

## ServSwitch Wizard DVI/USB SRX™

Extend one or two\* quality DVI video links plus four USB devices up to nearly 200 feet (60m) from your computer.

Uses one or two\* lengths of Category 5e, 6 or 7 twisted-pair cable.

\* Dual-variant models



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Information**

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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.

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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 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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## 1. Specifications

Approvals: CE, FCC

Hardware Compatibility: All computers with DVI digital video and USB interfaces

Software Compatibility: Operates with all known software and operating systems including Windows®, Linux®, Unix®, BSD, all Sun® OS, all Mac® OS, NetWare®, etc.

Connectors:	<i>Single-variant</i>	<i>Dual-variant</i>
(local transmitter)	Video: DVI-D female USB: USB Type B female Audio: 1 x 3.5mm jack socket Other: RJ-45 CATx link socket Power jack	2 x DVI-D female 2 x USB Type B female 2 x 3.5mm jack socket 2 x RJ-45 CATx link socket Power jack
Connectors:	Video: DVI-D female USB: (4) USB Type A female Audio: 1 x 3.5mm jack socket Other: RJ-45 CATx link socket Power jack	2 x DVI-D female 2 x USB Type B female 2 x 3.5mm jack socket 2 x RJ-45 CATx link socket Power jack
(remote receiver)		
Operating Temperature:	32 to 104°F (0 to 40°C)	
Power adapter(s):	Input: 100–240 VAC, 50/60 Hz Output: DC jack (5VDC output)	

### Local unit

Dimensions	<i>Single-variant</i>	<i>Dual-variant</i>
(w):	120mm (4.66")	120mm (4.66")
(h):	26mm (1.02")	48mm (1.88")
(d):	75mm (2.94")	75mm (2.94")
Weights:	0.34kg (0.75lbs)	0.5kg (1.1lbs)
Power requirements:	450mA @ 5VDC	1.7A @ 5VDC

### Remote unit

Dimensions	<i>Single-variant</i>	<i>Dual-variant</i>
(w):	163.4mm (6.43")	120mm (4.66")
(h):	26mm (1.02")	48mm (1.88")
(d):	74.8mm (2.94")	75mm (2.94")
Weights:	0.43kg (0.95lbs)	0.5kg (1.1lbs)
Power requirements:	1A @ 5VDC	2.5A @ 5VDC

## 1.1 Compatibility

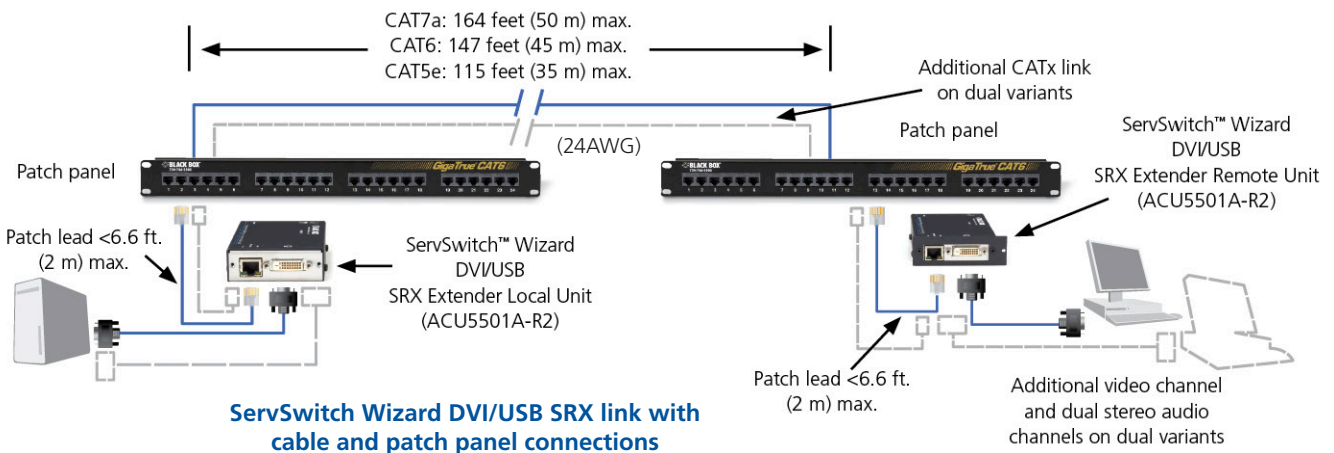
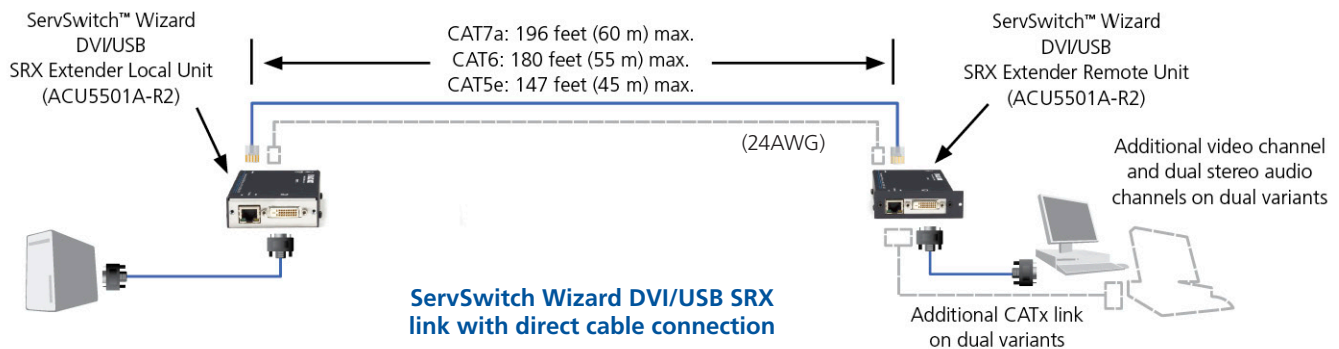
Please note that ACU5501A-R4 is not compatible with earlier versions ACU5501A-R3 or ACU5501A-R2. Similarly, ACU5502A-R3 is not compatible with earlier version ACU5502A-R2. In practice this means that you must ensure that both ends of an extender pair (local and remote modules) are at the same revision level.

