

# PowerCage 411

MODULAR POWER ENCLOSURE FOR FOX3 FIBER OPTIC EXTENDERS



**FOX3**  
SYSTEMS

**4K UHD**

**VECTOR 4K**  
SCALING

**DoDIN APL**  
APPROVED PRODUCT

**EVERLAST**  
POWER SUPPLIES

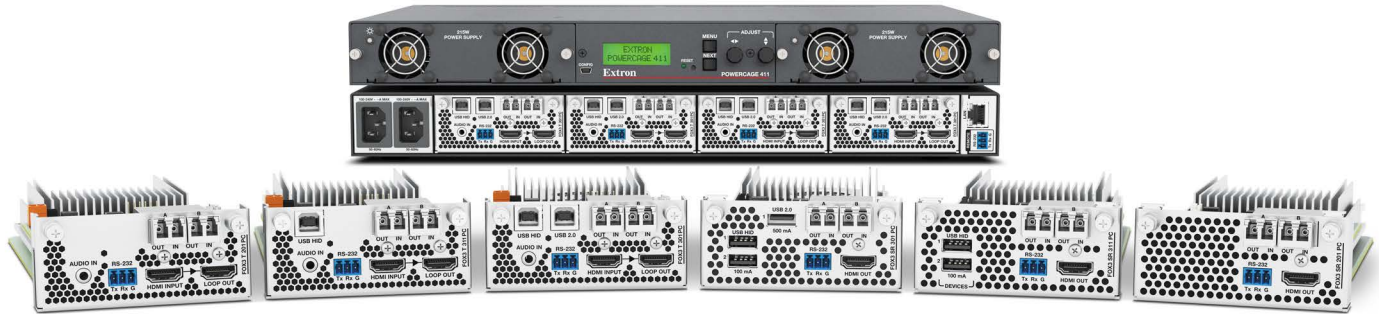
## FOX3 Fiber Optic Extenders with Space-Saving Design

- ▶ Compact, 1U rack-mountable enclosure
- ▶ Accommodates up to four modules
- ▶ Modular, field-upgradable, and hot-swappable design
- ▶ Dual-redundant and hot-swappable power supplies
- ▶ Ethernet monitoring and control
- ▶ RS-232 insertion from the Ethernet port
- ▶ Dual AC power connectors
- ▶ Front panel LCD display and controls for easy setup and troubleshooting

**Extron**

# PowerCage 411

The Extron PowerCage 411 is a compact 1U rack-mountable, four-slot enclosure that supports Extron FOX3 series fiber optic extenders. Engineered with uncompromising quality and proven performance to provide an efficient way to power, manage, and mount multiple extenders, the PowerCage 411 simplifies integration for large, rack-mounted systems as well as user workstations with multiple computers.



**18 Gbps**  
4K/60 4:4:4

Extron FOX3 extenders support input and output signals up to 4K/60 with full 4:4:4 color sampling, delivering the highest quality images for video and computer sources. It integrates easily into a wide range of 4K environments.

**VECTOR 4K**  
SCALING

Extron Vector 4K is the latest generation of Extron scaling technologies engineered for critical quality 4K image processing, together with a full suite of integration features for pro AV applications.

  
**EVERLAST**  
POWER SUPPLIES

Everlast power supplies are designed and engineered by Extron for continuous, dependable operation in mission-critical environments.

**DoDIN APL**  
APPROVED PRODUCT

Extron DoDIN Approved Products are available as DISA Unified Capabilities APL versions upon request. Please contact your Extron Sales Representative for availability and pricing.



Extron FOX3 Systems industry-leading family of fiber optic matrix switchers and extenders provide secure AV and KVM switching and distribution. They are available with advanced features such as SmartGlide™ KVM Switching, Hotkey Switching, and audio breakaway.

# OVERVIEW

## Exceptional Thermal Management

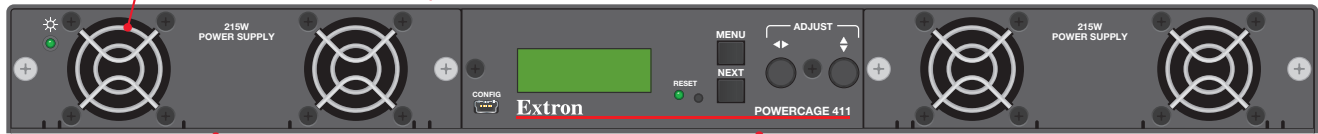
Provides air flow to each module for optimal cooling and reliable operation.

