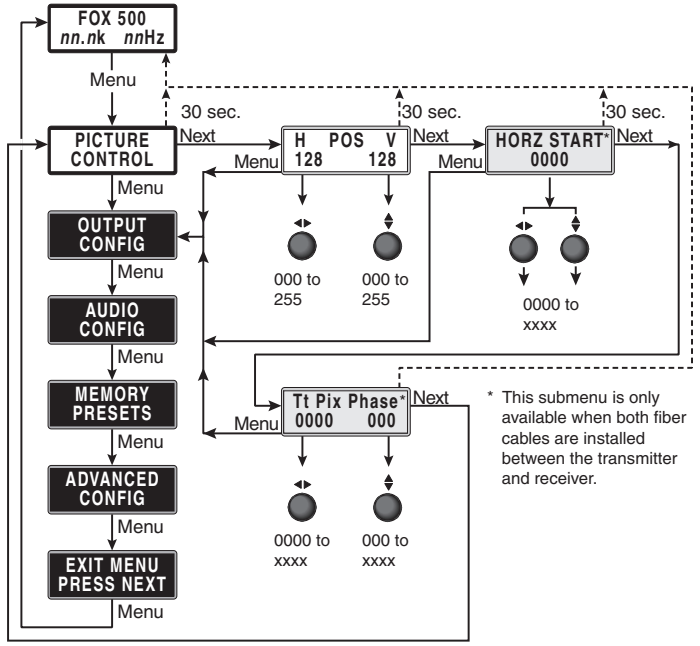


Figure 3-3 — Picture Control menu flowchart

Position submenu

The position submenu allows you to shift the receiver's output image horizontally and vertically on the display. Rotate the Adjust ◄► knob to shift the image horizontally. Rotate the Adjust ▲▼ knob to shift the image vertically.

Horizontal Start submenu

The Horizontal Start submenu defines the horizontal position of the first active pixel in the active area or the receiver's output. Rotate either Adjust knob while in this submenu to set the start variable.

Output Configuration menu

Figure 3-4 is a flowchart that shows an overview of the Output Configuration menu, its submenus, and the available settings.

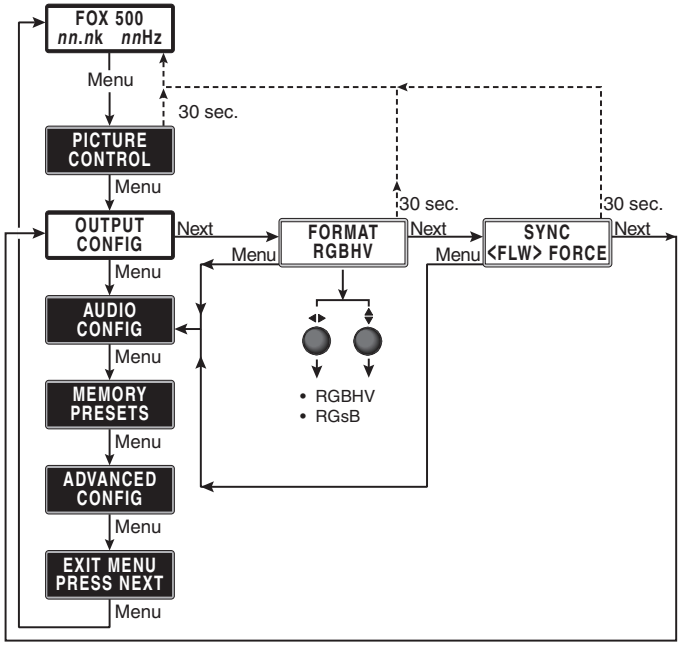


Figure 3-4 — Output Configuration menu flowchart

Format submenu

Rotate either Adjust while in the Format submenu to select the desired video output format (RGBHV or RGsB).

Sync submenu

The display or projector may require a negative sync signal. Rotate either Adjust knob to select FLW (Follow) (the output video sync follows the input sync) or Force (sync is forced negative).

Audio Configuration menu

Figure 3-5 is a flowchart that shows an overview of the Audio Configuration menu, its submenus, and the available settings.

NOTE *The Gain submenu is only available when both fiber cables are installed between the transmitter and receiver.*

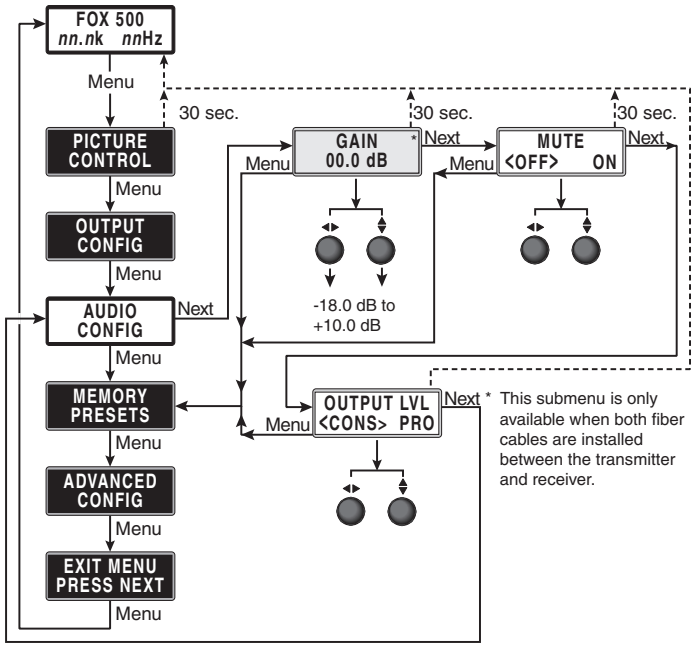


Figure 3-5 — Audio Configuration menu flowchart

Gain submenu

Rotate either Adjust knob while in the Gain submenu to select the input audio gain or attenuation value, from -18 dB to +10 dB in 1.0 dB increments. The default is a 0 dB audio level.

Mute submenu

Rotate either Adjust knob while in the Mute submenu while in the Mute submenu to select or deselect the audio output mute function.

Output Level submenu

Rotate either Adjust knob while in the Output Level submenu to set the audio level for the output. The available levels are CONS (consumer) level (–10 dBV) and PRO (professional) (+4 dBu).

Memory Presets menu

Figure 3-6 is a flowchart that shows an overview of the Memory Presets menu, its submenus, and the available settings.