## 2. Overview

Thank you for choosing the ServSwitch Wizard DVI/USB SRX extenders. These compact modules present the quickest way to extend high quality DVI digital video plus USB keyboard and mouse (plus on dual variants, a second digital video channel and two stereo audio channels) with an additional 2 USB peripherals up to 196 feet (60 meters) away from your computer.

Thanks to our long involvement and investment in extender technology we have succeeded in overcoming the numerous problems associated with extending digital video signals. Using our proprietary transmission techniques the ServSwitch Wizard DVI/USB SRX (and dual) modules can reliably transfer video rates up to 165 Mpixels per second. This is in addition to two USB channels for keyboard and mouse - all via the same single length of Category 5e, 6 or 7a twisted pair cabling.

The ServSwitch Wizard DVI/USB SRX extenders have been designed to be quick to install and totally transparent in operation.



### Cable distance rules

- Extension distances up to 196 feet (60 m) are supported.
- Extensions of 196 feet (60 m) may be achieved with uninterrupted runs of recommended cable (Black Box CAT7a patch cable) at full resolution.
- Extensions of 180 feet (55 m) may be achieved with uninterrupted runs of CAT6 bulk/trunk (not patch) cable at full resolution.
- The overall cable run(s) must be reduced by 16 feet (5 m) for each additional cable coupling.
- Black Box does not recommend CAT5e cables for use with this product. However, 147 feet (45 m) may be typically achieved with uninterrupted runs of CAT5e bulk/trunk (not patch) cable at full resolution.
- The run specification may be increased by 32 feet (10 m) when using resolutions of 1280 x 1024 or lower.
- All patch cables should be as short as possible and should be no longer than 6.6 feet (2 m).
- It is recommended that Black Box CAT7a patch cables are used for maximum performance.

## 3. Installation

### 3.1 Mounting the modules – desk or rack

The ServSwitch Wizard DVI/USB SRX modules can be situated on a desk or alternatively, for larger installations, mounted within an optional rack mount chassis.

#### 3.1.1 Desk mount

Apply the supplied self-adhesive rubber feet to the underside of the module as shown in Figure 3-1:

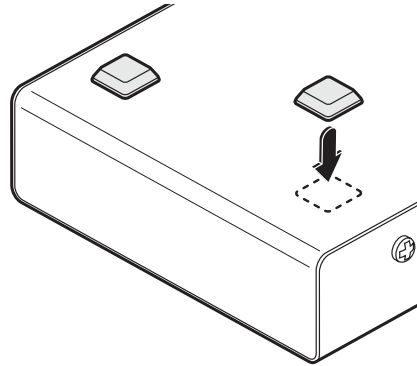


Figure 3-1. Applying the supplied self-adhesive rubber feet to the underside of the module



### 3.1.2 Rack mount

Note: The module switches are not accessible once it is inserted into the rack, therefore, check all settings before insertion.

- 1 Place the rack securing plate (available as a separate kit) onto the front of the module and secure it with the two countersunk screws.
- 2 Orient the ServSwitch Wizard DVI/USB SRX module on its side so that its labeled face is the correct way up.
- 3 Slide the module into the required rack position. The rectangular cut-out in the front upper lip of the rack allows the two screws on the module's upper edge to slide through.
- 4 The rack mount chassis has a series of holes in its floor that are spaced to accommodate the two screws on the module's lower edge. Ensure that the screws correctly locate into the two holes of the chosen slot. The rack securing plate on the module should now be flush with the front of the rack mount chassis.
- 5 Use the third (pan-head) screw, in the top hole of the rack securing plate to fasten the module to the rack as shown in Figure 3-2:

