

USER GUIDE

KVXHP-400

KVX HP SERIES EXTENDERS

24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM

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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:

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

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 librerías o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe 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 conectado 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 física 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 líneas de energía.
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 objetos líquidos 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: Objetos 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.



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CHAPTER 1: SPECIFICATIONS

- 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) 41.9
- 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
- (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: w: 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.



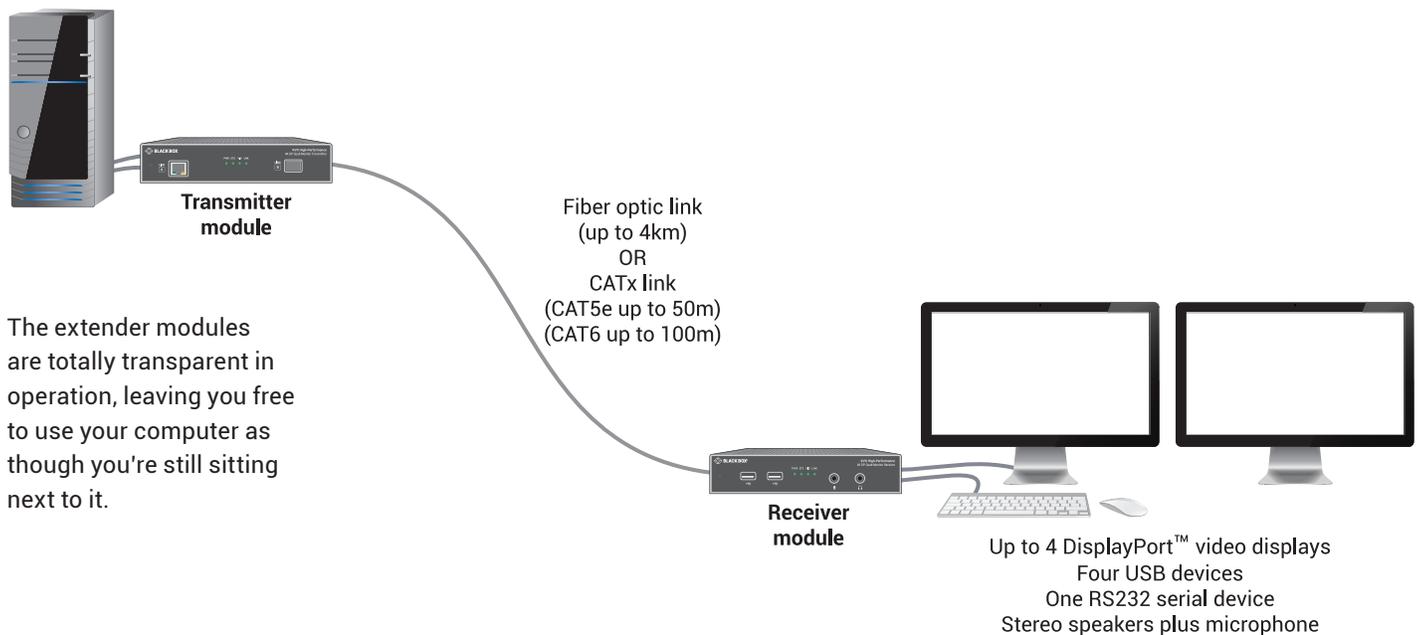
CHAPTER 2: WELCOME

Thank you for choosing the KVX-HP 400-series (quad 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* below).

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 quad 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.



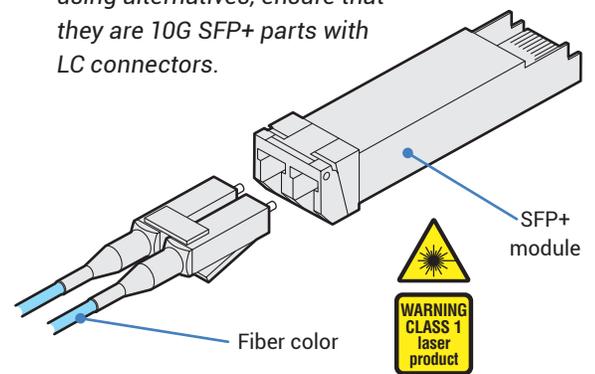
The extender modules are totally transparent in operation, leaving you free to use your computer as though you're still sitting next to it.

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):

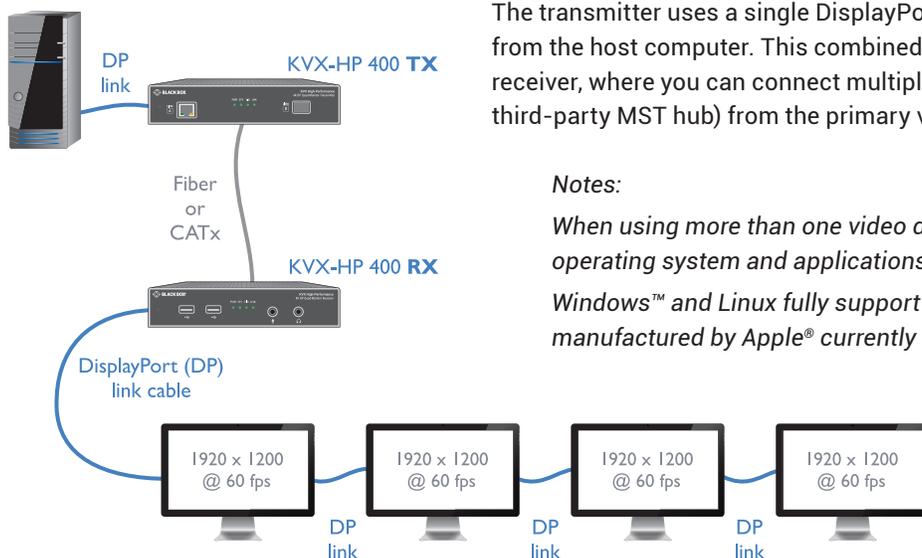
Distance	Fiber type	Fiber color code
70m	OM1 (TIA-492AAAA)	Orange
150m	OM2 (TIA-492AAAB)	Orange
380m	OM3 (TIA-492AAAC)	Aqua
400m	OM4 (TIA-492AAAC)	Aqua
4km	OS1 (TIA-492C000)	Yellow
	OS2 (TIA-492E000)	Yellow

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



MULTI-DISPLAY SUPPORT USING MST

The 400-series extenders support the MST (Multi-Stream Transport) protocol, which was introduced in the DisplayPort™ 1.2 standard. MST allows feeds for multiple video displays to be fed along a single cable.