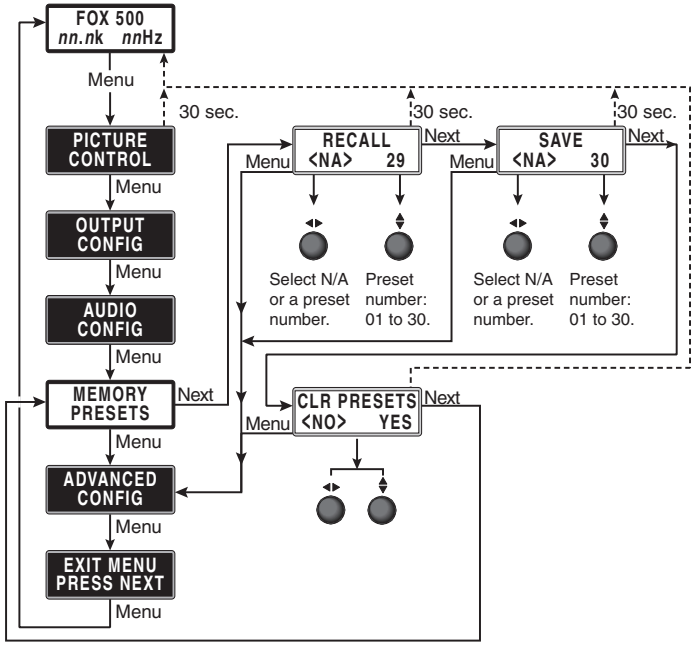


Figure 3-6 — Memory Presets menu flowchart

Memory presets, which are saved values of the horizontal and vertical position and sizing information are saved in nonvolatile memory. When the FOX 500 is powered down and later powered back up, the settings are available for selection using the Save submenu (see below). Saving the settings to a preset overwrites the settings previously written to that preset.

Recall submenu

Rotate the Adjust ◄► knob while in the Recall submenu to select (< >) either the displayed preset number (01 through 30) or N/A (NA) for no preset. Press the Next button to recall the current settings to the displayed preset. Select N/A and press the Next button to exit the submenu without recalling the settings.

Save submenu

Rotate the Adjust ◄► knob while in the Save submenu to select (< >) either the displayed preset number (01 through 30) or N/A (NA) for no preset. Press the Next button to save the current settings. Select N/A and press the Next button to exit the submenu without saving the settings.

Clear Presets submenu

Rotate either Adjust knob to select (< >) Yes and press the Next button to erase all presets. Select No and press Next to exit the submenu without clearing the presets.

Advanced Configuration menu

Figure 3-7 is a flowchart that shows an overview of the Advanced Configuration menu, its submenus, and the available settings.

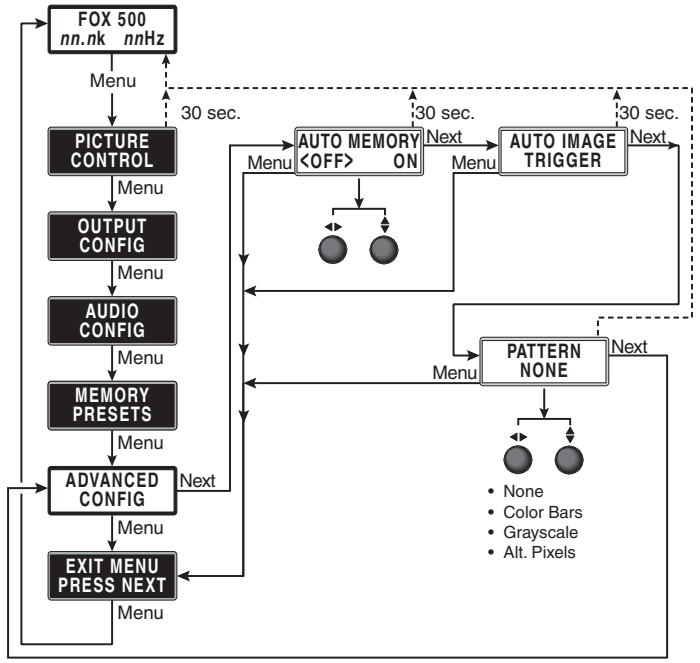


Figure 3-7 — Advanced Configuration menu flowchart

Auto Memory submenu

The auto memory function automatically saves the horizontal and vertical position, horizontal start, total pixels, and pixel phase settings for different input resolutions. When on, auto memory applies the settings based on the sensed input resolution.

Rotate either Adjust knob while in the Auto Memory submenu to select (< >) either on or off for the auto image function. Press the Next button to save the current settings.

Auto Image Trigger submenu

The auto image function adjusts the output settings for the best image, based on the sensed input resolution.

Rotate either adjust knob to trigger the auto image function.

NOTE *If no video input is connected, the submenu display reads Auto Image N/A and no function is available from this screen.*

Pattern submenu

The receiver can output any of three test patterns that help you adjust the display's color, focus, and grayscale. Rotate either Adjust knob while in the Pattern submenu to select among the Color Bars, grayscale, and alternating pixels test patterns.

NOTE *You must have a video input connected and fiber cable Optical 1 connected between the transmitter and receiver for the receiver to output a selected test pattern.*

The test pattern will turn off if the input signal rate is changed or disconnected or if power is removed.

The size of the test pattern depends on the size of the active input signal. Any picture adjustments made on the input affect the test patterns as well.

Exit menu

From the Exit menu (figure 3-8), press the Next button to return to the default display cycle, or press the Menu button to return to the Picture Control menu.

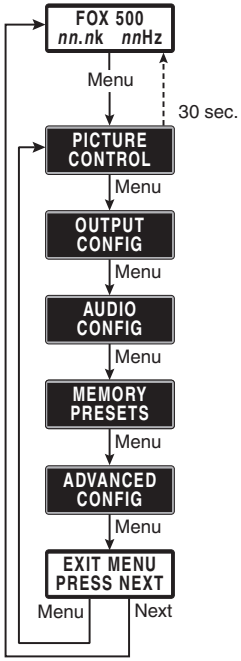


Figure 3-8 — Exit menu flowchart

System reset

To reset the FOX 500 to the factory default settings, press and hold the Menu button while applying power. After about 3 seconds, the LCD displays System Reset message. Release the Menu button.

Front panel security lockout (executive mode)

The front panel security lockout limits the operation of the receiver from the front panel. When the receiver is locked, the Menu and Next buttons are disabled.

To toggle the lock on and off, press and hold the Menu button and the Next button for approximately two seconds (figure 3-9).