## Dual redundant and hot-swappable power supplies

Provides primary and back-up power for added reliability in critical applications.

## Power I/O Slot Control

Enables independent power on/off control for each board via RS-232 or Ethernet.



## Variable speed fans

Provides ambient air cooling with a reduced noise levels by only operating as needed.

## Front panel USB configuration

Provides convenient access for setup, configuration, and firmware updates.

## Front panel LCD display and controls

Facilitates quick setup of system parameters without the need to connect a computer.

## Two AC Power Inputs

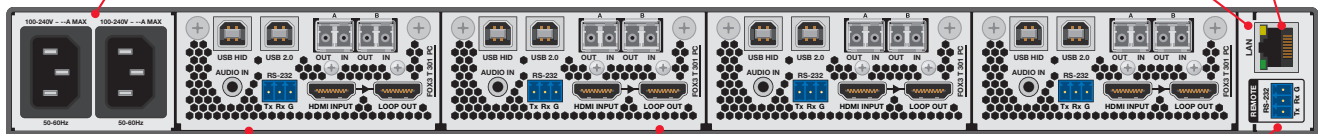
Provides continuous connection to primary and redundant power sources for added reliability.

## RS-232 insertion from the Ethernet port to installed boards

Provides system level control to a local or remote device.

## Ethernet Monitoring and Control

Enables control and proactive monitoring over a LAN, WAN, or the Internet using standard TCP/IP protocols.



## Modular, field-upgradable, and hot-swappable design

Enables board to be added or replaced for quick and easy upgradeability or expansion.

## Accommodates up to four boards

Enables up to four FOX3 series fiber optic extenders in a single 1U rack space.

## RS-232 control port

Enables control and configuration of the enclosure and installed boards.

# MODULAR DESIGN PROVIDES MAXIMUM FLEXIBILITY

## Modular Design Provides Maximum Flexibility

The PowerCage 411 is a 1U rack-mountable enclosure that can be populated with up to four extender modules, making it an ideal solution for larger systems that need to support remote devices. Matrix switchers generally reside in equipment racks, which are typically some distance away from both the source equipment and display devices. In general, a mixture of transmitters and receivers are utilized to distribute signals to and from these locations, often with the need to overcome specific challenges such as limited conduit space and distance limitations. The ability to accommodate multiple extenders within a single enclosure saves rack space and streamlines system design and installation. The modular hot-swappable design also offers a degree of future-proofing, whereby unpopulated slots are available to support system growth without additional rack space, system downtime, or equipment relocation.

