KVXHP-100   KVXHP-200

KVX
HP SERIES
EXTENDERS

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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Disclaimer:

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INSTRUCCIONES DE SEGURIDAD

(NORMAS OFICIALES MEXICANAS ELECTRICAL SAFETY STATEMENT)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

CONTENTS

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KVX-HP 100-SERIES

- Nominal Operating Power · 10W
- Peak Power · 12W
- External Power · 12V DC, 1.5A
- Max operating Altitude · 6561' (2000m)
- Operating Temp range · 32 to 104°F (0 to +40°C)
- Operating Humidity range (%RH) · 0-80%
- Storage Temp range · 14 to 122°F (-10 to +50°C)
- Storage Humidity range (%RH) · 0-80%
- Max Thermal Dissipation (BTU) · 41.94
- MTBF (Tx / Rx) · 530k / 520k hours
  MTBF (Pair) · 260k hours

LOCAL UNIT – TRANSMITTER (TX)

- (4) Tri-color status indicators
- DisplayPort™ in and local pass-through out
- (2) USB2.0 type B
- Line in and out analog audio
- RJ12 serial port
- RJ45 and SFP+ ports

REMOTE UNIT – RECEIVER (RX)

- (4) Tri-color status indicators
- (2) DisplayPort out (second port is a duplicate)
- (4) USB2.0 type A
- Mic in, headset and speaker out
- RJ12 serial port
- RJ45 and SFP+ ports

PHYSICAL DESIGN

- Robust metal construction
- TX and RX: h: 7.3" (186mm), h: 1.5" (39mm), d: 5.8" (148mm)
- TX: 2.8lbs (1.2kg)
- RX: 2.7lbs (1.2kg)

POWER SUPPLY

- 100-240VAC, 47-63Hz
- 12VDC 18W output from power supply unit.

KVX-HP 200-SERIES

- Nominal Operating Power · 10W
- Peak Powe · 12W
- External Power · 12V DC, 1.5A
- Max operating Altitude · 6561' (2000m)
- Operating Temp range · 32 to 104°F (0 to +40°C)
- Operating Humidity range (%RH) · 0-80%
- Storage Temp range · 14 to 122°F (-10 to +50°C)
- Storage Humidity range (%RH) · 0-80%
- Max Thermal Dissipation (BTU) · 41.94
- MTBF (Tx / Rx) · 510k / 490k hours
  MTBF (Pair) · 250k hours

LOCAL UNIT – TRANSMITTER (TX)

- (4) Tri-color status indicators
- (2) DisplayPort in
- (2) USB2.0 type B
- Line in and out analog audio
- RJ12 serial port
- RJ45 and SFP+ ports

REMOTE UNIT – RECEIVER (RX)

- (4) Tri-color status indicators
- (2) DisplayPort out
- (3) USB2.0 full speed, type A
- (1) USB2.0 transparent Hi-Speed, type A
- Mic in, headset and speaker out
- RJ12 serial port
- RJ45 and SFP+ ports

PHYSICAL DESIGN

- Robust metal construction
- TX and RX: h: 7.3" (186mm), h: 1.5" (39mm), d: 5.8" (148mm)
- TX: 2.8lbs (1.2kg)
- RX: 2.7lbs (1.2kg)

POWER SUPPLY

- 100-240 VAC, 47-63Hz
- 12 VDC 18W output from power supply unit.

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CHAPTER 2: WELCOME

Thank you for choosing the KVX-HP 100-series (single head) or 200-series (dual head) extender modules. Using either fiber optic or CATx links, these compact modules allow you to extend KVM connections over long distances from a host computer (see *Transmission distances when using fiber* on the right).

The high-grade screening employed within the metal cased enclosures, particularly when combined with the immunity from interference of the fiber optic links.

The extender modules provide support for:

• High quality single- or dual- digital video (up to 4K 4096 x 2160 @60Hz),

• USB keyboard and mouse plus two other USB devices (up to USB 2.0),

• An RS232 serial device at speeds up to 115200 baud,

• Mono microphone,

• Stereo speakers,

• Line-level audio in/out connections.

Transmitter module

Fiber optic link
(up to 4km)
OR
CATx link
(CAT5e up to 50m)
(CAT6 up to 100m)
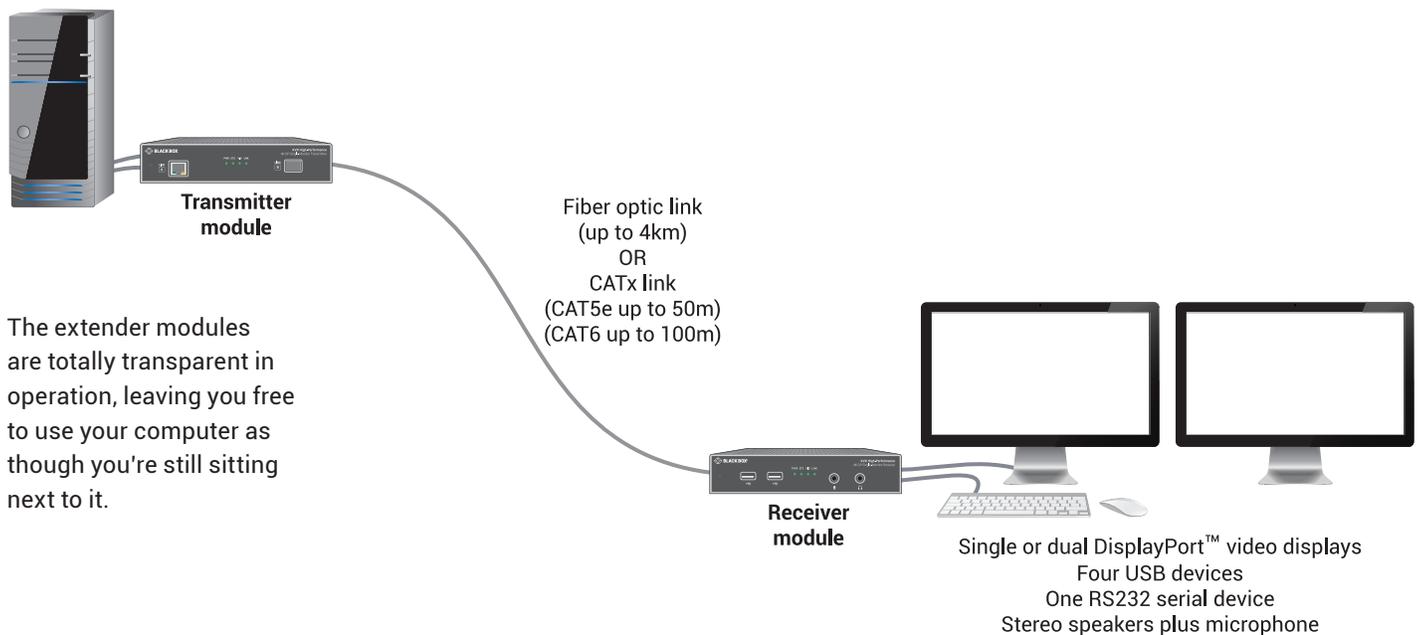
The extender modules are totally transparent in operation, leaving you free to use your computer as though you're still sitting next to it.

Receiver module

Single or dual DisplayPort™ video displays
Four USB devices
One RS232 serial device
Stereo speakers plus microphone

TRANSMISSION DISTANCES WHEN USING FIBER

The choice of fiber used with the modules has a considerable effect on the distance over which operation can take place. Using multi-mode fiber you can achieve distances up to 400m (1,312 feet); whereas, by using single-mode fiber (and accompanying SFP+ modules), the achievable maximum distance is increased to 4km (2.5 miles):

*Note: Black Box supplied SFP+ modules are recommended. If using alternatives, ensure that they are 10G SFP+ parts with LC connectors.*

SFP+ module

Fiber color

WARNING CLASS 1 laser product

Distance	Fiber type	Fiber color code
70m	OM1 (TIA-492AAAA)	Orange
150m	OM2 (TIA-492AAAB)	Orange
380m	OM3 (TIA-492AAAC)	Aqua
400m	OM4 (TIA-492AAAC)	Aqua
4km	OS1 (TIA-492C000)	Yellow
	OS2 (TIA-492E000)	Yellow
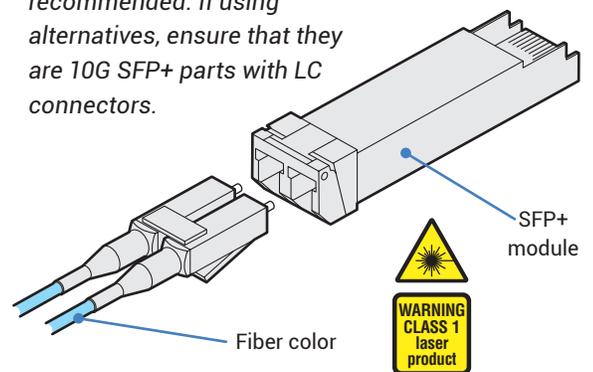
KVX-HP 100-SERIES FEATURES

The transmitter and receiver modules are contained within slimline metal casings that measure just 186 x 152 x 40mm.