The transmitter uses a single DisplayPort link to accept up to four video streams from the host computer. This combined MST stream is then transferred to the receiver, where you can connect multiple video displays in a daisy-chain (or via a third-party MST hub) from the primary video output port:

Notes:

When using more than one video display, the host's video adapter, operating system and applications must support MST.

Windows™ and Linux fully support MST, however, no devices manufactured by Apple® currently support it.

All except the final video display in the chain on the receiver must specifically support MST on DisplayPort 1.2 or later. These displays will each have a DP output port to allow the daisy-chain link to continue to the next. The last video display in the chain does not need to support MST as it is the final destination for the video signals.

Note: Check that the video card and display specifications support the required number of daisy-chained displays.

SUPPORT FOR MULTIPLE NON-MST VIDEO DISPLAYS

If you are using multiple video displays with the receiver that do not support MST, there are a couple of options:

- You can optionally enable an internal hub within the receiver which will allow non-MST video displays to be connected to the two output ports so that they can use the first and second video streams respectively (see page 25).
- You can optionally use an external MST hub, which will receive the combined DisplayPort signal from the first video port on the receiver and split out separate links to the standard video displays (see next page).

CATX LINK CABLE RECOMMENDATIONS

Due to the high data bandwidth required between the transmitter and receiver, 400-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.

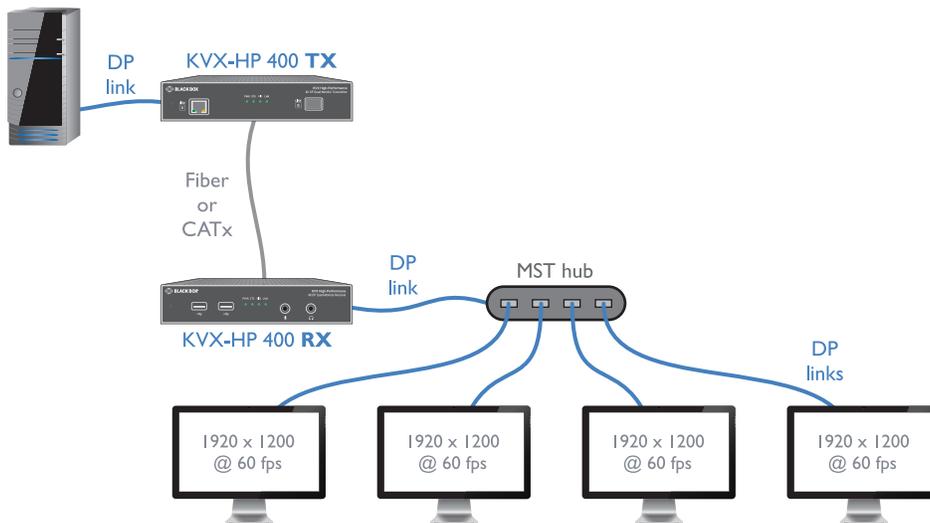
CAT6 is recommended for CATx extensions, with a gauge (thickness) of at least 23AWG. Up to 5Gb/s of data may be transmitted, so the cable must be rated for at least 5GBase-T or 250MHz.

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.

SUPPORT FOR MULTIPLE NON-MST VIDEO DISPLAYS (CONT.)

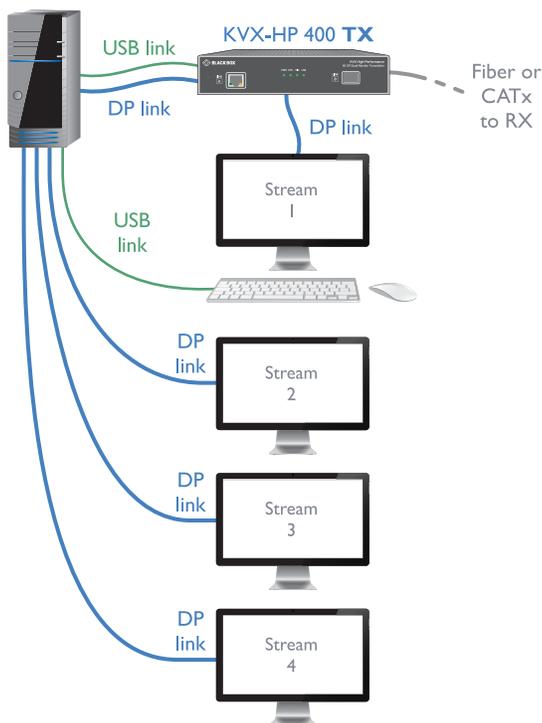
An external MST hub can receive the combined DisplayPort™ MST signal from the first video port on the receiver and split out separate links to standard video displays (the second video output port on the receiver will be disabled):



Black Box recommends using its DPMSTHUB-4P 4-port hub.

MULTIPLE DISPLAYS AT THE LOCAL CONSOLE

The transmitter supports just one console video display. If other local console video displays are required, then streams 2 to 4 can be accessed directly from the host computer's video adapter.



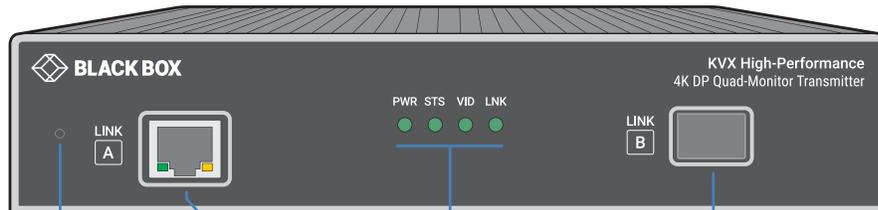
The transmitter has no console USB outlets, so if a local keyboard and/or mouse are required, they need to be connected directly to the host computer.