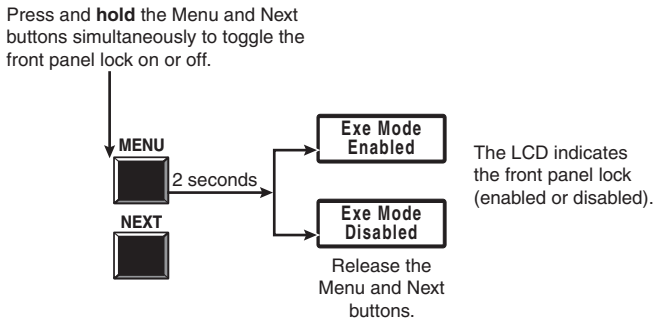


Figure 3-9 — Toggle front panel lock on or off

If the user pushes either button when the receiver is locked, the LCD displays Exe Mode Enabled.

Chapter 4

Remote Control

Rear Panel Remote RS-232 Ports

Front Panel Configuration Port

Simple Instruction Set Control

Windows®-Based Program Control

The transmitter and receiver each has two serial ports that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the transmitter and receiver possible. The serial ports are:

- The rear panel Remote RS-232 port on 3-pin captive screw connectors
- The front panel Configuration (RS-232) port, a 2.5 mm mini stereo jack

The protocol for all ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

NOTE *For each unit, the rear panel Remote RS-232 port is active only if the front panel Configuration port is not in use. If a front panel configuration connection is made, the rear panel Remote RS-232 port becomes inactive and the front panel Configuration port is active.*

NOTE *Only one fiber optic cable, Optical 1, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will **not** receive RS-232 reports from the controlled device, and there will be **reduced** RS-232 command and Windows control program functionality on the RX unit. To receive responses from the controlled device and for full functionality, you will need to install both fiber optic cables.*

Rear Panel Remote RS-232 Ports

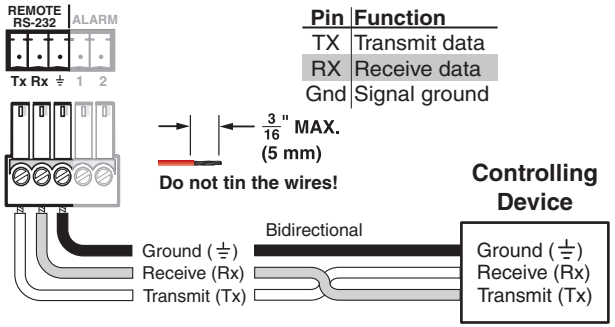
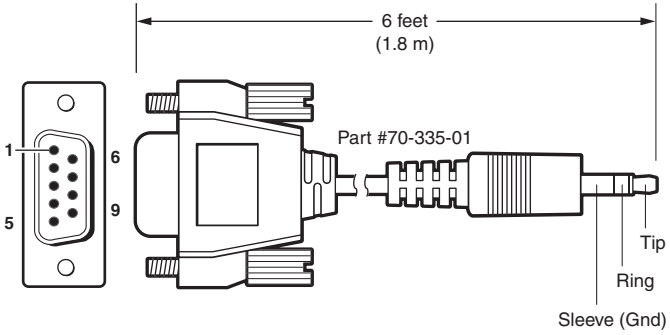


Figure 4-1 — Remote connector pin assignments

Front Panel Configuration Port

NOTE *The front panel configuration ports parallel the rear panel Remote RS-232 ports. If a front panel configuration connection is made on either unit, that unit's rear panel Remote RS-232 port becomes inactive and the front panel Configuration port is active.*

The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part **#70-335-01** (figure 4-2) can be used for connection to the Configuration port.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 4-2 — Optional 9-pin TRS RS-232 cable

Simple Instruction Set Control

Host-to-interface communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the unit executes the command and sends a response to the host device. All responses from the unit to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Symbol definitions

Symbols (variables), defined on the next page, are used throughout the "Unit-initiated messages" section and the command/response table on page 4-8. The symbols represent variables in the unit-initiated messages and the command/response table fields.

↵	= CR/LF (carriage return/line feed) (0x0D 0A)	
•	= space	
X1	= Mute/auto image/front panel lock status	0 or 1 (0=off and 1=on)
X2	= Output sync format	0 = RGBHV 1 = RGsB
X3	= Output sync polarity	0 = follow input 1 = force sync to negative
X4	= Horizontal and vertical position	
X5	= Horizontal start	0 to 255
X6	= Pixel phase	0 to 31
X7	= Total pixels	± 255 of the default value
X8	= Sync frequency	xxx.xx (frequency in kHz [H] or Hz [V])
X9	= Memory preset number	1 to 30
X10	= Audio gain adjustment range	0 to 10
X11	= Audio attenuation adjustment range	0 to -18
X12	= Audio level adjustment range	-18 to +10 (in 1.0 dB steps)
X13	= Output level	0 = consumer 1 = professional
X14	= Test pattern	0 = none 1 = Color Bars 2 = grayscale 3 = alternating pixels
X15	= Firmware version	*v.vv*
X16	= Link/input status	0 = link or input not sensed 1 = link or input sensed
X17	= Mode	SM = singlemode MM = multimode
X18	= Transmitter or receiver	Tx = transmitter Rx = receiver

Unit-initiated messages

When a local event, such as a front panel operation or error condition, occurs, the unit responds by sending a message to the host. The unit-initiated messages are listed below:

(c) COPYRIGHT 2006, EXTRON ELECTRONICS FOX 500 Tx, V*x.xx*, 60-*xxx-xx*↵↵

- or -

(c) COPYRIGHT 2006, EXTRON ELECTRONICS FOX 500 Rx, V*x.xx*, 60-*xxx-xx*↵↵

The connected unit issues the appropriate copyright message (above) when it first powers on. V*x.xx* is the firmware version number, 60-*xxx-xx* is the connected unit's part number.

Reconfig↵

The unit sends the Reconfig message whenever the video input signal to the transmitter is changed.

Hph X4 ↵

The unit sends the Hph message whenever the output's horizontal position is shifted.

Vph X4 ↵

The unit sends the Vph message whenever the output's vertical position is shifted.

Hst X5 ↵

The unit sends the Hst message whenever the output's horizontal start is shifted.

Tpx X7 ↵

The unit sends the Tpx message whenever the total pixels variable is changed.

Phs X6 ↵

The unit sends the Phs message whenever the pixel phase variable is changed.

Syn X3 ↵

The unit sends the Syn message whenever the output video format is changed.

Pol X3 ↵

The unit sends the Pol message whenever the output sync polarity setting is changed.

Aud X12 ↵

The unit sends the Aud message whenever the input audio level (gain and attenuation) is changed.

Amt X1 ↵

The unit sends the Amt message whenever audio output is muted or unmuted.

Lvl X13 ↵

The unit sends the Lvl message whenever the audio output level is changed.

Spr X9 ↵

The unit sends the Spr message whenever a preset is saved.