KVX-HP 100-SERIES TRANSMITTER MODULE
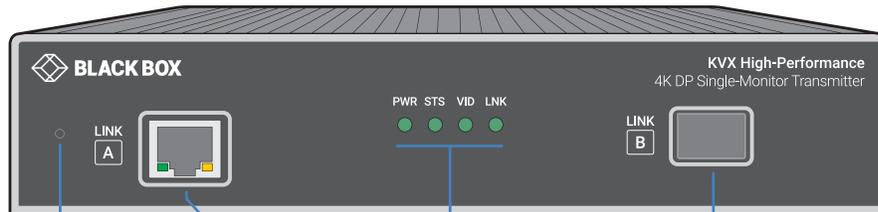
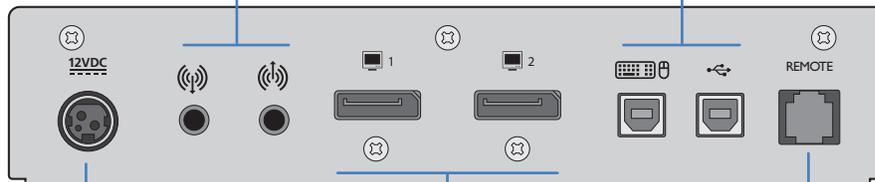**Recessed reset button**
See Resetting a module.

CATx port
Provides an alternative link method to fiber. See CATx link.

Status indicators
These provide visual confirmation of various system functions. See Indicators for further details.

SFP+ slot
Accommodates a fiber optic SFP+ module of your choice. See Fiber optic link for further details.

Audio ports
Connects to the audio output/input ports of your computer. See Transmitter audio links for further details.

USB ports
Connect to USB ports on your computer. The outer-most port also supports USB audio streaming. See Transmitter USB links for further details.

Power input
See Transmitter power connection for further details.

Video ports
Connect to the DisplayPort connectors of your computer. See Transmitter video link for further details.

Remote port
Can be used for RS232 serial devices. See Transmitter remote port for further details.

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KVX-HP 100-SERIES RECEIVER MODULE
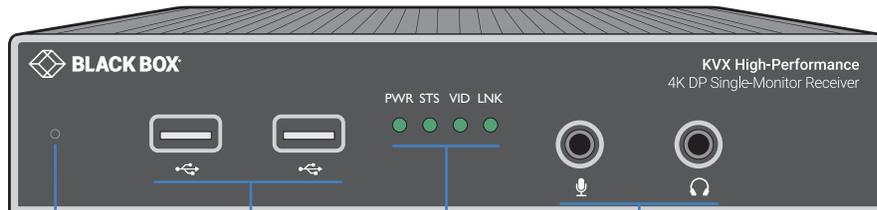
Recessed reset button
See Resetting a module.

USB ports
Connect your USB keyboard, mouse and other HID peripherals. See Receiver USB devices for further details.
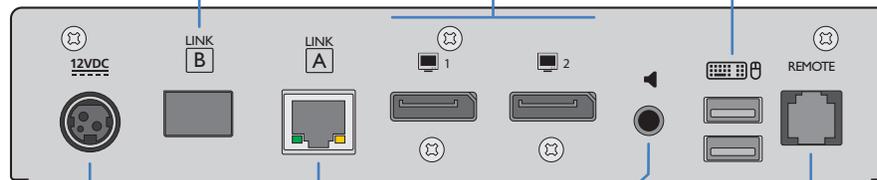
Status indicators
These provide visual confirmation of various system functions. See Indicators for further details.

Audio ports
Connect your microphone and headphones. See Receiver audio devices for further details.

SFP+ slot
Accommodates a fiber optic SFP+ module of your choice. See Fiber optic link for further details.

Video ports
Connect to your DisplayPort-equipped video displays. See Receiver video display(s) for further details.

USB ports
Connect your USB keyboard, mouse and other HID peripherals. See Receiver USB devices for further details.

Power input
See Receiver power connection for further details.

CATx port
Provides an alternative link method to fiber. See CATx link.

Speaker port
Connect your speakers. See Receiver audio devices for further details.

Remote port
Can be used for RS232 serial devices. See Receiver remote port for further details.

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KVX-HP 200-SERIES FEATURES

The transmitter and receiver modules are contained within slimline metal casings that measure just 186 x 152 x 40mm.

KVX-HP 200-SERIES TRANSMITTER MODULE
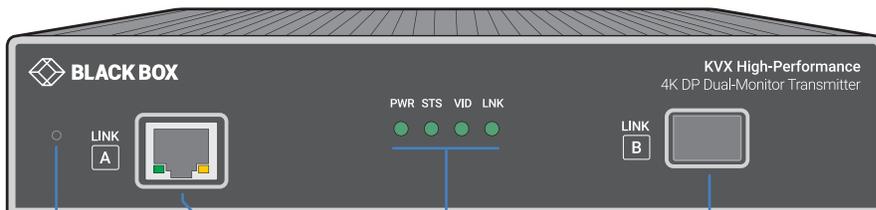
Recessed reset button
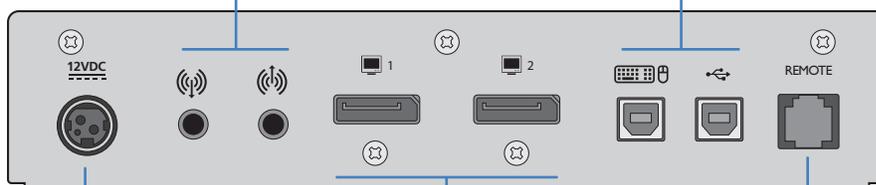See Resetting a module.

CATx port
Provides an alternative link method to fiber. See CATx link.

Status indicators
These provide visual confirmation of various system functions. See Indicators for further details.

SFP+ slot
Accommodates a fiber optic SFP+ module of your choice. See Fiber optic link for further details.

Audio ports
Connects to the audio output/input ports of your computer. See Transmitter audio links for further details.

USB ports
Connect to USB ports on your computer. The outer-most port supports transparent USB. See Transmitter USB links for further details.

Power input
See Transmitter power connection for further details.

Video ports
Connect to the DisplayPort™ connectors of your computer. See Transmitter video link for further details.

Remote port
Can be used for RS232 serial devices. See Transmitter remote port for further details.

KVX-HP 200-SERIES RECEIVER MODULE

BLACK BOX

KVX High-Performance
4K DP Dual-Monitor Receiver

PWR STS VID LNK
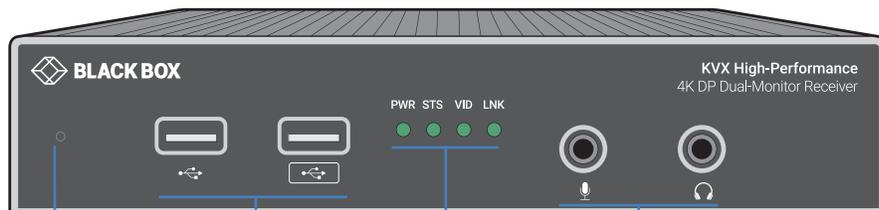
Recessed reset button
See Resetting a module.

USB ports
The left port supports keyboard, mouse and other USB HID peripherals. The right port supports a wider range of devices. See Receiver USB devices for further details.

Status indicators
These provide visual confirmation of various system functions. See Indicators for further details.