Note: The display connected to the local console should support at least equal video resolution of that connected at the RX, otherwise no video will be displayed.

FEATURES

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

KVX-HP 400-SERIES TRANSMITTER MODULE



Recessed reset button
See [Resetting a module](#).

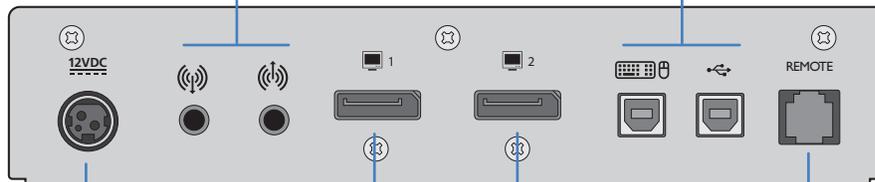
CATx port
Provides an alternative link method to fiber. See [CATx link](#).

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.



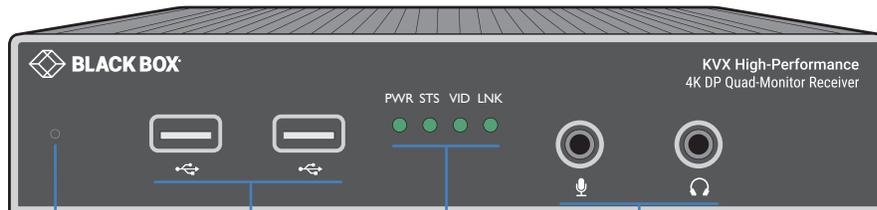
Power input
See [Transmitter power connection](#) for further details.

Video input port
Connect to the DisplayPort™ connector of your computer. See [Transmitter video link](#) for further details.

Video output port
Optionally connect a local console video display. See [Multi-display support using MST and Transmitter video link](#).

Remote port
Can be used for RS232 serial devices. See [Transmitter remote port](#) for further details.

KVX-HP 400-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.

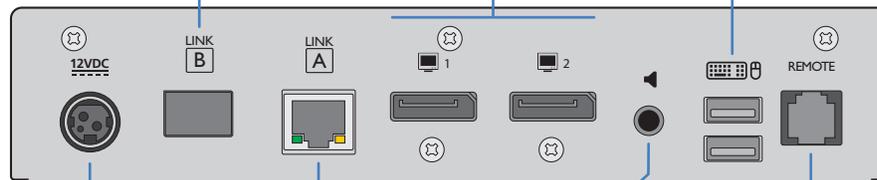
Status indicators
These provide visual confirmation of various system functions. See [Indicators](#) for further details.

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 output ports
Depending on settings, either port 1 provides all four MST video streams, or port 1 and 2 provide the first two streams. See [Multi-display support using MST](#) and [Choosing RX video mode](#).

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.

CHAPTER 3: INSTALLATION

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.

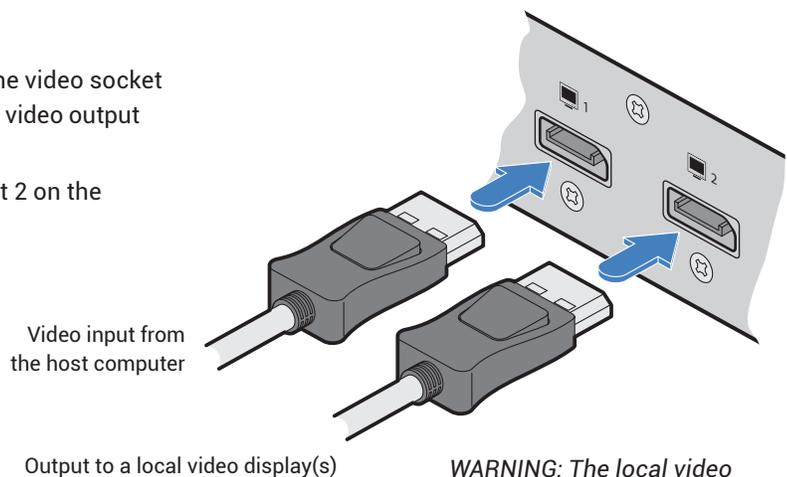
TRANSMITTER VIDEO LINK(S)

KVX-HP 400-series modules can transfer various high resolution video modes via their DisplayPort™ connectors and support up to four video displays.

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.

Optionally connect local video display(s) to video socket 2 on the transmitter module rear panel.



WARNING: The local video display will be at the same resolution as output from the RX. Ensure that the local monitor can handle the required resolution.

MAXIMUM VIDEO RESOLUTIONS

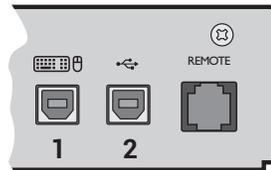
The extenders support the following maximum video resolutions:

Fiber (up to 4km) or CATx (up to 100m)

1 display at 4096 x 2160 / 60fps	(4K)
2 displays at 2560 x 1600 / 60fps	(WQXGA)
3 displays at 1920 x 1200 / 60fps	(WUXGA)
4 displays at 1920 x 1200 / 60fps	(WUXGA)

TRANSMITTER USB LINKS

The transmitter module has two USB input ports on its rear panel:

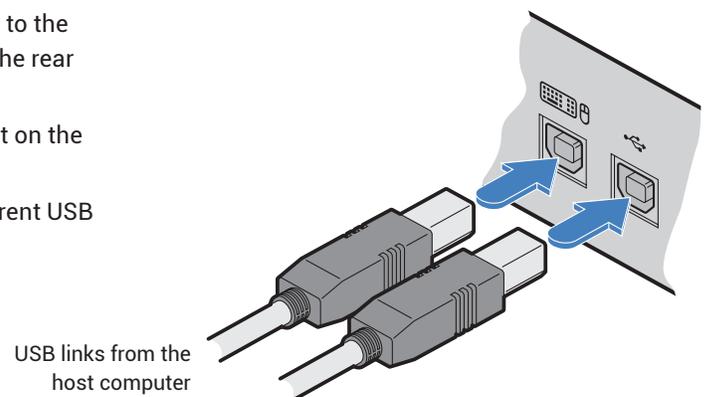


The ports have different functions depending on the model of extender that you are using:

1	2
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

TO CONNECT THE USB PORT(S)

- 1 Connect the type B connector of the supplied USB/video cable to the left-hand side USB port (labeled '1' 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).