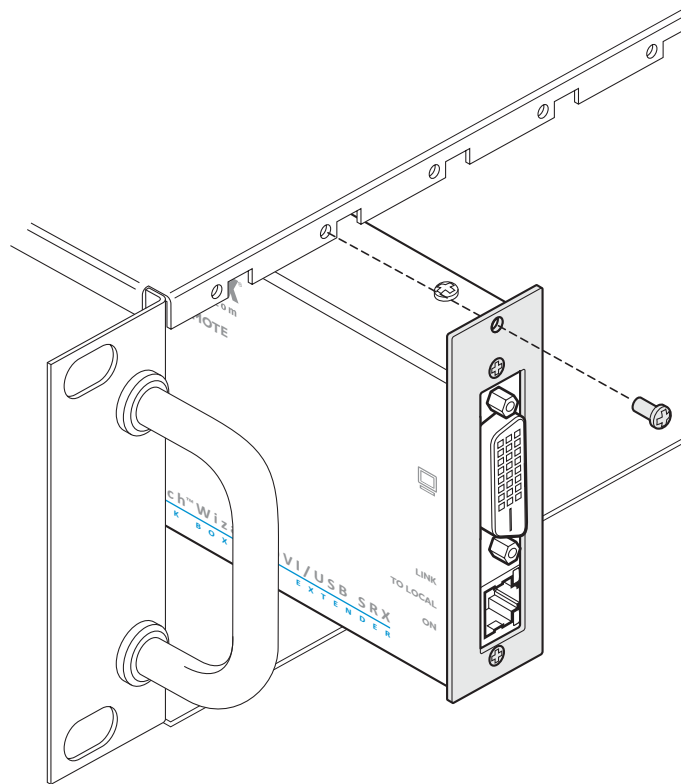


Figure 3-2. Fixing the module into the rack

## 3.2 Connections

Installation of the ServSwitch Wizard DVI/USB SRX modules is straightforward and requires minimal configuration in most cases.

- Connections at the local module
- Connections at the remote module

Note: After all connections are made, power up the monitor connected to the remote module, then power up the remote module and finally switch on the computer connected to the local module.

### 3.2.1 Connections at the local module

#### 3.2.1.1 Video connections

- 1 Use the supplied DVI/D link cable to connect the DVI input socket of the local module to the digital video output socket of the computer as shown in Figure 3-3:

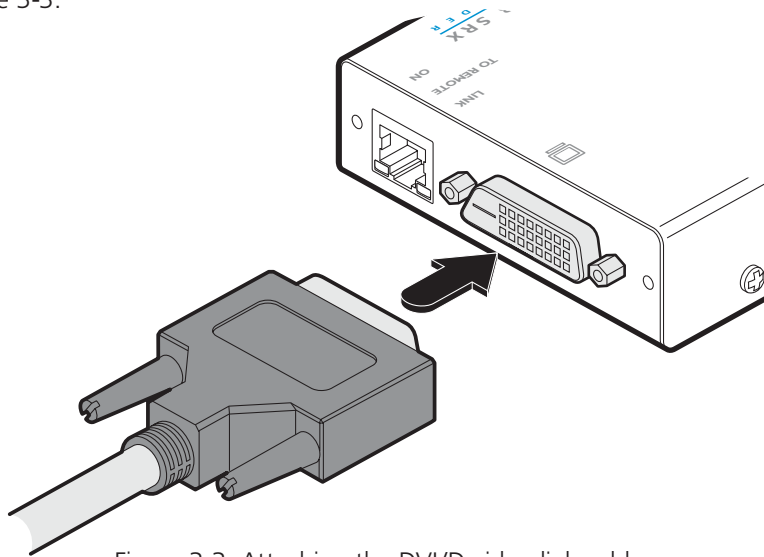


Figure 3-3. Attaching the DVI/D video link cable

[Dual-variant only] Optionally attach a second video input from the computer system using the supplied DVI/D link cable.

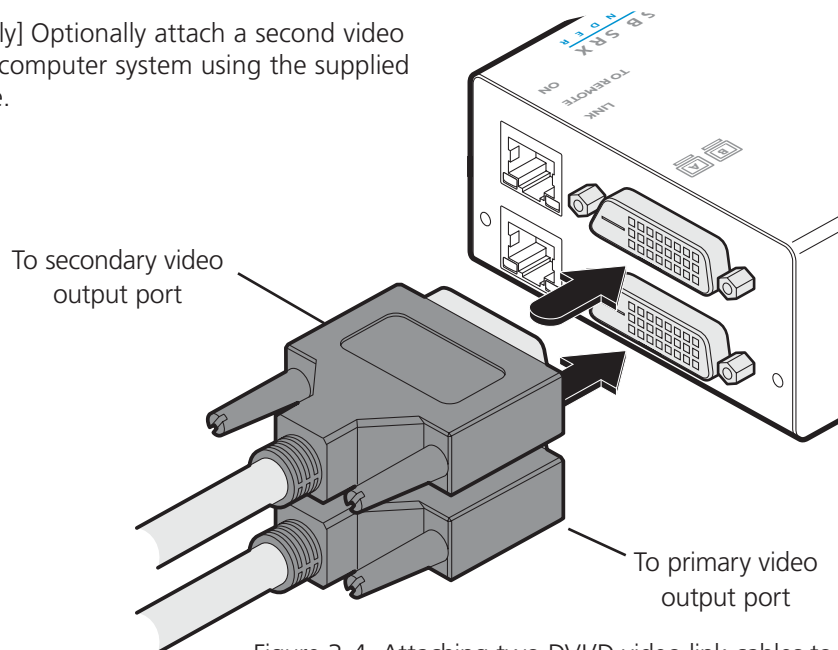


Figure 3-4. Attaching two DVI/D video link cables to the dual-variant local module

### 3.2.1.2 USB connections

- 1 Use the supplied USB cable to link the USB socket of the local module to a vacant USB socket on the computer as shown in Figure 3-5:

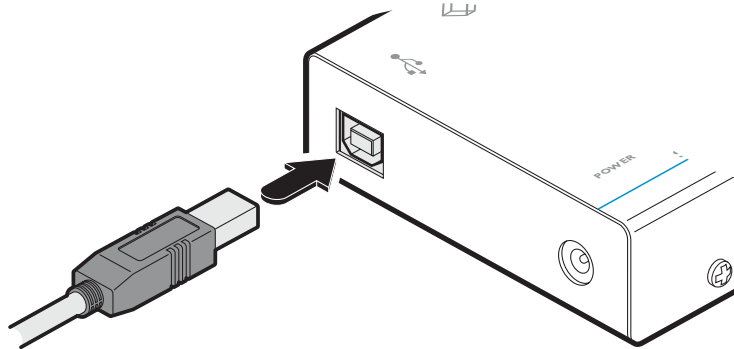


Figure 3-5. Attaching the USB link cable

[Dual-variant only] Optionally attach a second USB connection from the computer system using the supplied USB cable.