Audio ports
Connect your microphone and headphones. See Receiver audio devices for further details.
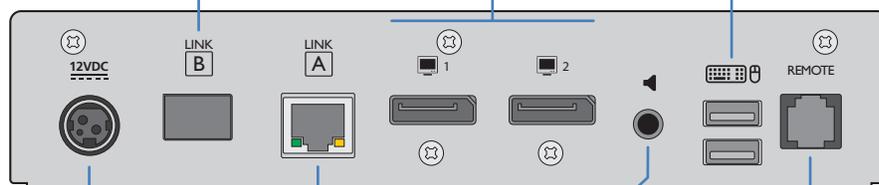
SFP+ slot
Accommodates a fiber optic SFP+ module of your choice. See Fiber optic link for further details.

Video ports
Connect to your DisplayPort™-equipped video displays. See Receiver video display(s) for further details.

USB ports
Connect your USB keyboard, mouse and other HID peripherals. See Receiver USB devices for further details.

12VDC   LINK B   LINK A   1   2   REMOTE

Power input
See Receiver power connection for further details.

CATx port
Provides an alternative link method to fiber. See CATx link.

Speaker port
Connect your speakers. See Receiver audio devices for further details.

Remote port
Can be used for RS232 serial devices. See Receiver remote port for further details.

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CATX LINK CABLE RECOMMENDATIONS

Due to the high data bandwidth required between the transmitter and receiver, 100- and 200-series extenders are highly dependent upon good quality CATx cable links. Video performance is particularly reliant on high speed communication channels.

The main factors that affect link quality are:

• The length and type of CATx cable used,

• The number, length and type of intermediate patch connections,

• The quality of the cable terminations.

CAT6 is recommended for CATx extensions, with a gauge (thickness) of at least 23AWG. Up to 5Gb/s of data may be transmitted, so the cable must be rated for at least 5GBase-T or 250MHz.

Patch links affect performance. For each additional break/patch within a run, the overall maximum extension is likely to be reduced. The amount will be dependent upon the nature of the patch panel. For best results, patch cables should be of type CAT6 and be less than 2 meters in length.

Use of CAT7 cables is not recommended. There is no associated ANSI/TIA specification for CAT7 resulting in a wide range of cable quality available, particularly with regard to shield grounding.

CHAPTER 3: INSTALLATION

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LOCATIONS

Please consider the following important points when planning the position of the modules:

• Situate the transmitter module close to the system to which it will be connected and near to a source of mains power. Place the receiver module in similar close proximity to the peripherals that it will connect with, plus a source of mains power.

• Consult the precautions listed within the supplied safety leaflet.

• Connections do not need to be carried out in the order given within this guide, however, where possible connect the *power in* as the final step.

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
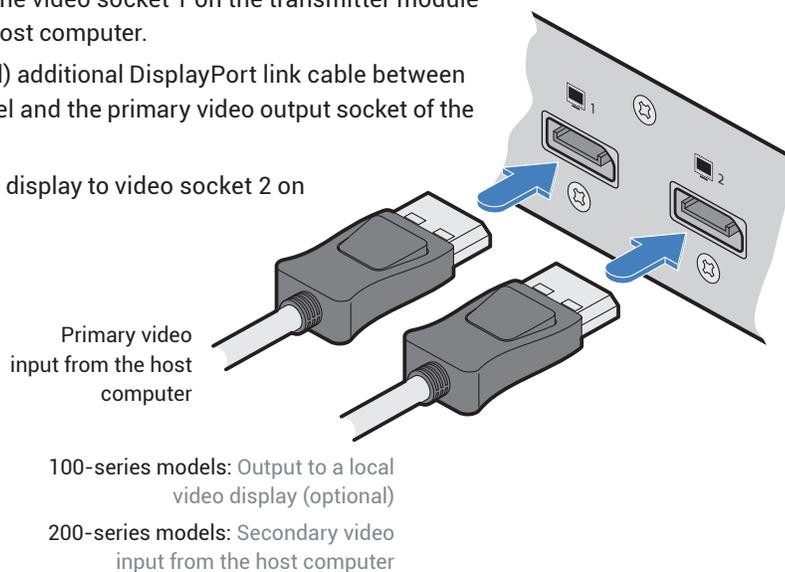
TRANSMITTER VIDEO LINK(S)

KVX-HP 100-series and 200-series modules can transfer various high resolution video modes via their DisplayPort™ connectors. The 100-series models support a single video display while 200-series models support dual video displays.

Note: On 200-series models, dual video displays at 4K resolution are not possible using a CATx link - fiber must be used. However, dual WQXGA resolutions are possible using CATx.

TO CONNECT THE VIDEO PORT(S)

1 Connect the supplied DisplayPort link cable between the video socket 1 on the transmitter module rear panel and the primary video output socket of the host computer.

2 On 200-series models, optionally connect the (supplied) additional DisplayPort link cable between the video socket 2 on the transmitter module rear panel and the primary video output socket of the host computer.

    On 100-series models, optionally connect a local video display to video socket 2 on the transmitter module rear panel.

Primary video input from the host computer

100-series models: Output to a local video display (optional)

200-series models: Secondary video input from the host computer

VIDEO RESOLUTIONS

The extenders support, but are not limited to, the following common video resolutions (all at 60 fps):

1920 x 1080 (HD)	2560 x 2048 (QSXGA)
1920 x 1200 (WUXGA)	2048 x 1080 (2K)
2560 x 1080	2048 x 2160
2560 x 1440 (WQHD)	3840 x 2160 (UHD)
2560 x 1600 (WQXGA)	4096 x 2160 (4K)

TRANSMITTER USB LINKS

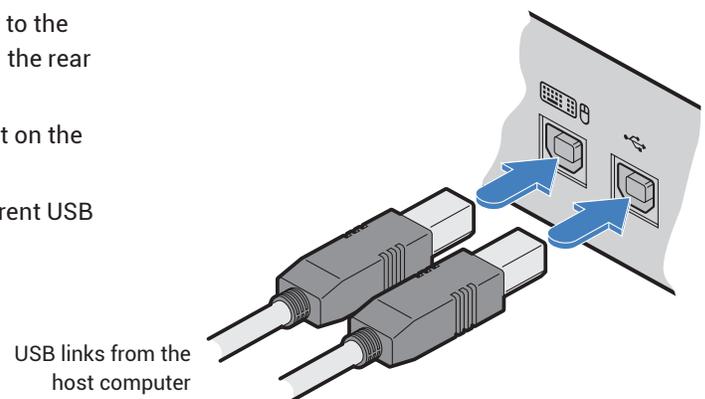The transmitter module has two USB input ports on its rear panel:
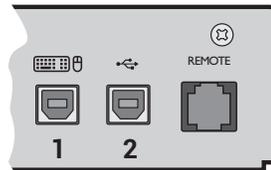
The ports have different functions depending on the model of extender that you are using:

	1	2
100-series	USB HID (Human Interface Device) feed to all USB ports on the receiver	USB audio feed to/from the analog audio ports labeled 🎧 🎤 🔈 on the receiver
200-series	USB HID (Human Interface Device) feed to all USB ports on receiver except the one labeled [⬲]	Transparent USB feed to front panel socket labeled [⬲] on the receiver

TO CONNECT THE USB PORT(S)

1 Connect the type B connector of the supplied USB/video cable to the right-hand side USB port (labeled '2' on the diagram above) on the rear panel of the transmitter module.

2 Connect the type A connector of the cable to a vacant USB port on the host computer.

3 Repeat steps 1 and 2 for the second port if USB audio/transparent USB are required (see table above).

USB links from the host computer

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TRANSMITTER AUDIO LINKS

The modules support analog stereo audio in and out connections. Where necessary, make connections between the audio input and/or output ports of the host computer and the transmitter module.

Note: Digital audio is also supported separately via the DisplayPort™ connectors as a transparent link- through.

TO CONNECT THE AUDIO PORTS

1 For the line in and/or line out ports, connect the supplied audio link cable between the audio port on the transmitter module rear panel and the line in or line out socket of the host computer.