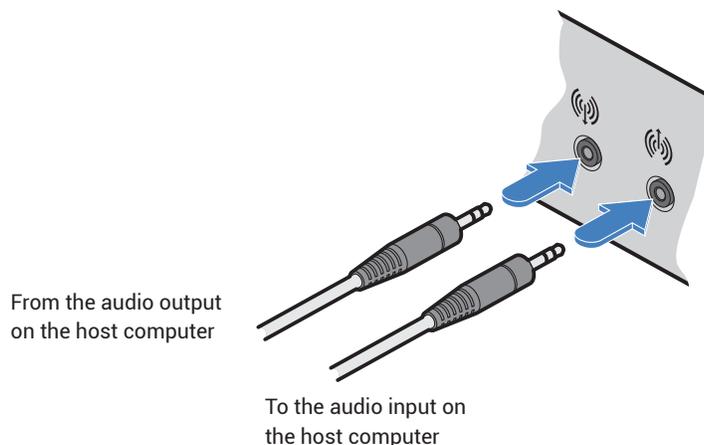
TRANSMITTER AUDIO LINKS

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.



TRANSMITTER REMOTE PORT

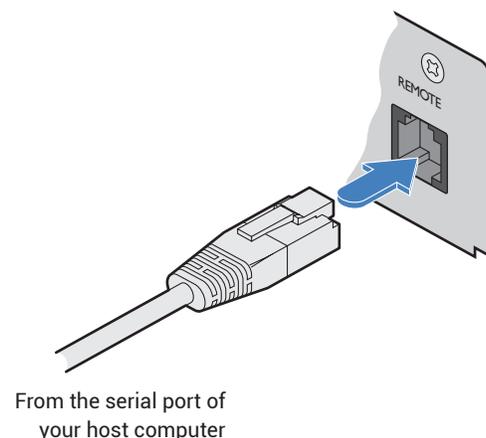
The Remote port has a dual role, it can either:

- 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 (VSC50) to link the Remote port on the rear panel of the transmitter module with a vacant RS232 serial port on your host computer.



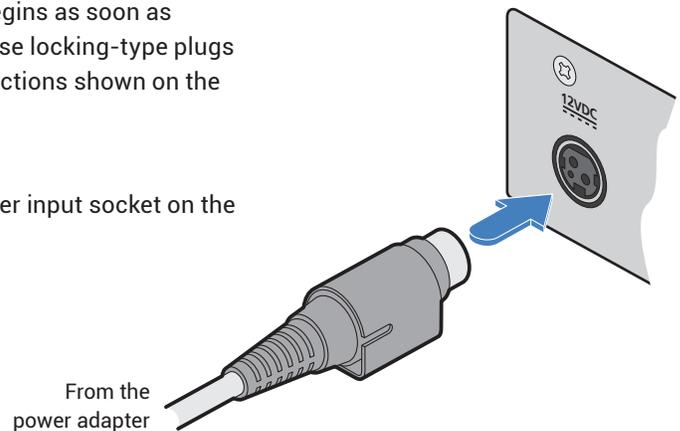
Please see [Appendix 1](#) for pin-out details of the Remote port.

TRANSMITTER POWER CONNECTION

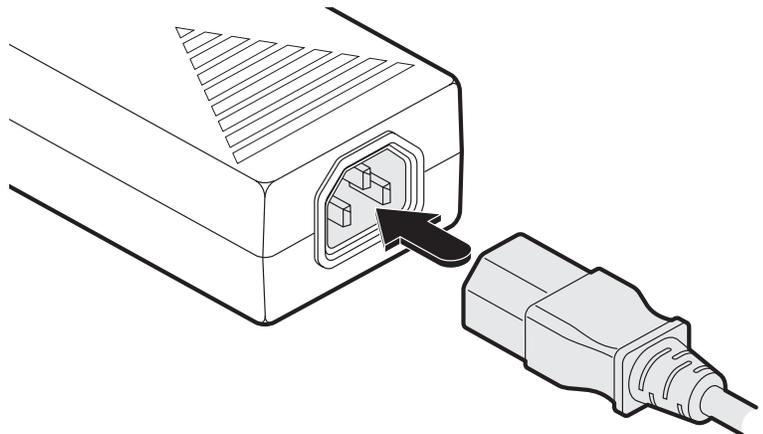
There is no on/off switch on either of the modules, so operation begins as soon as power is applied. The power adapters supplied with the modules use locking-type plugs to help prevent accidental disconnections; please follow the instructions shown on the right whenever disconnecting a power adapter.

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.

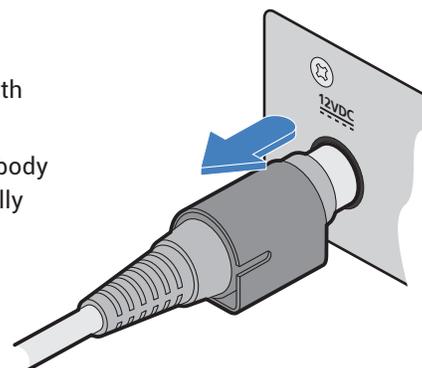


- 2 Connect the IEC connector of the supplied country-specific power cord to the socket of the power adapter.
- 3 Connect the power cord to a nearby mains supply socket.



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.



Gently pull back the plug outer body to release the lock

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.