Rpr X13 ↵

The unit sends the Rpr message whenever a preset is recalled.

Zpg↵

The unit sends the Zpg message whenever all presets have been erased.

Img[X1]↵

The unit sends the Img message (with the [X1] variable) whenever the auto memory function has been toggled on or off.

Img↵

The unit sends the Img message (with no variable) whenever the auto image function has been triggered.

Tst[X14]↵

The unit sends the Tst message whenever a test pattern has been selected or test patterns are turned off.

1Lnk[X16]•2Lnk[X16]•RGB[X16]•Aud[X16]↵

The unit sends the status message whenever a change in the fiber link and video and audio connection occurs.

Error responses

When the unit receives a valid SIS command, it executes the command and sends a response to the host device. If the unit is unable to execute the command because the command is invalid or it contains invalid parameters, the unit returns an error response to the host. The error response codes are:

E10 - Invalid command↵

E11 - Invalid preset number↵

E13 - Invalid parameter↵

E14 - Invalid command for this configuration↵

Timeout

Pauses of 10 seconds or longer between command ASCII characters result in a timeout. The command operation is aborted with no other indication.

Using the command/response table

The command/response table begins on page 4-8. Lower case letters are acceptable in the command field except where indicated for the audio level (gain and attenuation) commands. Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table below is for use with the command/response table.

ASCII to HEX Conversion Table

Space	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27				
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F				
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37				
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F				
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47				
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F				
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57				
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F				
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67				
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F				
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77				
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F				

Esc	1B	CR	0D	LF	0A

Command/response table for SIS commands

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Video mute			
Mute output	1B	Blk1↵	Blank the video output.
Unmute output	0B	Blk0↵	Output video.
Show video mute status	B	X1↵	Video ouput mute status is X1 (0 = unmuted, 1 = muted).
Output sync format			
Set output sync format	6*X2#	SynX2↵	Set the sync format. 0 = RGBHV, 1 = RGBS, 2 = RGsB.
Show output sync format	6#	X2↵	
Output sync polarity			
Set output to sync negative	7*1#	Pol1↵	Receiver output sync (H and V for RGBHV, S for RGBS, or s for RGsB) is always negative.
Set output sync to follow the input	7*0#	Pol0↵	Output sync follows the video sync input to the transmitter.
Show the sync polarity	7#	X3↵	
Horizontal shift			
Set a horizontal position	X4H	HphX4↵	Set horizontal centering to X4.
Increment position.	+H	HphX4↵	Shift the image one pixel to the right.
Decrement position	-H	HphX4↵	Shift the image one pixel to the left.
Show position	H	X4↵	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Vertical shift			
Set a vertical position	X4/	VphX4↵	Set vertical centering to X4.
Increment position	+/	VphX4↵	Shift the image up one line.
Decrement position	-/	VphX4↵	Shift the image down one line.
Show position	/	X4↵	
Horizontal start			
NOTE *When the controlling PC is connected to the receiver, the FOX 500 can perform this command **only** if the fiber 2 cable is connected. The unit returns the E14 error if fiber 2 is not connected.*			
Set a start position	X5)	HstX5↵	Set the horizontal location of the first active pixel in the active window.
Example:	128*)	Hst128↵	Set pixel 128 as the first active pixel.
Increment start position	+)	HstX5↵	Shift the horizontal start position one pixel to the right.
Decrement start position	-)	HstX5↵	Shift the horizontal start position one pixel to the left.
Show start position	)	X5↵	
Pixel phase			
NOTE *When the controlling PC is connected to the receiver, the FOX 500 can perform this command **only** if the fiber 2 cable is connected. The unit returns the E14 error if the fiber 2 cable is not connected.*			
Set a pixel phase value	X6U	PhsX6↵	Set the pixel phase value to X6.
Example:	10U	Phs10↵	Set the pixel phase value to 10.
Increment pixel phase	+U	PhsX6↵	Increase pixel phase value by 1..
Decrement pixel phase	-U	PhsX6↵	Decrease pixel phase value by 1.
Show pixel phase	U	X6↵	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Total pixels			
NOTE *When the controlling PC is connected to the receiver, the FOX 500 can perform this command **only** if the fiber 2 cable is connected. The unit returns the E14 error if fiber 2 is not connected.*			
Set a total pixel value	11*X7#	TpxX7↵	Set the total pixels to a specific value.
Example:	11*15#	Tpx+15	Set the total pixel value to 15 pixels larger than the actual resolution.
Increment total pixel value	11*+#	TpxX7↵	Increase total pixel value by 1 pixel.
Decrement total pixel value	11*-#	TpxX7↵	Decrease total pixel value by 1 pixel.
Show total pixel value	11#	TpxX7↵	
List sync frequency			
View input frequency	1LS	X8,X8↵	List the input frequency as X8 kHz (horizontal) and X8 Hz (vertical.
Memory presets			
Save preset	X9,	SprX9↵	Command code is a comma.
Recall preset	X9.	RprX9↵	Command code is a period.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Audio input gain and attenuation			
NOTE *The set gain (**G**) and attenuation (**g**) commands are case sensitive.*			
NOTE *When the controlling PC is connected to the receiver, the FOX 500 can perform this command **only** if the fiber 2 cable is not connected. The unit returns the E14 error if fiber 2 is not connected.*			
Set input audio gain to + dB value	X10G	AudX12↵	
Example:	2G	Aud+02.0↵	Set the input audio gain to +2 dB.
Set input audio attenuation to - dB value	X11g	AudX12↵	
Increment level	+G	AudX12↵	Increase audio level by 1.0 dB.
Example:	+G	Aud+03↵	Increment the audio input level from +2 dB to +3 dB.
Decrement level	-G	AudX12↵	Decrease the audio level by 1.0 dB.
Example:	-G	Aud-09↵	Decrement audio input level from -08 dB to -9 dB.
Show input gain	G	X12↵	
Audio output level			
Set to consumer level	40*0#	Lvl0↵	Set the transmitter's audio output to the consumer (–10 dBV) level.
Set to professional level	40*1#	Lvl1↵	Set the transmitter's audio output to the professional (+4 dBu) level.
Show audio output level	40#	X13↵	0 = consumer, 1 = professional.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Audio mute			
Mute the audio	1Z	Amt1↵	Silence the receiver's audio output.
Unmute the audio	0Z	Amt0↵	The receiver outputs audio.
Auto memory			
Disable auto memory	55*0#	Img0↵	
Enable auto memory	55*1#	Img1↵	
Show auto memory status	55#	X1↵	
Auto image			
Trigger auto image	55*2#	Img↵	
Front panel lock (Executive mode)			
Lock the front panel	1X	Exe1↵	
Unlock the front panel	0X	Exe0↵	
Show the panel lock status	X	X1↵	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Test pattern			
NOTE *You must have a video input connected and fiber cable Optical 1 connected between the transmitter and receiver for the receiver to output a selected test pattern.* *The test pattern will turn off if the input signal rate is changed or disconnected or if power is removed.*			
Output Color Bars	1J	Tst1↵	Set the receiver to output the Color Bars test pattern.
Output grayscale	2j	Tst2↵	Set the receiver to output the grayscale test pattern.
Output alt. pixels	3J	Tst3↵	Set the receiver to output the alternating pixels test pattern.
Test pattern off	0J	Tst0↵	Set the receiver to output the input video (no test pattern selected)
Show test pattern status	J	X14↵	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Information requests			
Information request	I	1Link[X16]•2Link[X16]•RGB[X16]•Aud[X16]•[X17]•[X18]↵	The unit responds with the current status (signal detected) of optical link 1, optical link 2, the video input, the audio input, the fiber optic mode (singlemode or multi mode), and the device type (Tx or Rx).
NOTE *The receiver monitors the fiber 1 cable. If the PC is connected to the transmitter and fiber cable 2 is not installed, for the information request (I) and Status commands (S) below, the transmitter reports 1Link0 regardless of the status of the fiber 1 cable.*			
Show firmware version	Q	[X15]↵	
Example:	Q	1.23↵	The factory-installed FOX 500 controller firmware version is 1.23 (sample value only).
Request part number	N	60-746-*nn*↵	See appendix A for part numbers..
Show link 1 status	1S	[X16]↵	0 = light link not received at receiver, 1 = light received.
Show link 2 status	2S	[X16]↵	0 = light link not received at transmitter, 1 = light received.
Show input video status	3S	[X16]↵	0 = video is not input to the transmitter, 1 = video is input.
Show input audio status	4S	[X16]↵	0 = audio is not input to the transmitter, 1 = audio is input.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
Resets			
Reset audio gain and attenuation	[Esc]ZA←	Zpa↵	Reset the audio input level at the transmitter to 0 dB and the audio output level at the receiver to the consumer (-10 dB) level.
Reset presets	[Esc]ZG←	Zpg↵	Reset (erase) all memory presets.
System reset	[Esc]ZXXX←	Zpx↵	Reset all settings to the factory defaults.