From the audio output on the host computer

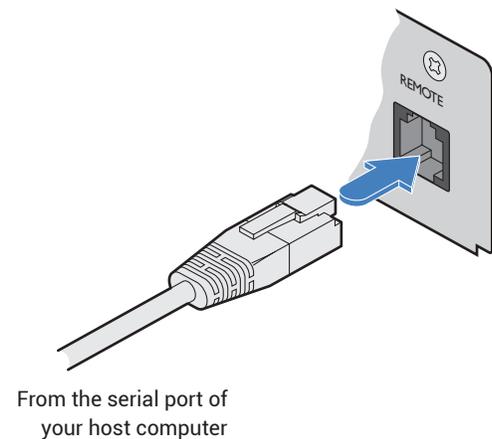To the audio input on the host computer
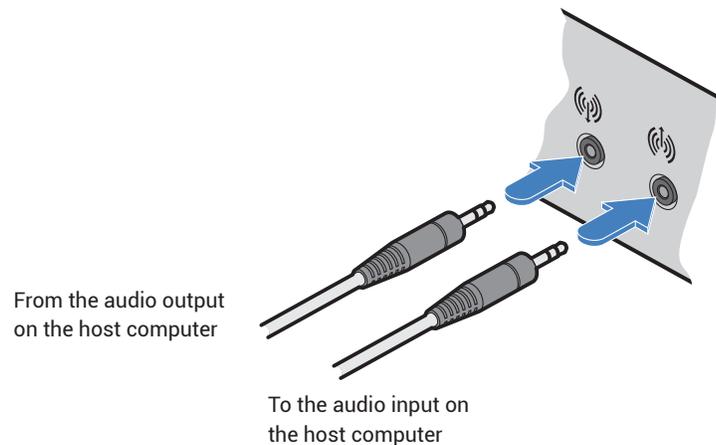
TRANSMITTER REMOTE PORT

The Remote port has a dual role, it can either:

• Allow an optional remote control to be connected to the module, or

• Create an RS232 serial connection with the receiver module.

When serial devices are attached to the Remote ports on the transmitter and receiver modules, the units transparently convey the signals between them at rates up to 115200 baud - no serial configuration is required. An optional serial cable is available.

TO CONNECT THE REMOTE PORT

1 Use the optional serial cable to link the Remote port on the rear panel of the transmitter module with a vacant RS232 serial port on your host computer.
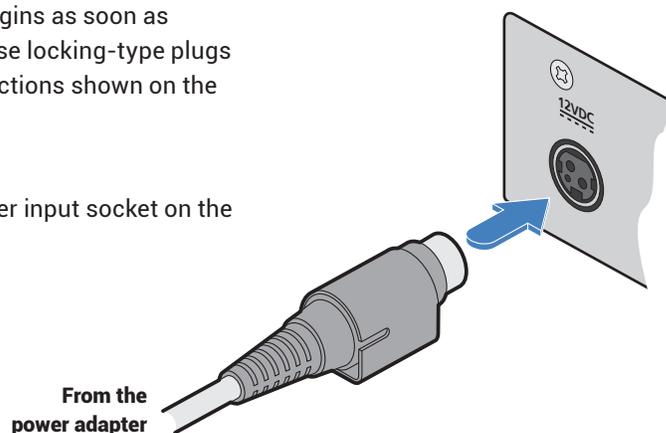
Please see Appendix 1 for pin-out details of the Remote port.

From the serial port of your host computer

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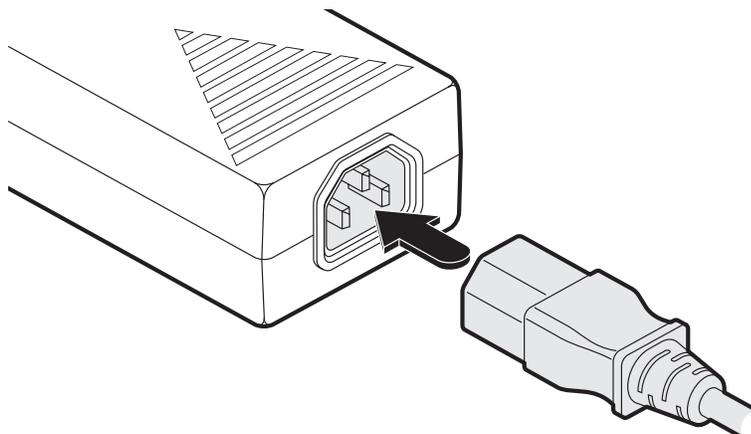
TRANSMITTER POWER CONNECTION

There is no on/off switch on either of the modules, so operation begins as soon as power is applied. The power adapters supplied with the modules use locking-type plugs to help prevent accidental disconnections; please follow the instructions shown on the right whenever disconnecting a power adapter.

TO CONNECT THE POWER ADAPTER

1 Attach the output plug of the supplied power adapter to the power input socket on the right side of the rear panel.
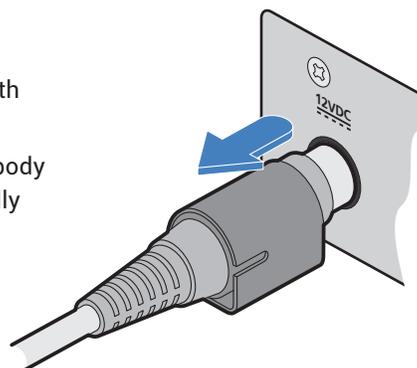
From the power adapter

2 Connect the IEC connector of the supplied country-specific power cord to the socket of the power adapter.

3 Connect the power cord to a nearby mains supply socket.

TO DISCONNECT THE POWER ADAPTER

1 Isolate the power adapter from the mains supply.

2 Grasp the outer body of the power adapter plug where it connects with the module.

3 Gently pull the body of the outer plug away from the module. As the body of the plug slides back, it will release from the socket and you can fully withdraw the whole plug.

IMPORTANT: Please read and adhere to the electrical safety information given within the supplied safety leaflet. In particular, do not use an unearthed power socket or extension cable.

Note: Both the modules and the power supplies generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 40 degrees Centigrade.

Gently pull back the plug outer body to release the lock

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LINKING

The extender modules can be linked using either:

- CATx (see below), or
- Fiber (see next page)

When fiber is used there are no limits to the resolutions that can be transferred, up to the maximum 4K (4096 x 2160); when a CATx link is used, the maximum resolution for dual head installations on 200-series models will be WQXGA (2560 x 1600).

|	**Fiber**	**CATx**
100-series	Single head at 4K maximum	Single head at 4K maximum
200-series	Dual head at 4K maximum	Single head at 4K maximum Dual head at WQXGA maximum
	Distances up to 4km	Distances up to 100m

CATX LINK

The CATx ports on each module (labeled Link A) allow you to create direct links of up to 50m (when using CAT5e) or 100m (when using CAT6). In order to work in CATx mode, the SFP+ fiber modules must be removed from their sockets.

Note: The CATx ports are not network ports and should not be connected to network switches or computer ports.

Note: Use of CAT7 cables is not recommended. There is no associated ANSI/TIA specification for CAT7 resulting in a wide range of cable quality available, particularly with regard to shield grounding.
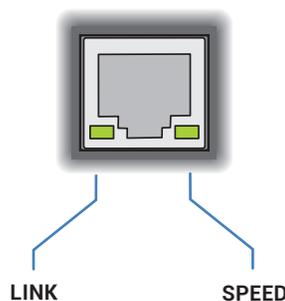
TO MAKE THE CATX LINK

1 Connect a CATx (CAT 5e or 6 as required) cable between the Link A ports on the transmitter (front panel) and the receiver (rear panel):

2 In operation, ensure that both indicators on the CATx connectors are green. See below.
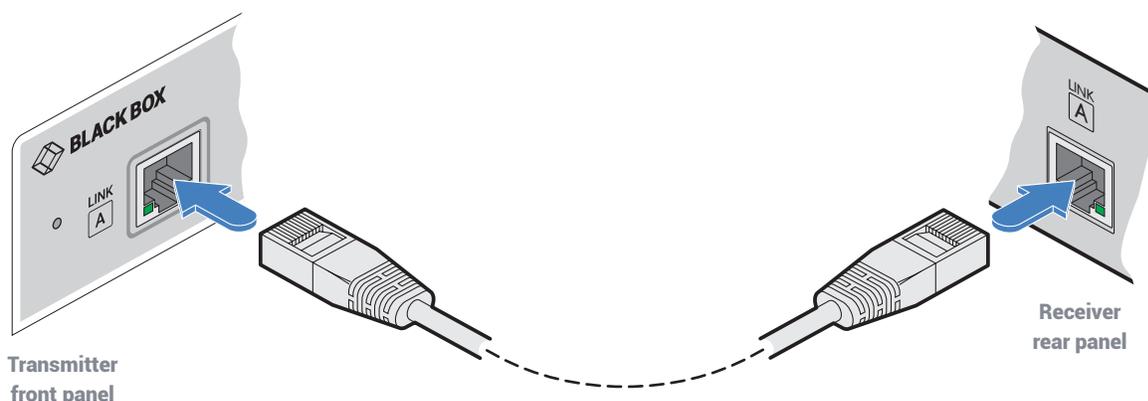
Transmitter front panel

Receiver rear panel

CATX STATUS INDICATORS

The status indicators on the CATx port connector of each module provide further status information when a CATx link is in use:

* The CATx LINK LED will be either yellow or green, depending upon the connector manufacturer used. There is no difference in functionality.