LINKING

The extender modules can be linked using either:

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

CATX LINK

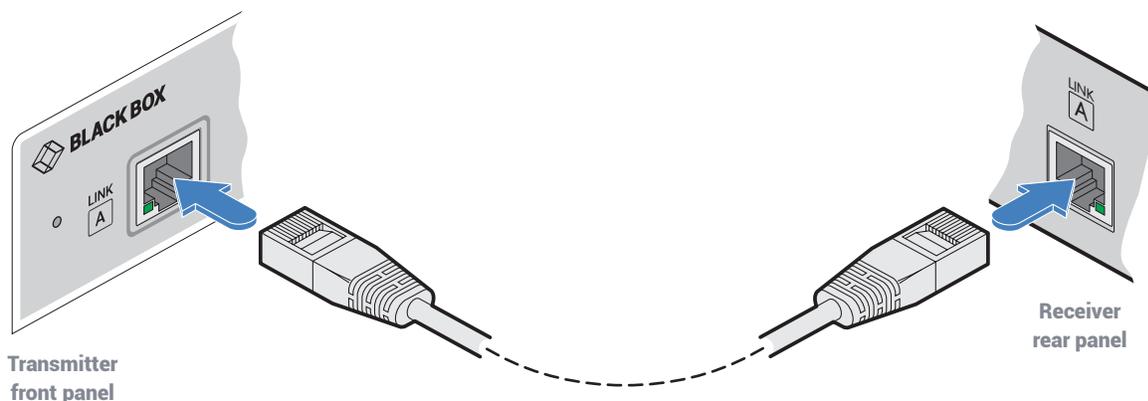
The CATx ports on each module (labeled Link A) allow you to create direct links of up to 50m (when using CAT5e) or 100m (when using CAT6). In order to work in CATx mode, the SFP+ fiber modules must be removed from their sockets.

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.

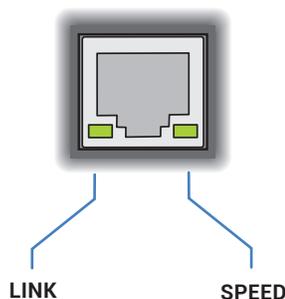
TO MAKE THE CATX LINK

- 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.



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:



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.*

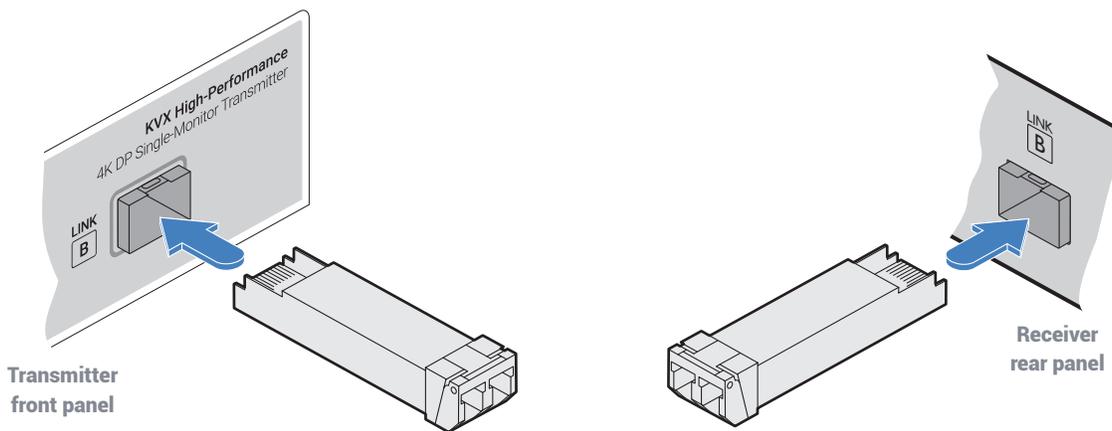
FIBER OPTIC LINK

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.

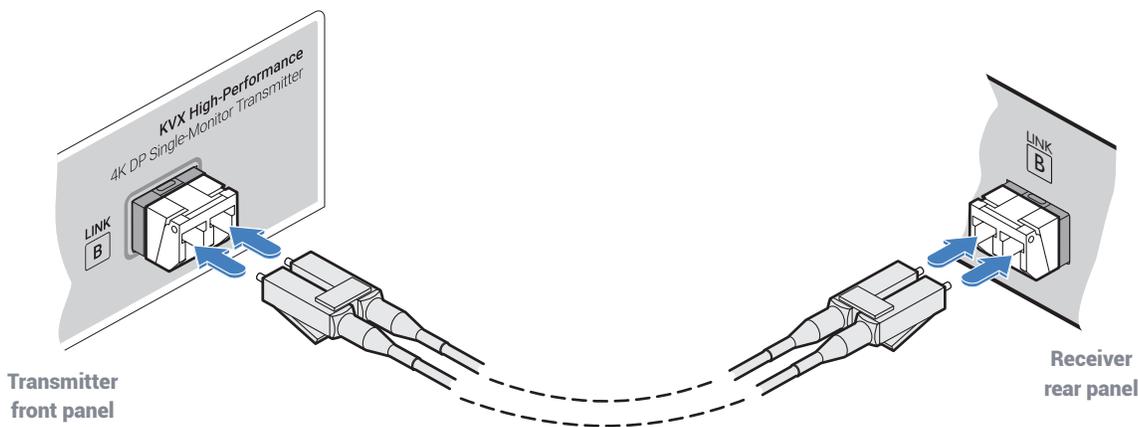
TO MAKE THE FIBER OPTIC LINK

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:



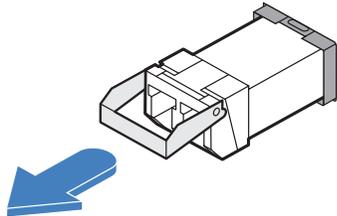
- 2 Repeat for the other SFP+ module on the other extender.
- 3 For each SFP+ module, remove the black rubber insert that protects the sensors.
- 4 If fitted, remove the dual inserts that protect the fiber optic connectors.
- 5 Insert the fiber optic connectors into the SFP+ module so that they click 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.

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).