Windows®-Based Program Control

The Extron FOX 500 Control Program, which communicates with the transmitter and receiver pair via either unit's rear panel Remote RS-232 port or front panel Configuration port, provides an easy way to operate the pair.

The program is compatible with Windows 2000, Windows XP, or later. Updates to this program can be downloaded from the Extron Web site (http://www.extron.com).

Installing the software

The program is contained on a CD-ROM. To install the software, insert the CD-ROM into the drive. The setup program should start automatically. If it does not self-start, run Launch.exe from the CD and follow the instructions that appear on the screen. By default, the Windows installation creates a C:\Program Files\Extron\FOX500 directory, and it places two icons into a group folder named "Extron Electronics\FOX 500." The two installed icons are:

- FOX 500 Control Pgm
- Uninstall FOX 500

Starting the program

Start the Extron FOX 500 Control Program as follows:

1. Click *Start* > *Programs* > *Extron Electronics* > *FOX 500* > *FOX 500 Control Pgm*.

   The Communication Setup window appears (figure 4-3).

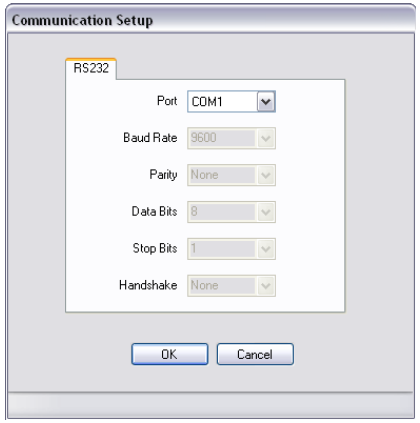


Figure 4-3 — Communication Setup window

2. Select the Com port to which your transmitter or receiver is connected. Click *OK*.

   The FOX 500 Control Program window appears (figure 4-4).

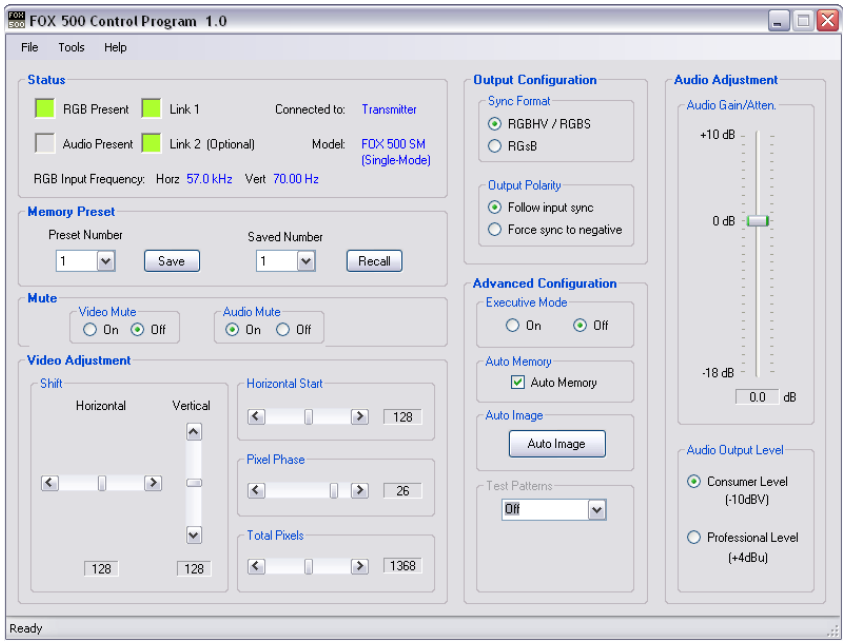


Figure 4-4 — FOX 500 Control Program window

NOTE *Only one fiber optic cable, Optical 1, is required for video, audio, and serial command transmission. But, if you connect only one fiber optic cable, you will* ***not*** *receive RS-232 reports from the controlled device, and there will be* ***reduced*** *Windows-based control program functionality on the Rx unit. To receive responses from the controlled device and for full functionality, you will need to install both fiber optic cables.*

Status area

The status area provides visual indications of the connection status. These indications are similar to the front panel indications described in chapter 3, "Operation".