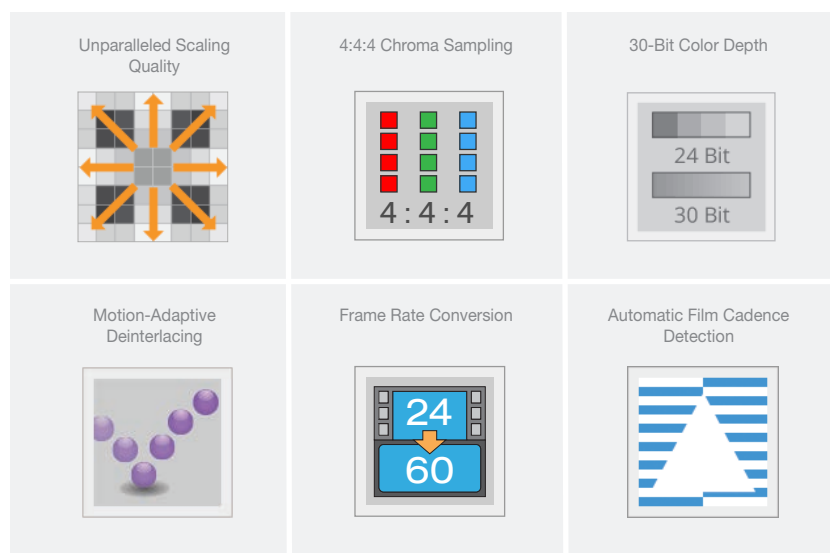
## System Monitoring and Control

The PowerCage 411 offers convenient local and remote system access for configuration, operation, and monitoring through the front panel USB configuration port, rear panel RS-232 serial control port, and Ethernet control port. The front panel LCD display and real-time status indicators offer instant feedback about power status, communication, and installed board model for each of the four slots. RS-232 and USB configuration ports on the enclosure enable communication to each module slot for configuration and convenient setup of the fiber optic extenders.

## Extron Vector 4K Scaling Technology

Vector 4K was developed internally by Extron's expert team of signal processing engineers. Extron engineers have crafted patented image processing technologies that set the industry benchmark for visual performance. Features such as bicubic scaling, 30-bit color depth, and 4:4:4 chroma sampling ensure very high image quality and preserve the detail present in original source material.

PowerCage FOX3 scaling receivers with Vector 4K scaling offer a variety of convenient, user-friendly features. Aspect ratio control and dynamic vector-based test patterns are just a few of the many standard product features that streamline integration and optimize system performance.



# POWERCAGE 411 AND TRANSMITTER BOARDS

## PowerCage 411

### Modular Power Enclosure for FOX3 Fiber Optic Extenders

#### Features

- Space-saving design in a compact, 1U rack-mountable enclosure
- Accommodates up to four modules
- Modular, field-upgradable, and hot swappable design
- Ethernet monitoring and control
- Dual redundant and hot swappable power supplies

Model	Version Description	Part#
PowerCage 411	Modular Power Enclosure for Fiber Optic Extenders	60-1492-02



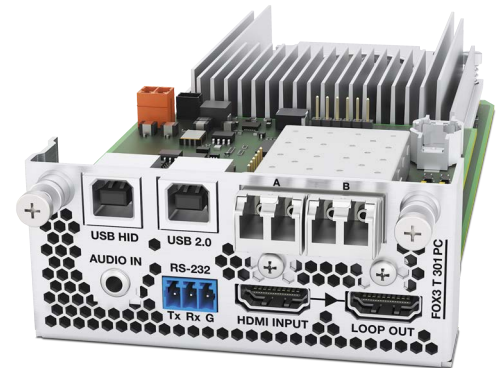
## FOX3 T 301 PC

### Fiber Optic Transmitter for HDMI, USB, Audio, and Control

#### Features

- Transmits HDMI video, USB, stereo audio, and RS-232 control signals over fiber optic cabling
- Supports USB 2.0 to 1.0 devices and USB 3.0 devices that can operate at USB 2.0 data rates of up to 480 Mbps
- Device class filtering on USB HID port restricts the range of device types to HID

Model	Version Description	Part#
FOX3 T 301 PC	MM Lossless 4K/60 Transmitter	70-1190-11
FOX3 T 301 PC	MM Lossless 4K/60 Transmitter	70-1190-12
FOX3 T 301 PC	MM Uncompressed 4K/60 Transmitter	70-1190-13
FOX3 T 301 PC	MM Uncompressed 4K/60 Transmitter	70-1190-14



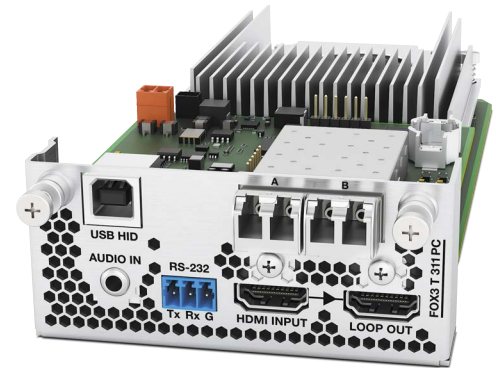
## FOX3 T 311 PC

### Fiber Optic Transmitter for HDMI, USB HID, Audio, and Control

#### Features

- Transmits HDMI video, USB HID, stereo audio, and RS-232 control signals over fiber optic cabling
- Device class filtering on USB HID port restricts the range of device types to HID