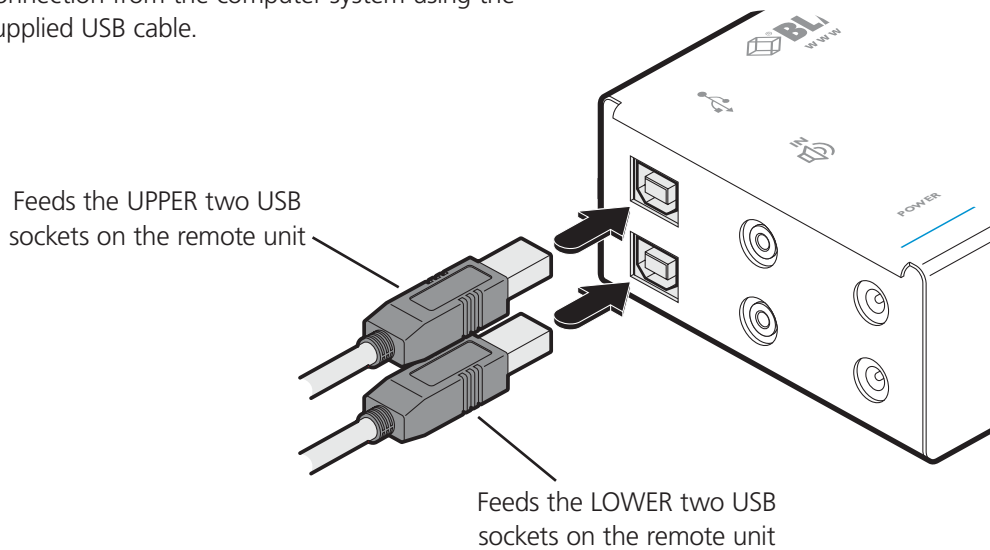


Figure 3-6. Attaching two USB link cables to the dual-variant local module

## 3.2.1.3 Link connections

- 1 Connect the link cable (see Overview page for cable advice) to the local module socket labeled **TO REMOTE** as shown in Figure 3-7:

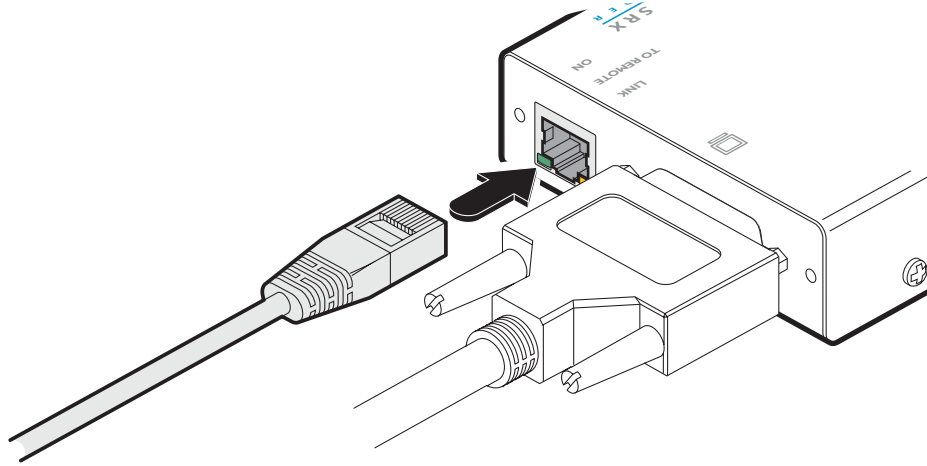


Figure 3-7. Attaching the CATx link cable

[Dual-variant only] Attach a second category 5e, 6 or 7a link cable (up to 60 metres in length) to the upper socket on the dual-variant local module.

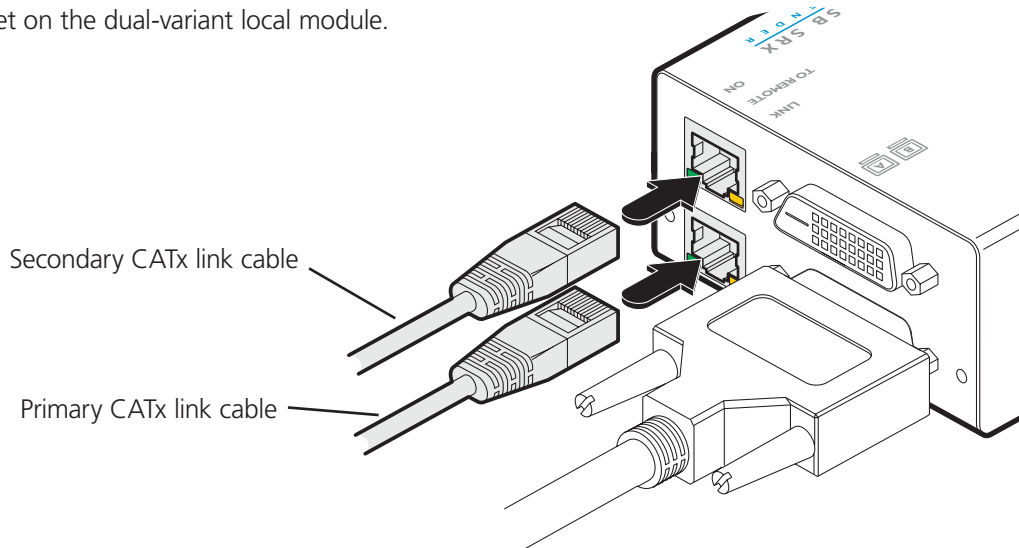


Figure 3-8. Attaching two CATx link cables to a dual-variant local module

### 3.2.1.4 Audio connections (ACU5501A-R3 & -R4 only)

Optionally link a audio input to the local module using a 3.5mm audio cable.