LINK

This indicator will be **green** or **yellow*** whenever there is a CATx link between the transmitter and receiver modules.

SPEED

This indicator signals whether the speed of the CATx link is sufficient:

- **amber** - link speed is below the necessary 5Gbit/sec. Check the CATx cable link for problems.
- **green** - link speed is ok.

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FIBER OPTIC LINK

Each pair of extenders require optional SFP+ fiber optic modules of your choice (single or multi-mode). The fiber optic cable used must match the SFP+ type and also be of a suitable type for the distance being covered. See Transmission distances for details.

**WARNING
CLASS 1
laser
product**

TO MAKE THE FIBER OPTIC LINK

IMPORTANT: Ensure the power supply is off/disconnected before inserting or removing an SFP+ module.

1 Remove an SFP+ module from its protective packing and insert it fully into the empty slot on the extender. The transmitter slot is located on the front panel; the receiver slot is situated on the rear panel:
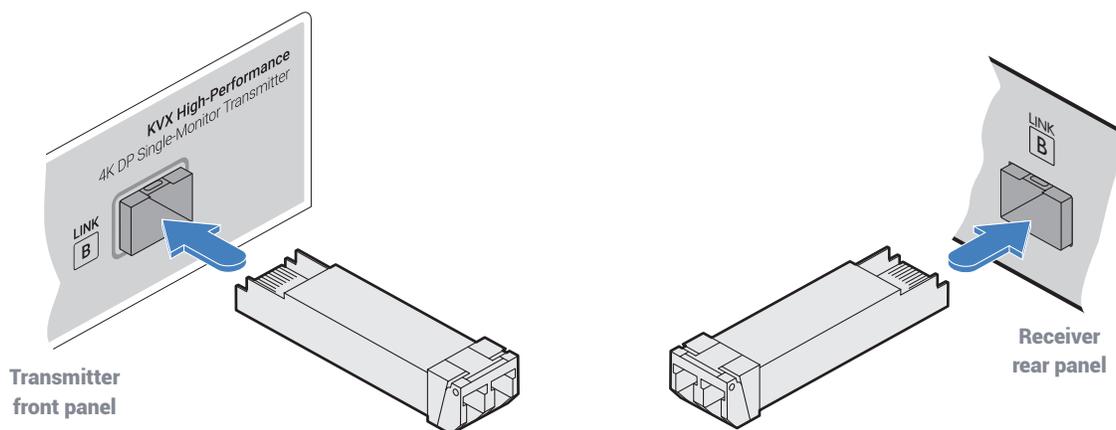
2 Repeat for the other SFP+ module on the other extender.

3 For each SFP+ module, remove the black rubber insert that protects the sensors.

4 If fitted, remove the dual inserts that protect the fiber optic connectors.

5 Insert the fiber optic connectors into the SFP+ module so that they click into place:
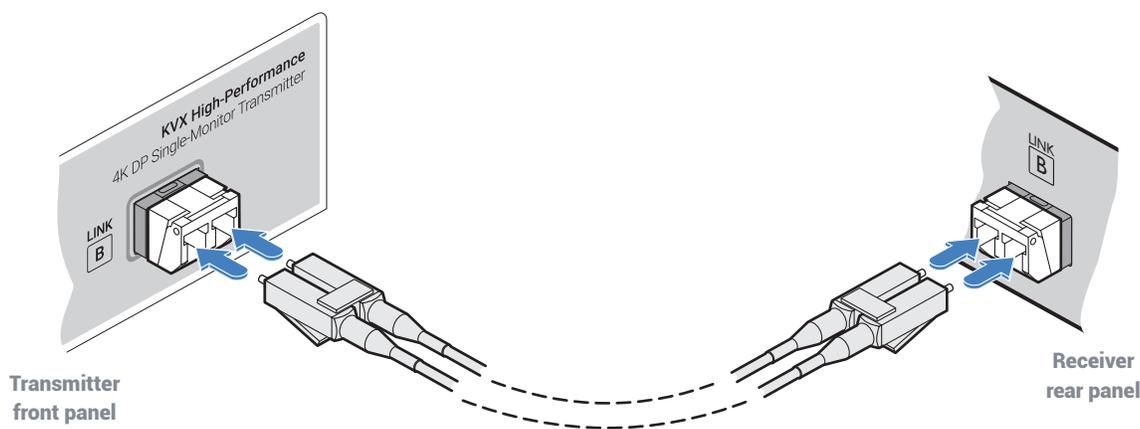
Note: In order to maintain a high level of confidence in the fiber optic link, it is recommended that Black Box supplied SFPs are used.

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TO REMOVE AN SFP+ MODULE

1 If fitted, remove the dual fiber optic connectors from the SFP+ module (press in the release tab of the fiber optic connectors to disengage them).

2 Unclip the small extraction lever and open it out (this action releases a locking tab and also provides a grip point).
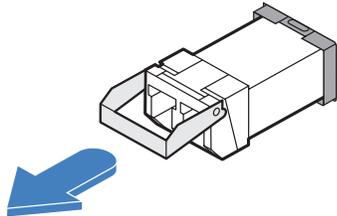
3 Gently pull on the extraction lever to withdraw the SFP+ module from the slot.

4 If the SFP+ module and/or fiber optic connector will remain unused for any period of time, be sure to fit the protective inserts to keep the optical interfaces clean.

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RECEIVER VIDEO DISPLAY(S)

Two DisplayPort™ sockets are provided on the rear panel of each receiver module. On 100-series models, the signal from port 1 is duplicated on port 2. On 200-series models, ports 1 and 2 operate independently to supply the signals introduced to video ports 1 and 2 on the transmitter.

Note: On 200-series models, dual video displays at 4K resolution are not possible using a CATx link - fiber must be used. However, dual WQXGA resolutions are possible using CATx.

TO CONNECT THE VIDEO DISPLAY

1 Connect the signal cable from your primary video display to port 1 on the rear panel of the receiver module.

2 Repeat for the secondary (or duplicate) video display on port 2.

To primary video display

To secondary (or duplicate) video display
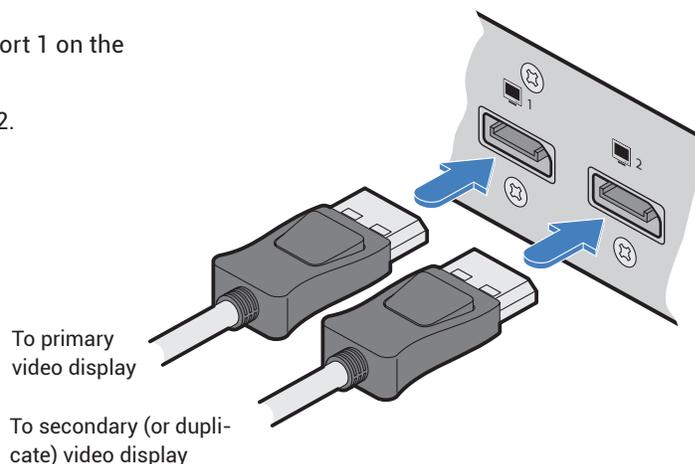
EDID MANAGEMENT

The EDID (Extended Display Identification Data) is read from the connected video display at the receiver module; it is then transferred to, and stored within, the transmitter module and then declared to the host computer. If the video display is removed then the cloned EDID stored at the transmitter module will still be presented to the video source.