- **RGB present indicator —** This indicator is green when the transmitter detects a sync signal on its video input:
  - Horizontal sync (H) (for RGBHV video)
  - Composite sync (S) (for RGBS video)
  - Green (Sync on green) (G) (for RGsB or RsGsBs video)
- **Audio present indicator —** This indicator is green when the transmitter detects a low level audio signal for a short period of time. This indicator goes dark if the audio signal drops below the minimum threshold for a short period of time.

Link 1 indicator — This indicator is green when the receiver detects light on the fiber optic cable Optical 1.

NOTE *The receiver detects the Optical 1 light. It reports the status to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, the control program's Link 1 indicator will **not** show green (detected) whether the receiver detects the link or not.*

Link 2 indicator — This indicator is green when the transmitter detects light on the fiber optic cable Optical 2.

NOTE *The transmitter detects the Optical 2 light. It reports the status to the receiver via the Optical 1 cable.*

*If you are connected to either of the **receiver's** serial ports, **and** the Optical 1 cable is disconnected, the control program's Link 2 indicator will **not** show green (detected) whether the transmitter detects the link or not.*

The Status area also shows to which unit the controlling PC is connected, the FOX 500 model (multimode or singlemode), and the video input frequency.

Memory Preset area

The Memory Preset area provides a means to save and recall memory presets. Memory presets are saved values of the horizontal and vertical position and sizing information. See "Memory Presets menu" in chapter 3, "Operation", for more information on presets.

Mute area

Click the Video Mute and/or Audio Mute radio buttons in the Mute area to turn the video and/or audio mutes on and off.

NOTE *When the video output is muted, the receiver mutes the red, green, and blue planes, but leaves the sync plane(s) (horizontal and vertical or composite sync) live so that there is no loss of sync in the display device.*

NOTE *When you mute or unmute the output, the setting is changed in the receiver. It reports the changes to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, you **can** still mute the output in the control program's Mute area, but the program **cannot** report the position values. The* Set video *(or* audio*)* mute On *or* Off *message is displayed for approximately 1 second (figure 4-5).*

Figure 4-5 — Alternate Mute area indication

Video Adjustment area

The Video Adjustment area provides slider controls that let you change the following video parameters:

- Horizontal shift (position)
- Vertical shift (position)
- Horizontal start
- Pixel Phase
- Total pixels

NOTE *When you make changes to the horizontal start, pixel phase, or total pixels settings, the value is changed in the transmitter.*

*If you are connected to either of the **receiver's** serial ports, **and** the Optical 2 cable is not connected in your system, you **cannot** change these values using the control program. These slider controls are grayed out (unavailable).*

NOTE *When you make horizontal or vertical position changes (shift the image), the setting is changed in the receiver. It reports the shift values to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, you **can** still shift the image in the control program's Video Adjustment area, but the program **cannot** report the position values.*

Output Configuration area

Sync Format radio buttons — Click either the RGBHV/RGBS or RGsB radio button to select the desired video output sync format.

Output Polarity radio buttons — Click either the *Follow input* sync or *Force sync to negative* radio button to select the desired video output sync polarity.

NOTE *When you make output configuration changes, the setting is changed in the receiver. It reports the changes to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, the program **cannot** report the output sync format and polarity position settings in the control program's Video Adjustment area. You **can** change the output sync format and polarity, but the program **cannot** report the changes.*

Advanced Configuration area

Executive Mode button — Click the Executive Mode radio button to toggle the front panel lock on and off.

NOTE *When you toggle the front panel lock on and off, the setting is changed in the receiver. It reports the changes to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, you **can** still toggle the front panel lock in the control program's Advanced Configuration area, but the program **cannot** report the lock's status. The program indication changes (figure 4-6) to show that the Executive mode is control only, without and indication of the current mode. The* Set executive mode On *or* Off *message is displayed for approximately 1 second.*

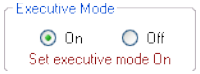


Figure 4-6 — Alternate Advanced Configuration area indication

Auto Memory checkbox — Click the Auto Memory checkbox to automatically apply saved position, horizontal start, total pixels, and pixel phase settings when the sensed input resolution changes. See "Auto Memory submenu" in chapter 3, "Operation" for more details about the auto memory function.

Auto Image button — Click the Auto Image button to adjust the output settings for the best image, based on the sensed input resolution.

Test Patterns drop box — Select one of three built-in test patterns; Color Bars, grayscale, and alternating pixels; as necessary to help adjust the display's color, focus, and grayscale. Select Off to output the video input to the transmitter.

NOTE *You must have a video input connected and fiber cable Optical 1 connected between the transmitter and receiver for the receiver to output a selected test pattern.*

The test pattern will turn off if the input signal rate is changed or disconnected or if power is removed.

Audio Adjustment area

Audio Gain/Attenuation slider — Click and drag the Audio Gain/Attenuation slider control to select the input audio gain or attenuation value, from -18 dB to +10 dB in 1.0 dB increments.

NOTE *When you make input gain or attenuation changes, the setting is changed in the transmitter.*

*If you are connected to either of the **receiver's** serial ports, **and** the Optical 2 cable is not connected in your system, you **cannot** change the input value from the control program's Audio Adjustment area.*

Audio Output Level area

Audio Output Level radio buttons — Click either the Consumer Level (-10 dBV) or Professional Level (+4 dBu) radio button to select the output audio level.

NOTE *When you make an audio output level change, the setting is changed in the receiver. It reports the changes to the transmitter via the optional Optical 2 cable.*

*If you are connected to either of the **transmitter's** serial ports, **and** the Optical 2 cable is not connected in your system, the program **cannot** report the output audio level in the control program's Audio Adjustment area. You **can** change the level, but the program **cannot** report the changes. The program shows the* Set Consumer *(or* Professional*)* level *message to indicate that the output level command is control only, not and indication (figure 4-7). The message is displayed for approximately 1 second.*

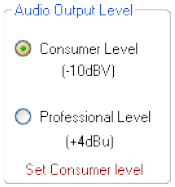


Figure 4-7 — Alternate Audio Adjustment area indication

Firmware upgrade

Firmware can be upgraded for each unit via either of that unit's serial ports by calling the Extron Firmware Loader utility from the Windows-based control program.

NOTE *When firmware upgrades are available, they are unique to the unit; a transmitter firmware upgrade for the Tx unit and a receiver upgrade for the Rx unit.*

You must connect directly to the unit to be updated.

Upload replacement firmware as follows:

1. Visit the Extron web site, www.extron.com, click the Download Center tab, and then click the Firmware link (figure 4-8). Select the appropriate firmware file(s) to download and copy it (them) to your computer. Note the folder to which you save the firmware file(s).