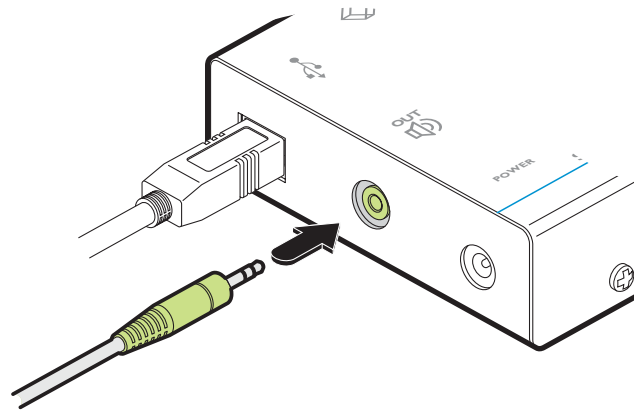


Figure 3-9. Attaching an audio link to the local module (ACU5501A-R3 & -R4 only)

### 3.2.1.5 Audio connections (dual-variants only)

Optionally link one or two stereo audio inputs to the local module using 3.5mm audio cable(s). One 3.5mm audio cable is supplied with dual-variant packages.

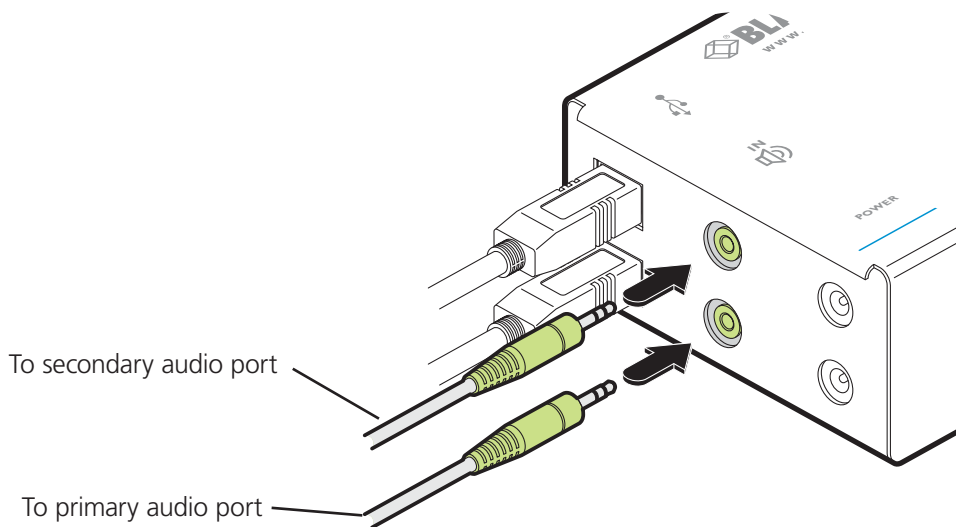
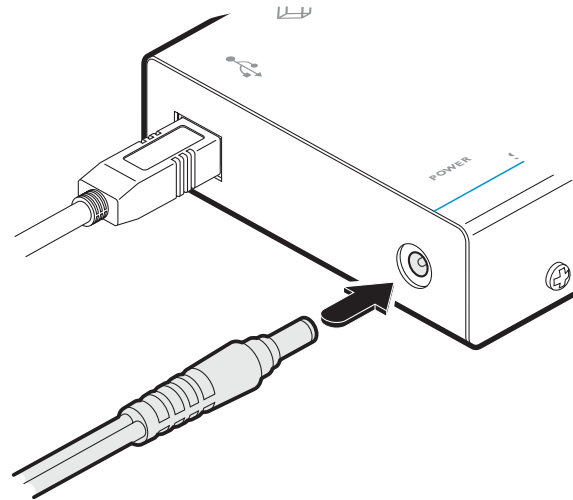


Figure 3-10. Attaching two audio links to a dual-variant local module

## 3.2.1.6 Power connections (optional)

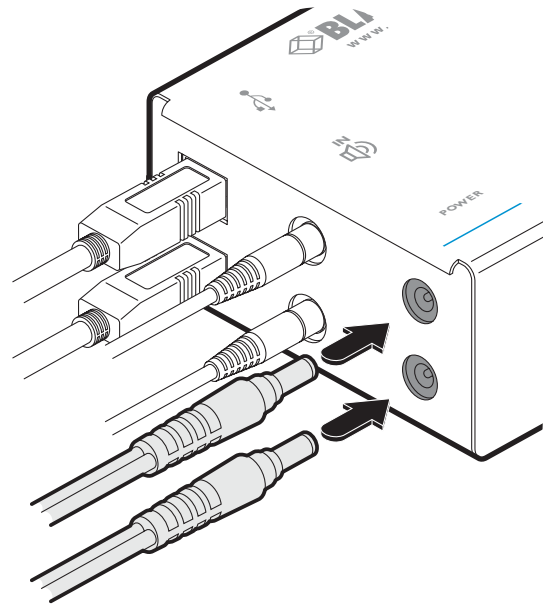
The local module is designed to derive its power from the host computer via the USB connection (two connections for the dual variant). If this is not possible, then you will need to use one or two optional Black Box power adapters.