VIDEO RESOLUTIONS

The extenders support, but are not limited to, the following common video resolutions (all at 60 fps):		
	1920 x 1080 (HD)	2560 x 2048 (QSXGA)
	1920 x 1200 (WUXGA)	2048 x 1080 (2K)
	2560 x 1080	2048 x 2160
	2560 x 1440 (WQHD)	3840 x 2160 (UHD)
	2560 x 1600 (WQXGA)	4096 x 2160 (4K)

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RECEIVER AUDIO DEVICES

The receiver module can support multiple analog audio devices, such as stereo headphones, a mono microphone or line-level in/out connections.

USB audio is also supported when the left hand USB socket on the receiver rear panel is connected to the computer. The audio signals received from the computer will be transferred to the analog audio sockets on the receiver. USB audio will take precedence over the 3.5mm audio jacks when both sources are present.

TO CONNECT AUDIO DEVICES

1   Connect stereo headphones and/or a mono microphone to the 3.5mm jack audio sockets on the front panel of the receiver module.

From mono microphone

To stereo headphones
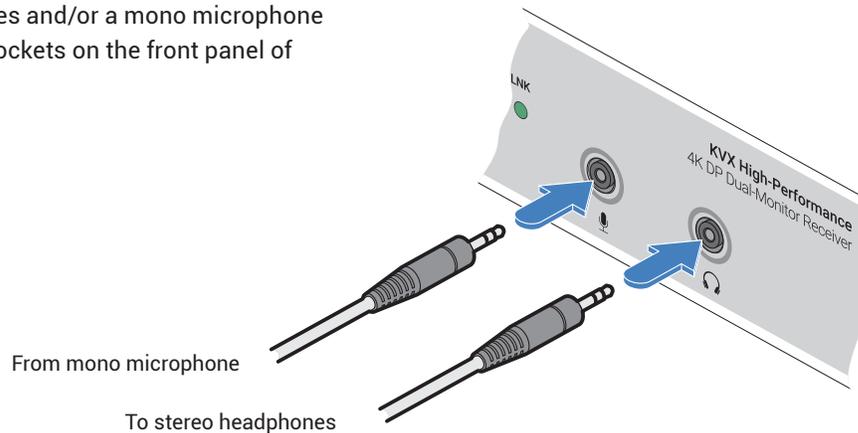
2   Optionally use the rear panel 3.5mm jack audio socket to connect line-level audio devices, such as powered speakers.

To speakers
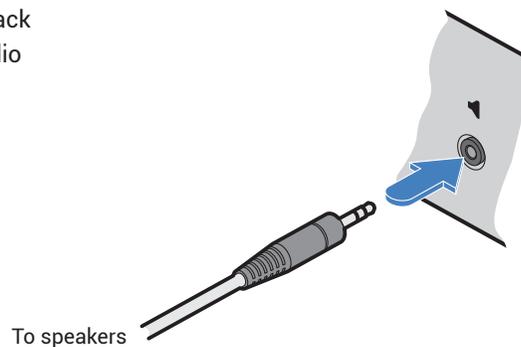
Note: Digital audio sent via the DisplayPort connectors are passed straight through from the transmitter to the receiver ports and remain completely separate from the analog audio signals.

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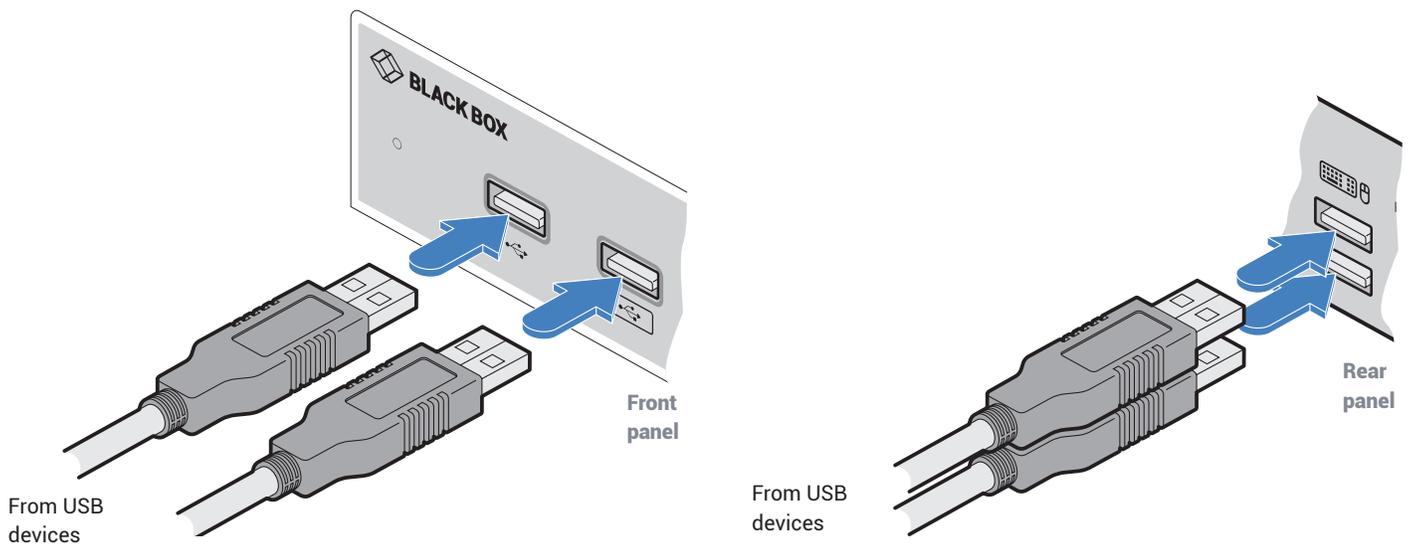SUPPORT**
1.877.877.2269

RECEIVER USB DEVICES

Each receiver module contains a USB hub that can support multiple v2.0 or v1.1 USB HID (Human Interface Device) peripherals. On 100-series models, all four USB sockets are identical in operation. However, on 200-series models, three of the USB sockets are used for HID peripherals while the fourth, labeled [⟲] (on the front panel) is a fully transparent USB port capable of supporting a wider range of devices.

TO CONNECT USB DEVICES

1 Connect your USB keyboard, mouse and any other two USB devices to the four sockets distributed on the front and rear panels of the receiver module.

Note: [200-series models only] The front panel socket labeled [⟲] is a fully transparent USB port capable of supporting a wider range of devices, such as headsets, web cams and flash drives.

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RECEIVER REMOTE PORT

The Remote port has a dual role, it can either:

- Allow an optional remote control to be connected to the module, or
- Create an RS232 serial connection with the receiver module.

When serial devices are attached to the Remote ports on the transmitter and receiver modules, the units transparently convey the signals between them at rates up to 115200 baud - no serial configuration is required. An optional serial cable is available.

TO CONNECT THE REMOTE PORT

1 Use the optional serial cable to link the Remote port on the rear panel of the transmitter module with a vacant RS232 serial port on your host computer.

From your serial device

Please see Appendix 1 for pin-out details of the Remote port.