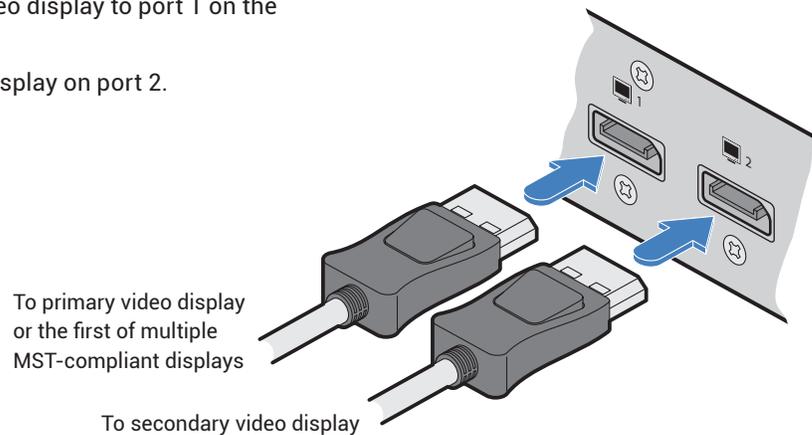
- 3 Gently pull on the extraction lever to withdraw the SFP+ module from the slot.
- 4 If the SFP+ module and/or fiber optic connector will remain unused for any period of time, be sure to fit the protective inserts to keep the optical interfaces clean.

RECEIVER VIDEO DISPLAY(S)

Two DisplayPort™ sockets are provided on the rear panel of each receiver module. Either all four possible MST streams are provided at port 1 OR just the first and second streams are provided at ports 1 and 2. See page 25 for details about setting changes.

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.



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.

MAXIMUM VIDEO RESOLUTIONS

The extenders support the following maximum video resolutions:

Fiber (up to 4km) or CATx (up to 100m)

1 display at 4096 x 2160 / 60fps	(4K)
2 displays at 2560 x 1600 / 60fps	(WQXGA)
3 displays at 1920 x 1200 / 60fps	(WUXGA)
4 displays at 1920 x 1200 / 60fps	(WUXGA)

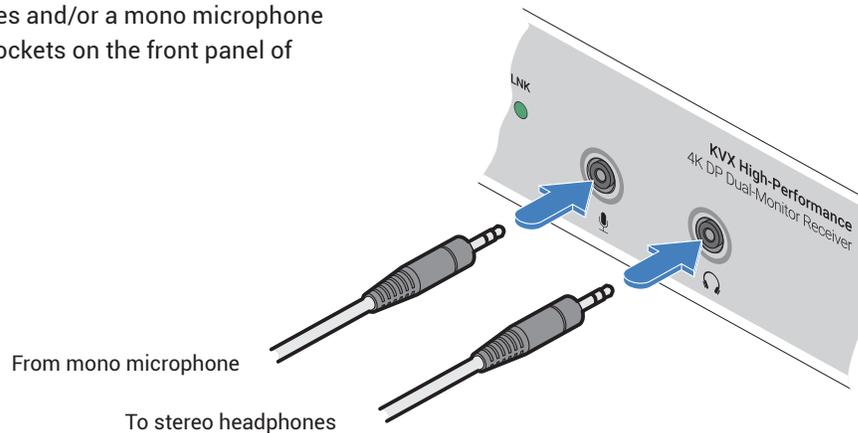
RECEIVER AUDIO DEVICES

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

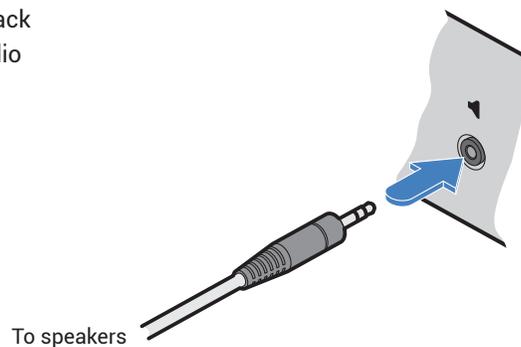
USB audio is also supported when the left hand USB socket on the receiver rear panel is connected to the computer. The audio signals received from the computer will be transferred to the analog audio sockets on the receiver. USB audio will take precedence over the 3.5mm audio jacks when both sources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



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



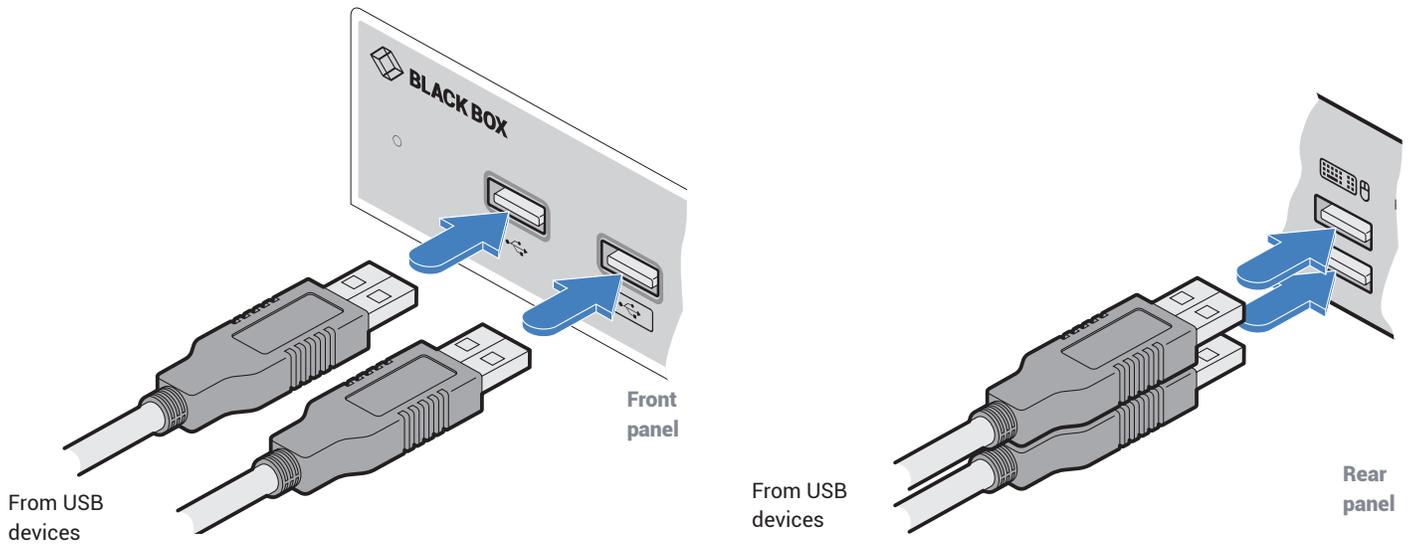
Note: Digital audio sent via the DisplayPort connectors are passed straight through from the transmitter to the receiver ports and remain completely separate from the analog audio signals.