- 1 Connect the output lead of the optional power adapter(s) to the socket(s) labeled 'POWER' on the local module as shown in Figures 3-11 and 3-12:



Single-variant local module:  
Use an optional power adapter only if powering from the host (via USB) is not possible.

Figure 3-11. Attaching the power adapter connection to the single variant local module



Dual-variant local module: Use two optional power adapters only if powering from the host (via dual USB connections) is not possible.


  
Do not use squid cables or power splitters. Two separate power adapters must be used.

Figure 3-12. Attaching the power adapter connections to the dual variant local module

- 2 Insert the IEC connector of the separate power cord(s) into the corresponding socket(s) of the power adapter(s). Connect the other end of the power cord to one/two nearby mains socket(s).

Note: After all connections are made, power up the monitor and the REMOTE module first (followed by the LOCAL module, if using the dual-variant with power adapters) and then switch on the computer.

### 3.2.2 Connections at the remote module

#### 3.2.2.1 Video connections

1 Connect the DVI/D lead from the video monitor to the DVI output socket of the remote module as shown in Figure 3-13:

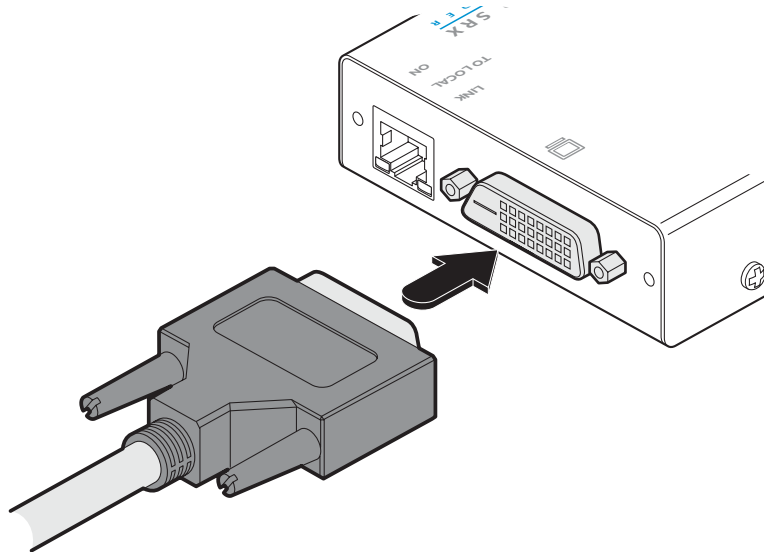


Figure 3-13. Attaching the DVI/D video monitor cable

[Dual-variant only] Optionally attach a second DVI video monitor.

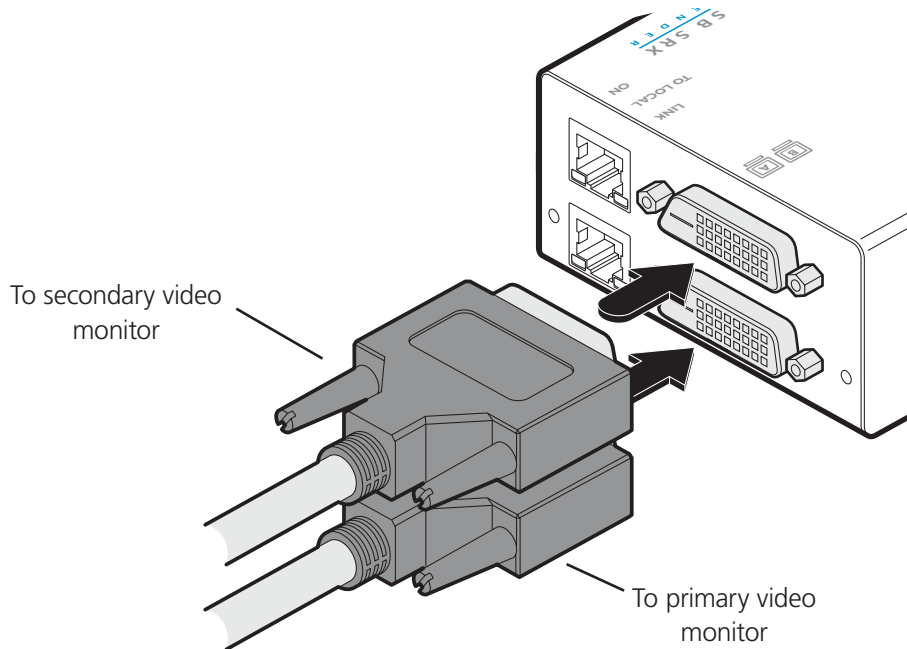


Figure 3-14. Attaching primary and secondary DVI/D video monitor cables to the dual-variant remote module

## 3.2.2.2 USB connections

1 Connect the leads from the keyboard and mouse to two of the USB sockets on the remote module as shown in Figure 3-15:

Note: It is not important which of the four sockets are used.