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RECEIVER POWER CONNECTION

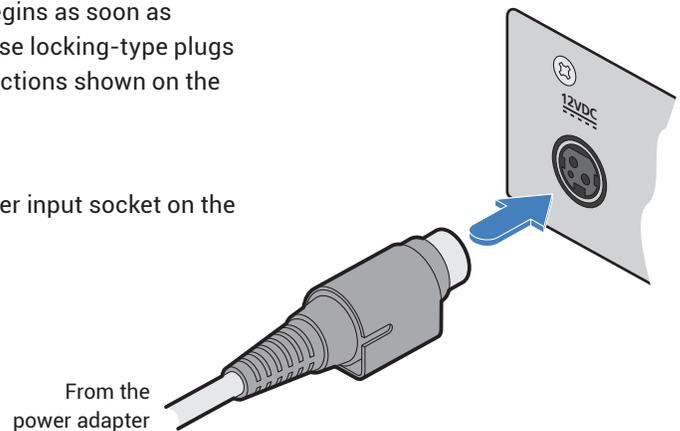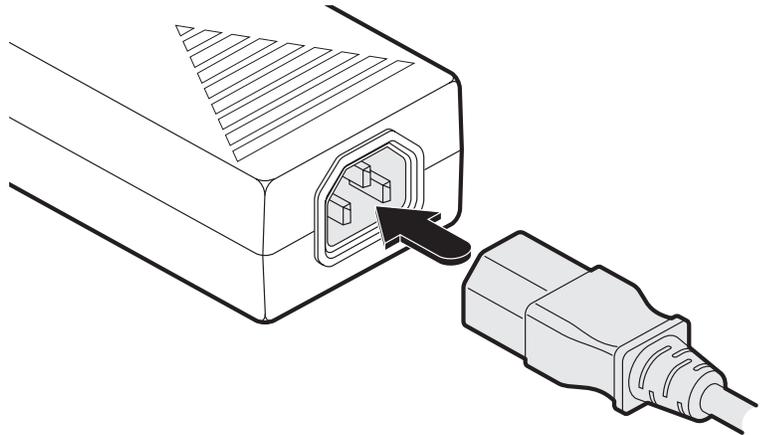There is no on/off switch on either of the modules, so operation begins as soon as power is applied. The power adapters supplied with the modules use locking-type plugs to help prevent accidental disconnections; please follow the instructions shown on the right whenever disconnecting a power adapter.

TO CONNECT THE POWER ADAPTER

1   Attach the output plug of the supplied power adapter to the power input socket on the right side of the rear panel.

From the
power adapter

2   Connect the IEC connector of the supplied country-specific power cord to the socket of the power adapter.

3   Connect the power cord to a nearby mains supply socket.

TO DISCONNECT THE POWER ADAPTER

1   Isolate the power adapter from the mains supply.

2   Grasp the outer body of the power adapter plug where it connects with the module.

3   Gently pull the body of the outer plug away from the module. As the body of the plug slides back, it will release from the socket and you can fully withdraw the whole plug.

IMPORTANT: Please read and adhere to the electrical safety information given within the supplied safety leaflet. In particular, do not use an unearthed power socket or extension cable.

Note: Both the modules and the power supplies generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 40 degrees Centigrade.

Gently pull back the plug outer
body to release the lock

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CHAPTER 4: CONFIGURATION

ACCESSING THE DASHBOARD

The modules generally configure themselves automatically, collecting EDID information from the attached monitor(s) and passing the details to the host computer. Unless an issue is encountered, the modules will begin working together correctly as soon as they are connected. The front panel indicators provide the primary source of status information, however, there is also a Dashboard popup which provides certain other details on the primary console display.

TO ACCESS THE DASHBOARD

1 Using your console keyboard attached to the receiver module, press (and release) the **Ctrl** key **three times** in quick succession (either of the keyboard's Ctrl keys can be used). In response, the three keyboard indicators will all flash, once per second.

2 Press the numeric key **1** located above the main section of the keyboard (not the numeric keypad).

The Dashboard will be displayed, similar to this:

		10G
● Link Quality	100%	
● Status	OK	
● Firmware	RX:0.00.0112 / TX:0.00.0112	

The example above shows a configuration that is working correctly.

If the communication link was working correctly, but the video signal was lost, it might report as follows:

		10G
● Link Quality	100%	
● Status	No Video	
● Firmware	RX:0.00.0112 / TX:0.00.0112	

If the communication link was missing then the dashboard would report the issue similar to this:

		10G
● Link Quality	0%	
● Status	No Link	
● Firmware	RX:0.00.0112 / TX:---	

The color of the Dashboard's **Link Quality** indicator matches the front panel **LNK** indicator:
- **Red**   0-25% quality
- **Amber**   25-50% quality
- **Yellow** 50-75% quality
- **Green**   75-100% quality

TO EXIT THE DASHBOARD

- Press (and release) the **Ctrl** key **three times** in quick succession and then press the numeric key **1** located above the main section of the keyboard (not the numeric keypad).

RESETTING A MODULE

On the left side of the front panel of each module, you will find a small reset hole which is used to invoke special functions.
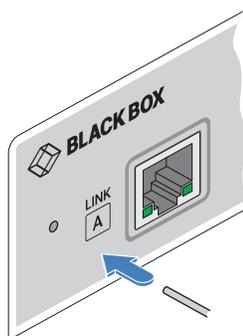
TO RESET A MODULE

1 Use a thin implement, such as a straightened paperclip, to press and release the button concealed behind the small hole. The PWR indicator will show **red**.

After a few seconds, the indicator will change from **red** to **green** to show that the reset procedure is complete.

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CHOOSING THE DUAL HEAD MODE (200-series models only)

When the CATx link is used to connect the transmitter and receiver modules, the available bandwidth is reduced. On 200-series models, if dual high resolution video displays are used, you can determine how the available bandwidth is shared between them. Two modes are available:

• **Balanced mode** - Shares the available video bandwidth equally between the two video displays, regardless of the EDIDs being reported by them, e.g. 1920x1200 each on video displays that would ordinarily request a native mode of 2560x1600.

• **Priority mode** - The primary video port will take priority, allowing it to display resolutions up to 4K, as reported by its EDID. The remaining bandwidth will be assigned to the second video head.

TO CHOOSE THE DUAL HEAD MODE

1 Using your console keyboard attached to the receiver module, press (and release) the **Ctrl** key **three times** in quick succession (either of the keyboard's Ctrl keys can be used).

   In response, the three keyboard indicators will all flash, once per second.

2 Press the numeric key located above the main section of the keyboard (not the numeric keypad) which represents the required mode:

   • **6** for Balanced mode,

   • **7** for Priority mode.

The current mode will be displayed on the Dashboard next to the link speed, eg BAL 5G, PRI 5G.

BAL	5G
00.0112	

PRI	5G
00.0112	

Note: If you do not press any key within five seconds, or press any key other than the digits 1, 6 or 7 (or once you have successfully chosen an action), the keyboard will revert to normal operation. To use another hotkey function, repeat the whole procedure described above.

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UPGRADING FIRMWARE

Firmware upgrades are periodically made available for products at blackbox.com. Use this procedure to upgrade the firmware in both extenders.

Note: Upgrades require roughly 11 minutes to complete.

TO UPGRADE THE FIRMWARE

1 Download the appropriate firmware upgrade file from blackbox.com. Copy the upgrade file to an empty (but FAT32-formatted) USB memory stick.

2 Ensure that the transmitter and receiver are linked and powered on. Also check that there are no USB drives inserted in the receiver module's ports.

3 On the receiver, press and hold a thin implement, such as a straightened paperclip, in the reset hole until the receiver's STS indicator flashes red/blue. The receiver is now in upgrade mode.

4 Wait for the LNK indicator to turn green, signifying that the link has been established. Video from the transmitter should be displayed and the STS indicator will continue to flash red/blue.

Press and hold
the recessed
reset button

5 Insert the memory stick containing the upgrade file into the front panel left USB port.

The upgrade should begin and both units will flash their STS indicators red/green to show the upgrade process is in progress. Following a successful upgrade, both units will automatically reboot and run the new firmware. The STS indicator will show green for a copper connection and blue for fiber.

6 Display the Dashboard (see page 24) to view the upgrade progress. The Status field will display a message if an error occurs. In an error situation, it may be necessary to reboot the modules to use the existing firmware version.