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.

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.



RECEIVER REMOTE PORT

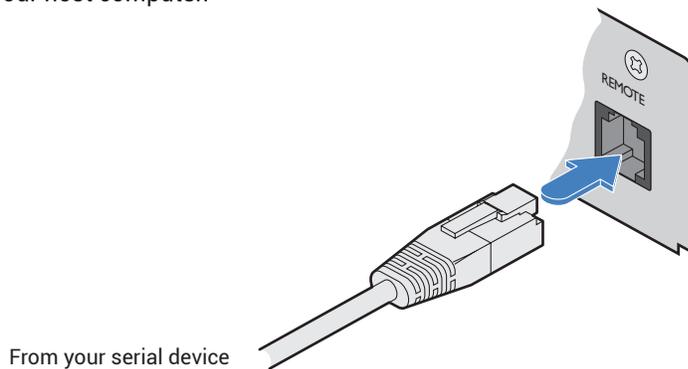
The Remote port has a dual role, it can either:

- 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.



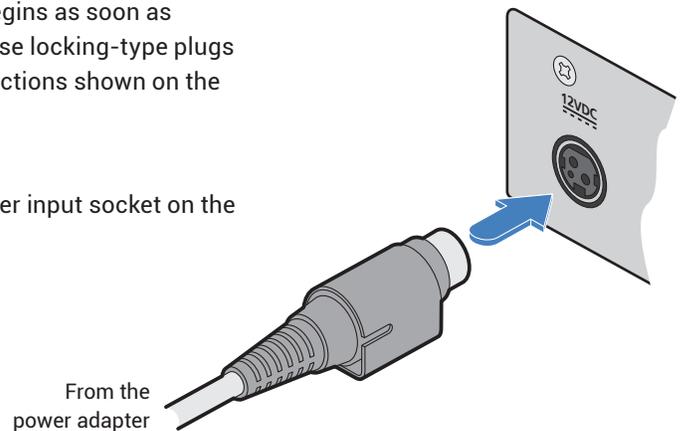
Please see [Appendix 1](#) for pin-out details of the Remote port.

RECEIVER POWER CONNECTION

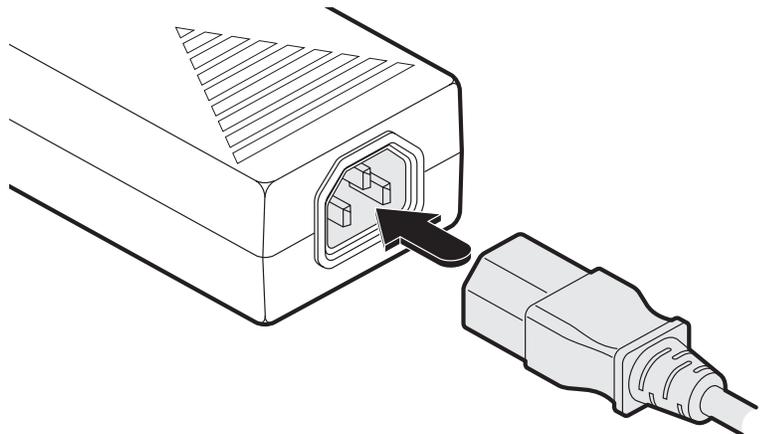
There is no on/off switch on either of the modules, so operation begins as soon as power is applied. The power adapters supplied with the modules use locking-type plugs to help prevent accidental disconnections; please follow the instructions shown on the right whenever disconnecting a power adapter.

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.

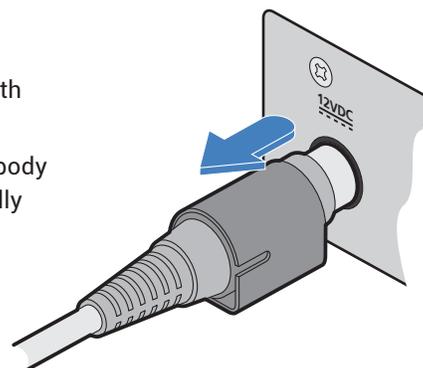


- 2 Connect the IEC connector of the supplied country-specific power cord to the socket of the power adapter.
- 3 Connect the power cord to a nearby mains supply socket.



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.



Gently pull back the plug outer body to release the lock

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.

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:



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:



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



The color of the Dashboard's **Link Quality** indicator matches the front panel **LNK** indicator:

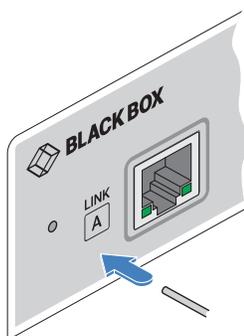
- **Red** 0-25% quality
- **Amber** 25-50% quality
- **Yellow** 50-75% quality
- **Green** 75-100% quality

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.

CHOOSING RX VIDEO MODE

KVX-HP 400-series receivers contain an internal DisplayPort™ MST hub which you can choose to either use or bypass. When bypassed (default setting), the full combined MST (Multi-Stream Transport) signal received from the transmitter is sent directly to video port 1. If the internal hub is engaged, then the first and second SST video streams (Single-Stream Transport) are decoded and sent to ports 1 and 2 respectively. The two modes are as follows:

- **SST mode** - This mode engages the internal hub and delivers the first and second (SST) video streams to the video ports on the receiver.
- **MST mode** - (Default) This mode bypasses the internal hub and delivers all four possible (MST) video streams directly to video port 1 on the receiver. Port 2 is disabled. Connect to either MST-compliant displays or an MST hub.

TO CHOOSE THE RECEIVER VIDEO 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:

- **8** for SST mode,
- **9** for MST mode.