Model	Version Description	Part#
FOX3 T 311 PC MM	Lossless 4K/60 Transmitter	70-1223-11
FOX3 T 311 PC MM	Lossless 4K/60 Transmitter	70-1223-12
FOX3 T 311 PC MM	Uncompressed 4K/60 Transmitter	70-1223-13
FOX3 T 311 PC MM	Uncompressed 4K/60 Transmitter	70-1223-14



## FOX3 T 201 PC

### Fiber Optic Transmitter for HDMI, Audio, and Control

#### Features

- Transmits HDMI video, stereo audio, and RS-232 control signals over fiber optic cabling

Model	Version Description	Part#
FOX3 T 311 PC MM	Lossless 4K/60 Transmitter	70-1224-11
FOX3 T 311 PC MM	Lossless 4K/60 Transmitter	70-1224-12
FOX3 T 311 PC MM	Uncompressed 4K/60 Transmitter	70-1224-13
FOX3 T 311 PC MM	Uncompressed 4K/60 Transmitter	70-1224-14



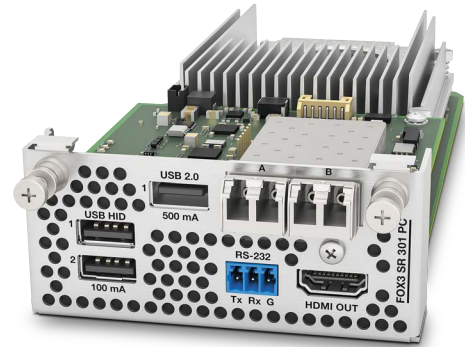
# POWERCAGE SCALING RECEIVER BOARDS

## FOX3 SR 301 PC

### PowerCage Fiber Optic Scaling Receiver for HDMI with embedded Audio, USB, and RS-232

#### Features

- Receives fiber optic signals from FOX3 Series transmitters and provides scaled HDMI video with embedded audio, USB, and RS-232 control
- High performance scaler provides selectable output resolutions up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling
- Supports mathematically lossless 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over one fiber
- Supports uncompressed 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over two fibers



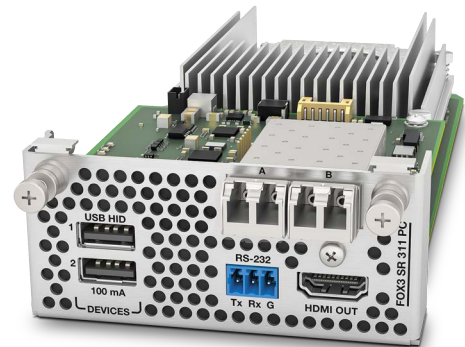
Model	Version Description	Part#
FOX3 SR 301 PC MM	Lossless 4K/60 Scaling Receiver	70-1190-21
FOX3 SR 301 PC SM	Lossless 4K/60 Scaling Receiver	70-1190-22
FOX3 SR 301 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1190-23
FOX3 SR 301 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1190-24

## FOX3 SR 311 PC

### PowerCage Fiber Optic Scaling Receiver for HDMI with embedded Audio, USB HID, and RS-232

#### Features

- Receives fiber optic signals from FOX3 Series transmitters and provides scaled HDMI video with embedded audio, USB HID, and RS-232 control
- High performance scaler provides selectable output resolutions up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling
- Supports mathematically lossless 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over one fiber
- Supports uncompressed 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over two fibers



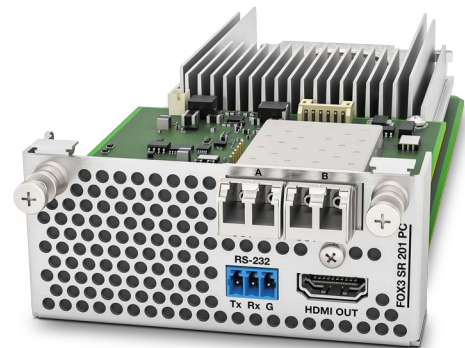
Model	Version Description	Part#
FOX3 SR 311 PC MM	Lossless 4K/60 Scaling Receiver	70-1223-21
FOX3 SR 311 PC SM	Lossless 4K/60 Scaling Receiver	70-1223-22
FOX3 SR 311 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1223-23
FOX3 SR 311 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1223-24