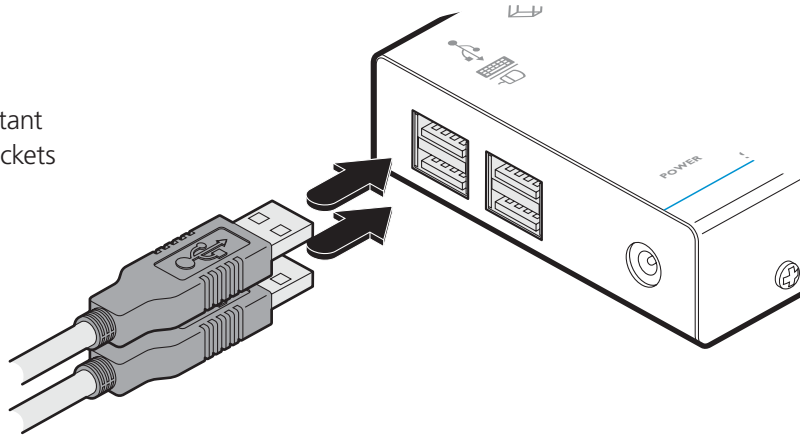


Figure 3-15. Attaching the keyboard and mouse USB cables

**IMPORTANT:** The total current that may be drawn from the USB ports is 1.2A, which should be sufficient for a keyboard, mouse (no more than 100mA each) and any two other devices (500mA maximum each). If more power for USB devices is required, please use a powered USB hub.

[Dual-variant only] Connect the leads from the keyboard and mouse to the two USB sockets on the remote module.

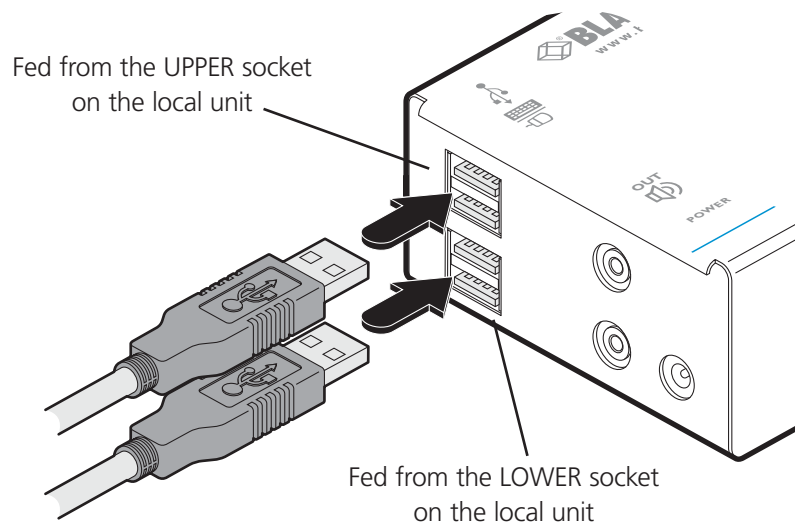


Figure 3-16. Attaching the keyboard and mouse USB cables to the dual-variant remote module

2 Where other USB peripherals are also required, connect up to two other leads to the remaining USB sockets.



### 3.2.2.3 Link connections

- 1 Connect the link cable (see Overview page for cable advice) to the remote module socket labeled **TO LOCAL** as shown in Figure 3-17:

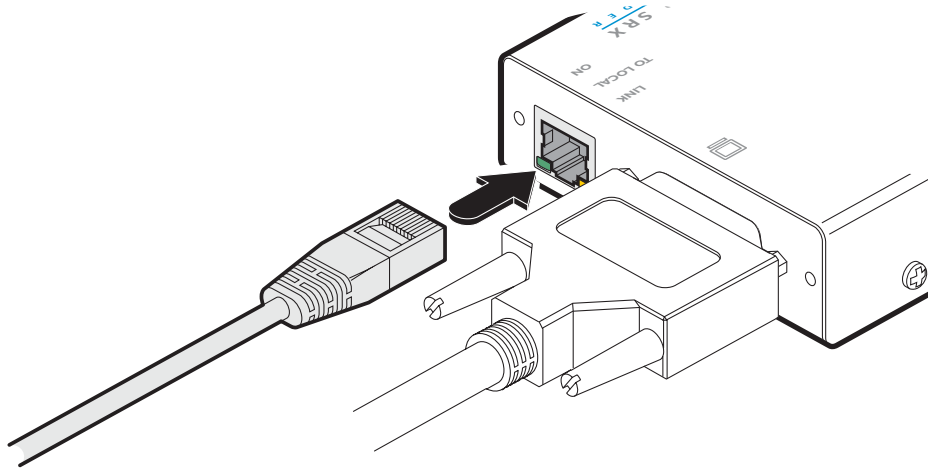


Figure 3-17. Attaching the CATx link cable

[Dual-variant only] Attach a second category 5e, 6 or 7a link cable (up to 60 metres in length) to the upper socket on the dual-variant remote module.