USB memory stick
with upgrade file
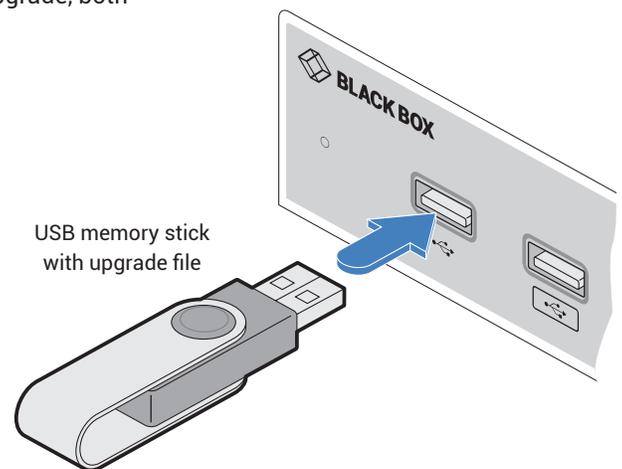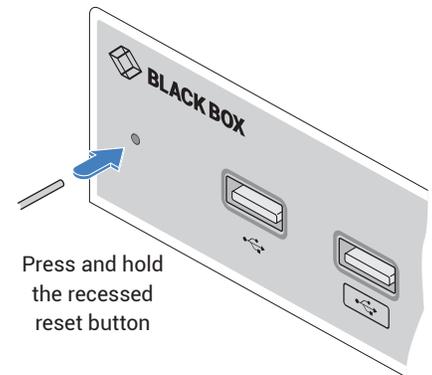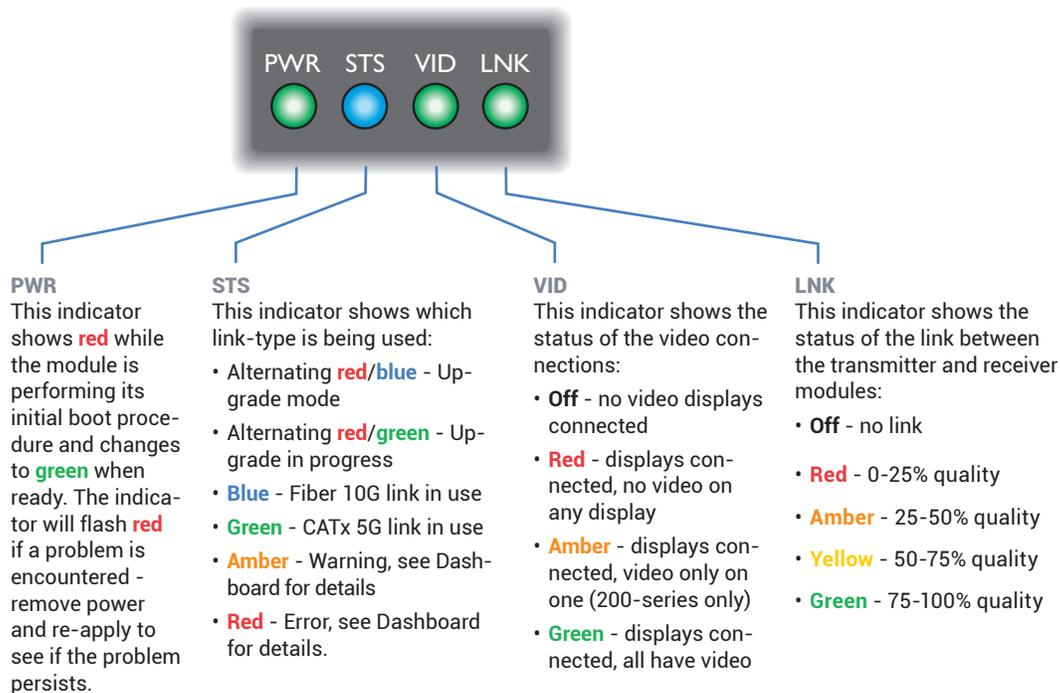
CHAPTER 5: OPERATION

The modules are designed to be transparent in operation; all peripherals should respond exactly as they would when situated next to your host computer.

INDICATORS

The transmitter and receiver modules contain various indicators to provide you with status information. Both modules have four red indicators on their front panels.
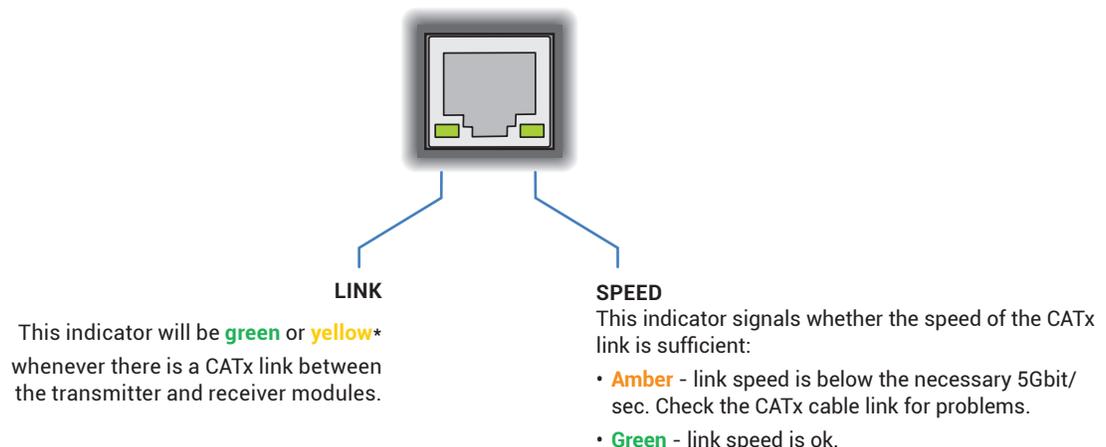
STATUS INDICATORS

The multi-color status indicators on the front panels of each module mostly behave in the same manner at the same time:

PWR
This indicator shows red while the module is performing its initial boot procedure and changes to green when ready. The indicator will flash red if a problem is encountered - remove power and re-apply to see if the problem persists.

STS
This indicator shows which link-type is being used:
• Alternating red/blue - Upgrade mode
• Alternating red/green - Upgrade in progress
• Blue - Fiber 10G link in use
• Green - CATx 5G link in use
• Amber - Warning, see Dashboard for details
• Red - Error, see Dashboard for details.

VID
This indicator shows the status of the video connections:
• Off - no video displays connected
• Red - displays connected, no video on any display
• Amber - displays connected, video only on one (200-series only)
• Green - displays connected, all have video

LNK
This indicator shows the status of the link between the transmitter and receiver modules:
• Off - no link
• Red - 0-25% quality
• Amber - 25-50% quality
• Yellow - 50-75% quality
• Green - 75-100% quality

CATX STATUS INDICATORS

The status indicators on the CATx port connector of each module provide further status information when a CATx link is in use:


LINK
This indicator will be green or yellow* whenever there is a CATx link between the transmitter and receiver modules.

SPEED
This indicator signals whether the speed of the CATx link is sufficient:
• Amber - link speed is below the necessary 5Gbit/sec. Check the CATx cable link for problems.
• Green - link speed is ok.

The CATx LINK LED will be either yellow or green, depending upon the connector manufacturer used. There is no difference in functionality.

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APPENDIX 1 - REMOTE PORT PIN-OUT

The **REMOTE** port uses a 6p6c socket. The pin-out is listed below.

Note: Although the pins labeled 'Not used' is inactive, it is still connected internally and so no links should be made at all to this pin.

REMOTE
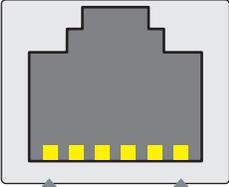
Pin	Signal
1	Sense/5V
2	Not used
3	Not used
4	GND
5	RX
6	TX

Note: The TX detects presence of an incoming power signal to determine whether 5V should be supplied at the RX.

SAFETY INFORMATION

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- For use in dry, oil free indoor environments only.

- Do not use to link between buildings.

- Ensure that the twisted pair interconnect cable is installed in compliance with all applicable wiring regulations.

- Do not connect the CATx link interface (RJ45 style connector) to any other equipment, particularly network or telecommunications equipment.

- Warning – the power adapter contains live parts.

- No user serviceable parts are contained within the power adapter - do not dismantle.

- Plug the power adapter into a grounded socket outlet close to the unit that it is powering.

- Replace the power adapter with a manufacturer approved type only.

- Do not use the power adapter if the power adapter case becomes damaged, cracked or broken or if you suspect that it is not operating properly.

- If you use a power extension cord with the units, make sure the total ampere rating of the devices plugged into the extension cord do not exceed the cord's ampere rating. Also, make sure that the total ampere rating of all the devices plugged into the wall outlet does not exceed the wall outlet's ampere rating.

- Do not attempt to service the units yourself.

- The units and power supplies can get warm in operation – do not situate them in an enclosed space without any ventilation.

- The units do not provide ground isolation and should not be used for any applications that require ground isolation or galvanic isolation.

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