Figure 4-8 — Location of firmware upgrade files

2. In the Windows Explorer or other file browser, double-click the downloaded executable (*.exe) file(s) to self-extract the firmware file(s).
3. Connect a Windows-based computer to the either serial port (rear panel Remote RS-232 or front panel Configuration) of the unit to be updated. See chapter 2, "Installation", for more details.
4. Start the FOX 500 Control Program. See "Starting the program", on page 4-16.
5. Click Tools > Update Firmware. The Extron Firmware Loader appears (figure 4-9).

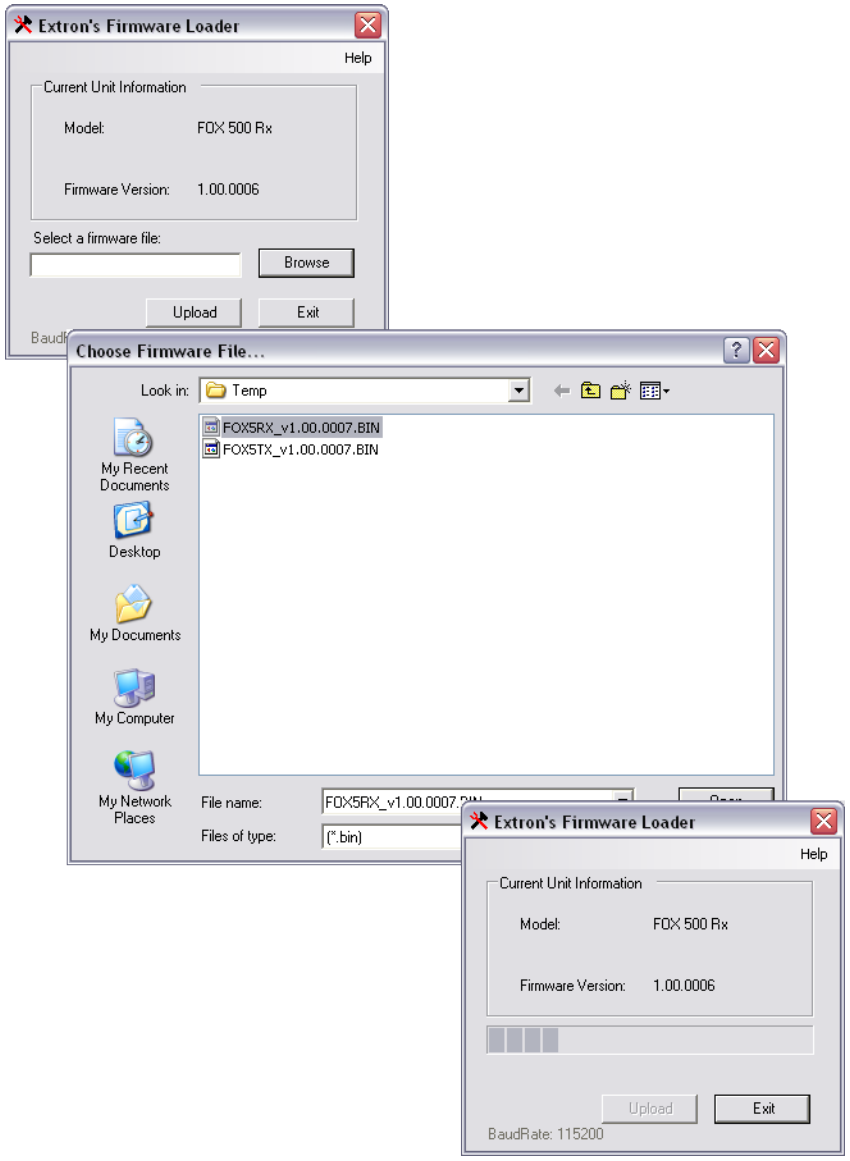


Figure 4-9 — Open window

a. Click Browse. The open file window appears.

b. Navigate to the folder where you saved the firmware upgrade file. Select the file. The Firmware Loader returns to the top.

NOTE *Valid firmware files must have the file extension ".BIN". Any other file extension is not a firmware upgrade for your FOX 500.*

c. Click Upload. The File Loader reports, "*This process could take several minutes. Please wait...*" and then displays a scroll bar that shows the status of the upload.

d. When the Firmware Loader reports, "*Transfer complete*!", click the Exit button.

6. Cycle the FOX 500 unit's power.

7. If necessary, repeat this entire procedure on the other unit of the transmitter/receiver pair.

Appendix A

Reference Information

Specifications

Part Numbers

Specifications

NOTE *The FOX 500 Tx/Rx consists of a transmitter (FOX 500 Tx) and a receiver (FOX 500 Rx) with one or two fiber optic cables linking the two units.*

The analog RGB input signal is digitized pixel by pixel in the transmitter, sent digitally through the fiber cable, and converted back to analog RGB in the receiver.

The analog audio signal(s) is (are) digitized in the transmitter, sent through the fiber cable, and converted back to analog audio in the receiver.

Optical fiber interconnection between transmitter and receiver

Number/type	1 or 2 fiber optic

NOTE *Only one fiber is required to transmit video, audio, and unidirectional data. A second fiber is required to transmit return data for bidirectional control/communication.*

Connectors	2 LC connectors
Operating distance	30 km (18.75 miles) with singlemode (SM) cables with a FOX 500 Tx/Rx SM 0.5 km (0.3 mile) with multimode (MM) cables with a FOX 500 Tx/Rx SM 0.15 km (450') with multimode (MM) cables with a FOX 500 Tx/Rx MM

NOTE *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 500 Tx/Rx MM, 1310 nm for FOX 500 Tx/Rx SM
Transmission power	-5 dBm, typical
Maximum receiver sensitivity	-18 dBm, typical
Optical budget	13 dB, maximum

NOTE *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.*

Video

Number/signal type	1 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs input 1 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs loop-through
Gain	Unity
Pixel data bit depth	8 bits per channel, 3 channels (R, G, and B)
Maximum resolution	1600 x 1200 @ 60 Hz, digitized pixel by pixel; higher resolutions up to 2048 x 1120, undersampled

Video input and loop-through — transmitter (FOX 500 Tx)

Number/signal type	1 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs input 1 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs loop-through
Connectors	1 x 5 female BNC *or* (1) female 15-pin HD for input (1) female 15-pin HD for loop-through
Nominal level	0.7 Vp-p for RGB
Minimum/maximum levels	Analog: 0.3V to 1.5 Vp-p with no offset
Impedance	75 ohms
Horizontal frequency	24 kHz to 100 kHz
Vertical frequency	40 Hz to 120 Hz
Return loss	<-40 dB @ 5 MHz

Video output — receiver (FOX 500 Rx)