The current mode will be displayed on the Dashboard next to the link speed, eg SST or MST:



Notes:

- *If the mode is changed, this will cause the RX to reboot.*
- *If you do not press any key within five seconds, or press any key other than the digits 1, 8 or 9 (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.*

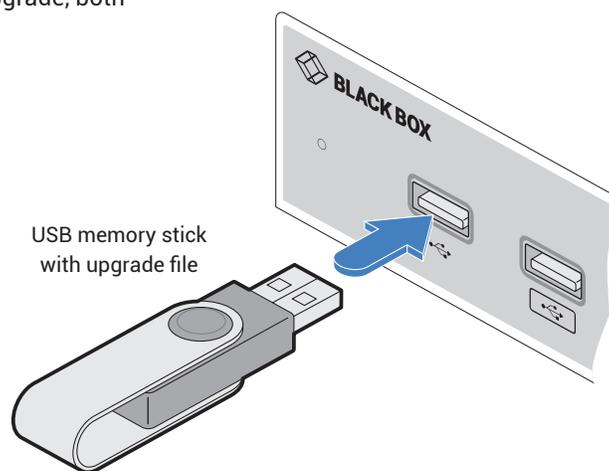
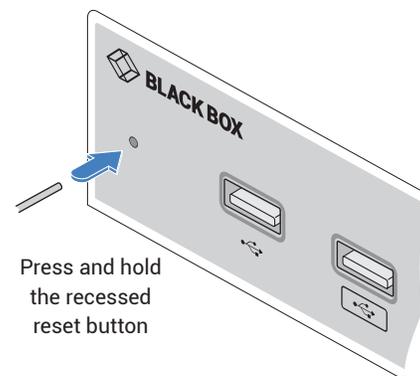
UPGRADING FIRMWARE

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.
- 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.



CHAPTER 5: OPERATION

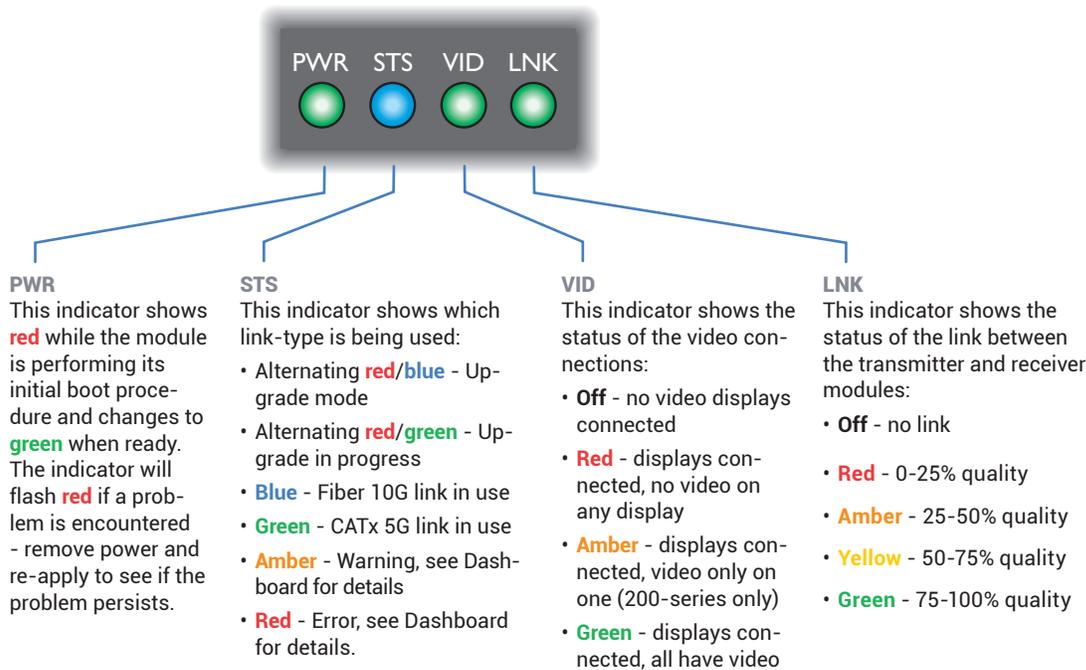
The modules are designed to be transparent in operation; all peripherals should respond exactly as they would when situated next to your host computer.

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.

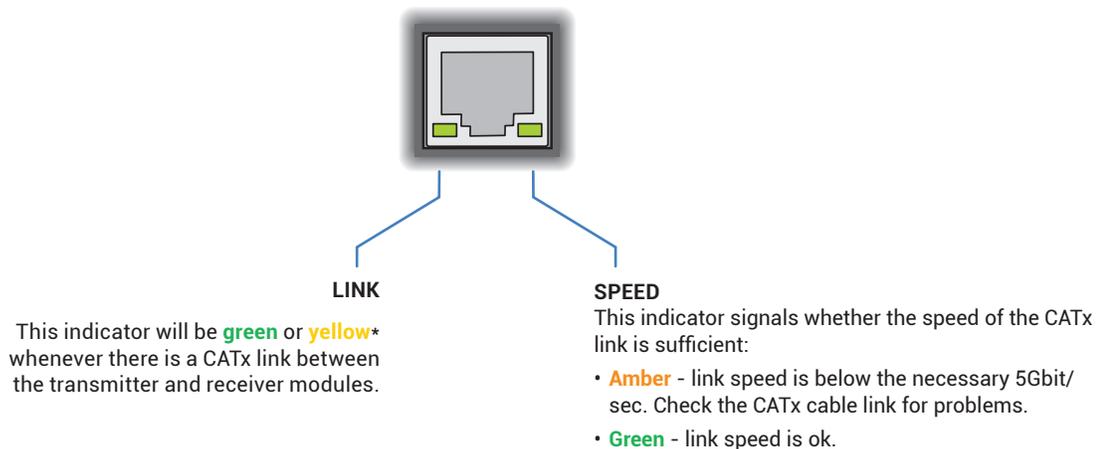
STATUS INDICATORS

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



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:



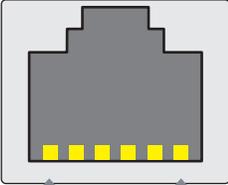
* The CATx LINK LED will be either yellow or green, depending upon the connector manufacturer used. There is no difference in functionality.

CHAPTER 6: FURTHER INFORMATION

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

- 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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