## FOX3 SR 201 PC

### PowerCage Fiber Optic Scaling Receiver for HDMI with embedded Audio and RS-232

#### Features

- Receives fiber optic signals from FOX3 Series transmitters and provides scaled HDMI video with embedded audio and RS-232 control
- High performance scaler provides selectable output resolutions up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling
- Supports mathematically lossless 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over one fiber
- Supports uncompressed 4K video up to 4096x2160 at 60 Hz with 4:4:4 chroma sampling over two fibers



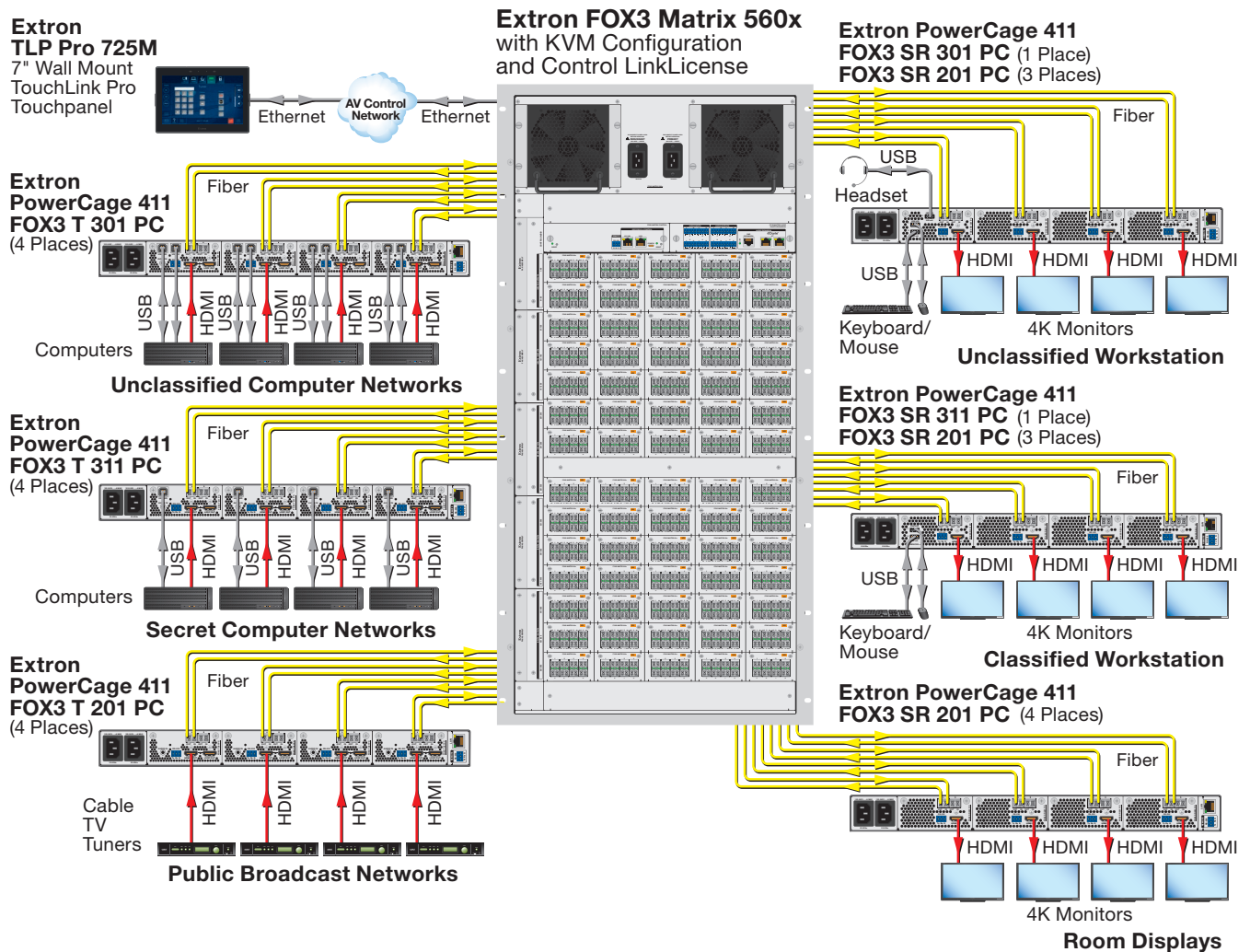
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FOX3 SR 201 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1224-23
FOX3 SR 201 PC MM	Uncompressed 4K/60 Scaling Receiver	70-1224-24