Number/signal type	2 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs (follows input or can be set by user)
Connectors	1 x 6 female BNC and (1) female 15-pin HD
Nominal level	0.7 Vp-p for RGB
Minimum/maximum levels	0.3 V to 1.5 Vp-p
Impedance	75 ohms
Return loss	-40 dB @ 5 MHz
DC offset	±5 mV with input at 0 offset

Sync

Input type	Autodetect RGBHV, RGBS, RGsB, RsGsBs
Output type	RGBHV, RGBS, RGsB, RsGsBs (follows input or can be set by user)
Input level	2.5 V to 5.0 Vp-p
Output level	TTL: 5.0 V p-p, unterminated, in HV or S; or 0.3 V p-p on Gs, terminated
Input impedance	510 ohms
Output impedance	75 ohms
Polarity	Positive or negative (follows input or can be set by user)

Audio

Number/signal type	2 inputs (mixed): 1 balanced stereo, 1 unbalanced stereo
Gain	
Range	Adjustable, -18 dB to +24 dB
Default	Unbalanced output: -6 dB; balanced output: 0 dB
Frequency response	20 Hz to 20 kHz, ±0.5 dB
THD + Noise	0.10% @ 1 kHz at nominal level
S/N	>80 dB at maximum output (unweighted)
CMRR	>65 dB @ 20 Hz to 20 kHz
Sample size	18 bits per channel, 2 channels (L and R)
Sampling rate	48 kHz

Audio input — transmitter (FOX 500 Tx)

Number/signal type	2 inputs (mixed): 1 balanced stereo, 1 unbalanced stereo
Connectors	(1) 3.5 mm captive screw connector, 5 pole (1) 3.5 mm mini stereo jack
Impedance	18k ohms unbalanced, 20k ohms balanced, DC coupled
Nominal level	+4 dBu (1.23 Vrms), -10 dBV (316 mVrms)
Maximum level	+17 dBV, (unbalanced) at 1% THD+N

NOTE *0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu*

Audio output — receiver (FOX 500 Rx)

Number/signal type	2 buffered outputs: 1 balanced stereo, 1 unbalanced stereo
Connectors	(1) 3.5 mm captive screw connector, 5 pole (1) 3.5 mm mini stereo jack
Impedance	50 ohms unbalanced, 100 ohms balanced
Nominal level	+4 dBu (1.23 Vrms), -10 dBV (316 mVrms)
Maximum level (Hi-Z)	>+19 dBu, unbalanced at 1% THD+N
Maximum level (600 ohm)	>+15 dBm, unbalanced at 1% THD+N

Control/remote

Serial control ports on each unit (transmitter and receiver)

Control	1 RS-232, 3.5 mm captive screw connector, 5 pole (3 pins are used) (rear panel) 1 RS-232, 2.5 mm mini stereo jack (front panel)
Pass-through	1 RS-232, 3.5 mm captive screw connector, 5 pole (3 pins are used) (rear panel); in parallel with 1 RS-232, 2.5 mm mini stereo jack (front panel)

Baud rate and protocol

Control	9600 baud, 8 data bits, 1 stop bit, no parity
Pass-through	9600 to 38400 baud

Serial control pin configurations	Captive screw connectors: 1 = Tx, 2 = Rx, 3 = GND Mini stereo jack: tip = Tx, ring = Rx, sleeve = GND
Program control	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™)

General

Power	100 VAC to 240 VAC, 50/60 Hz, 11 watts, internal, autoswitchable
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
Rack mount	Yes, with optional 1U rack shelf, part #60-190-01 or 60-604-01 Furniture mountable with optional under desk mounting kit, part #70-077-01
Enclosure type	Metal

Enclosure dimensions	1.7" H x 8.7" W x 9.5" D (1U high, half rack wide) 4.3 cm H x 22.1 cm W x 24.1 cm D (Depth excludes connectors and knobs.)
Product weight	4.6 lbs (2.1 kg) per Tx/Rx pair
Shipping weight	8 lbs (4 kg) per Tx/Rx pair
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICE
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 500 part numbers

NOTE *The FOX 500 Tx and FOX 500 Rx are a paired set, sharing a common serial number.*

NOTE *When returning a FOX 500 Tx or FOX 500 Rx to Extron for service, ensure that the identically serial-numbered paired half is also returned.*

The FOX 500 is available in singlemode (SM) and multimode (MM) models, each of which includes a transmitter (Tx) and a receiver (Rx):

FOX 500 Models	Part number
FOX 500 Tx/Rx SM	60-746-02
FOX 500 Tx SM	60-746-12
FOX 500 Rx SM	60-746-22
FOX 500 Tx/Rx MM	60-746-01
FOX 500 Tx MM	60-746-11
FOX 500 Rx MM	60-746-21

Included parts

These items are included in each order for a FOX 500 Tx/Rx:

Included parts	Part number
IEC power cord	
Tweeker (small screwdriver)	
User's guide	
Captive screw 5-pole connectors (qty. 6)	10-703-12
(2) 10' LC-LC duplex patch cables (SM or MM, depending on the model)	

Optional accessories

Accessories	Part number
9-pin D to 2.5 mm mini jack TRS RS-232 cable	70-335-01
RSU 129 9" 1U universal rack shelf kit	60-190-01
RSB 129 9" 1U basic rack shelf	60-604-01
MBU 125 under desk mounting kit	70-077-01
MBD 129 through desk mounting kit	70-077-02

Cables

Accessories	Part number
VGA M-M MD, 3' to 100' (0.9 m to 30.4 m) (molded)	26-238-*nn*
VGA M-M BK, 3' to 100' (0.9 m to 30.4 m) (backshell)	26-238-*nn*
VGAP M-M MD, 3' to 25' (0.9 m to 7.6 m) (molded)	26-439-*nn*
VGAP M-M BK, 35' to 100' (10.6 m to 30.4 m) (backshell)	26-439-*nn*
VGA-A M-M MD (with audio), 3' to 50' (0.9 m to 15.2 m) (molded)	26-490-*nn*
VGA-A M-M BK (with audio), 3' to 50' (0.9 m to 15.2 m) (backshell)	26-490-nn
MHR-5 BNC mini high resolution male to male, 3' to 100' (0.9 m to 30.4 m)	26-260-*nn*
MHR-5P BNC mini high resolution plenum male to male, 3' to 100' (0.9 m to 30.4 m)	26-378-*nn*
M59-5 BNC mini 59 flex male to male, 3' to 100' (0.9 m to 30.4 m)	26-499-*nn*
RG6-5 BNC super high resolution male to male, 3' to 100' (0.9 m to 30.4 m)	26-369-*nn*