# APPLICATION DIAGRAM

## Secure Command Center with SmartGlide KVM Switching

A secure command center monitors and processes information from both unclassified and classified sources. Unclassified workstations include the FOX3 SR 301 PC scaling receiver for full USB access, while classified workstations restrict USB access to keyboard and mouse functions with the FOX3 SR 311 PC scaling receiver.

The KVM Configuration and Control LinkLicense with SmartGlide KVM Switching enables an operator to control up to four computers with a single keyboard and mouse. Automatic, fast, and seamless keyboard and mouse switching as the mouse glides from one workstation display to the next. Users can also switch the keyboard and mouse using hotkey switching or an on-screen display control panel.



# SPECIFICATIONS

## TRUE 4K SPECIFICATION

Max 4K Capabilities		
Resolution and Refresh Rate	Chroma Sampling	Max Bit Depth per Color
4096 x 2160 at 60 Hz 3840 x 2160 at 60 Hz 4096 x 2160 at 30 Hz 3840 x 2160 at 30 Hz	4:4:4	8 bit
4096 x 2160 at 60 Hz 3840 x 2160 at 60 Hz		12 bit
	4:2:0	

Frame rate <sup>3</sup>	24, 25, 30, 50, or 60 fps
Chroma sampling <sup>3</sup>	4:4:4, 4:2:2
Color bit depth <sup>2,3</sup>	8, 10, or 12 bits per color
Signal Type	HDMI 2.0, HDCP 2.3
Max. video data rate	18.0 Gbps
NOTE: Optical data rate is 10 Gbps over one fiber and 20 Gbps over two fibers.	
NOTE: These transceivers are class 1 laser products. They meet the safety regulations of IEC-60825.	

## OPTICAL FIBER INTERCONNECTION BETWEEN TRANSMITTER AND RECEIVER

Connectors	1, 2, or 3 LC connectors
Nominal peak wavelength	850 nm for multimode, 1310 nm for singlemode
Optical loss budget	
Singlemode	+7.4 dB, maximum
Multimode	+8.3 dB, maximum

## VIDEO INPUT AND LOOP OUT — FOX3 T PC CARDS

Number/signal type	1 HDMI input 1 HDMI loop out
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## VIDEO OUTPUT — FOX3 SR PC CARDS

Number/signal type	1 HDMI
Scaled resolution	640x480 <sup>3</sup> , 800x600 <sup>3</sup> , 1024x768 <sup>3</sup> , 1280x768 <sup>3</sup> , 1280x800 <sup>3</sup> , 1280x1024 <sup>3</sup> , 1360x768 <sup>3</sup> , 1366x768 <sup>3</sup> , 1440x900 <sup>3</sup> , 1400x1050 <sup>3</sup> , 1600x900 <sup>3</sup> , 1600x1200 <sup>3</sup> , 1920x1200 <sup>3</sup> , 2048x1200 <sup>3</sup> , 2048x1536 <sup>3</sup> , 2560x1080 <sup>3</sup> , 2560x1440 <sup>3</sup> , 2560x1600 <sup>3</sup> , 3840x2160 <sup>1,2,3,4,5,6,7,8</sup> , 4096x2160 <sup>1,2,3,4,5,6,7,8</sup> , 480p <sup>7,8</sup> , 576p <sup>6</sup> , 720p <sup>3,4,5,6,7,8</sup> , 1080i <sup>6,7,8</sup> , 1080p <sup>1,2,3,4,5,6,7,8</sup> , 2K <sup>1,2,3,4,5,6,7,8</sup> , 1 custom, bypass
	<sup>1</sup> 23.98 Hz, <sup>2</sup> 24 Hz, <sup>3</sup> 25 Hz, <sup>4</sup> 29.97 Hz, <sup>5</sup> 30 Hz, <sup>6</sup> 50 Hz, <sup>7</sup> 59.94 Hz, <sup>8</sup> 60 Hz

## AUDIO INPUT — FOX3 T PC CARDS

Number/signal type	1 digital audio, de-embedded from HDMI (2-CH, PCM only) or 1 analog stereo, unbalanced
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## AUDIO OUTPUT — FOX3 SR PC CARDS

Number/signal type	1 digital audio, de-embedded with HDMI output (2-ch, PCM only)
Gain error	± 0.5 dB channel to channel
Volume control range	100% to 0% (0 - 100 in 1% steps)

## COMMUNICATIONS — ENCLOSURE HOST PORTS

Serial control port	1 bidirectional RS-232, 3.5 mm captive screw connector, 3 pole (rear panel)
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Baud rate and protocol	9600 baud, 8 data bits, 1 stop bit, no parity
Pass-through baud rate	9600 to 115,200 baud
Serial control pin configuration	1 = Tx, 2 = Rx, 3 = Gnd

<b>USB configuration port</b>	
Number/type	1 front panel mini USB B, female

<b>Ethernet control port</b>	
Number/type	1 female RJ-45
Ethernet data rate	10/100/1000Base-T, half/full duplex with autodetect
Program control	Extron Product Configuration Software Extron Simple Instruction Set (SIS™)

## USB EXTENSION (USB) — FOX3 T/SR 301 PC AND FOX3 T/SR 311 PC ONLY

<b>USB standards</b>	USB 2.0, USB 1.1, USB 1.0 compatible
<b>USB data rates</b>	Low speed (1.5 Mbps), full speed (12 Mbps), high speed (480Mbps)

<b>Data transfer types</b>	Bulk, control, interrupt, and isochronous
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## USB HOST PORTS — FOX3 T 301 PC AND FOX3 T 311 PC ONLY

<b>FOX3 T 301 PC</b>	
Number/signal type	1 USB HID 1 USB 2.0

<b>FOX3 T 311 PC</b>	
Number/signal type	1 USB HID

## USB DEVICE PORTS — FOX3 SR 301 PC AND FOX3 SR 311 PC ONLY

<b>FOX3 SR 301 PC</b>	
Number/signal type	(1) 2-port USB HID hub (1) 1-port USB 2.0 hub
Connectors	3 USB type A, female (2 USB HID and 1 USB 2.0)
Maximum built-in USB hubs	0
<b>NOTE:</b> This applies to the USB 2.0 hub only.	
Available USB power	USB 2.0 port = 500 mA USB HID ports = 100 mA

<b>FOX3 SR 311 PC</b>	
Number/signal type	(1) 2-port USB HID hub
Connectors	2 USB type A, female (2 HID)
Available USB power	USB HID ports = 100 mA

## GENERAL — POWERCAGE 411

<b>Mounting</b>	
Rack mount	Yes
<b>Enclosure type</b>	Metal
<b>Enclosure dimensions</b>	1.72" H x 19.00" W x 14.00" D (1U high, full rack wide) (4.4 cm H x 48.3 cm W x 35.6 cm D) (Depth excludes connectors on the optional boards.)

## GENERAL — FOX3 T PC AND FOX3 SR PC CARDS

<b>Power supply</b>	Internal Powered by the PowerCage 411 Enclosure
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## GENERAL — POWERCAGE 411 AND FOX3 PC CARDS

<b>Regulatory compliance</b>	CE, C-tick, c-UL, UL, FCC Class A, ICES, VCCI Complies with the appropriate requirements of RoHS, WEEE. Additionally, for FOX3 boards: FDA Class 1
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<b>Product warranty</b>	3 years parts and labor
<b>Everlast power supply warranty</b>	7 years parts and labor

NOTE: All nominal levels are at ±10%.

Model	Version Description	Part number
PowerCage 411	Modular Power Enclosure for Fiber Optic Extenders	60-1492-02

For complete specifications, please go to [www.extron.com](http://www.extron.com)  
Specifications are subject to change without notice.

# Extron

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