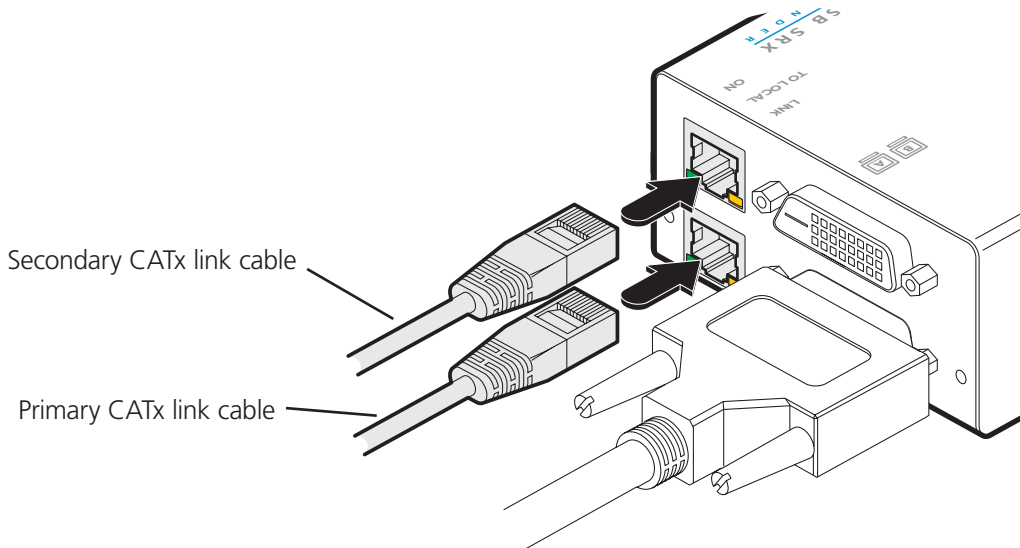


Figure 3-18. Attaching the CATx link cables to the dual-variant remote module

## 3.2.2.4 Speaker connections (ACU5501A-R3 & -R4 only)

Optionally link stereo speakers to the remote module using 3.5mm audio cable.

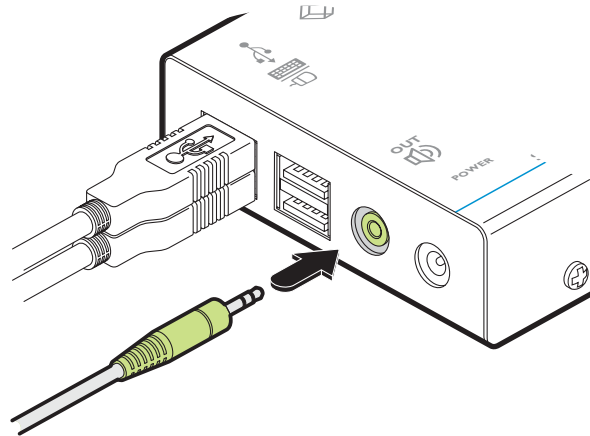


Figure 3-19. Attaching speakers to the remote module (ACU5501A-R3 & -R4 only)

## 3.2.2.5 Speaker connections (dual variants only)

Optionally link one or two stereo speakers to the remote module using 3.5mm audio cable(s).

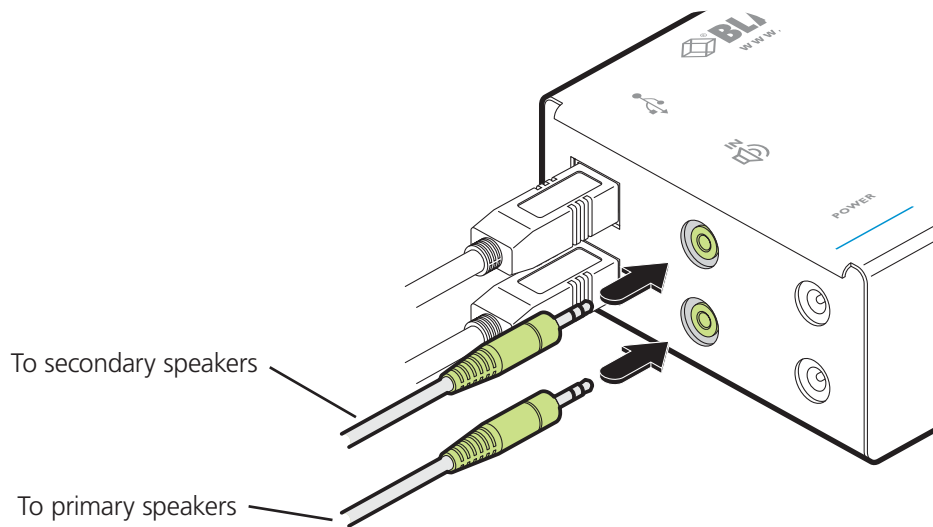


Figure 3-20. Attaching two sets of speakers to a dual-variant remote module

### 3.2.2.6 Power connections

- 1 Connect the output lead of the supplied power adapter to the socket labeled **POWER** on the remote module as shown in Figures 3-21 and 3-22:

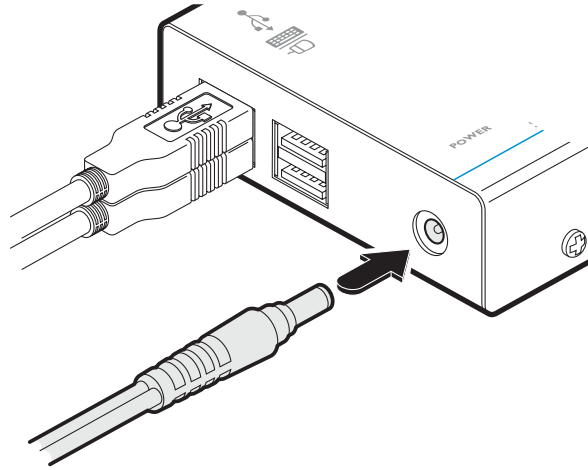


Figure 3-21. Attaching the power adapter connection

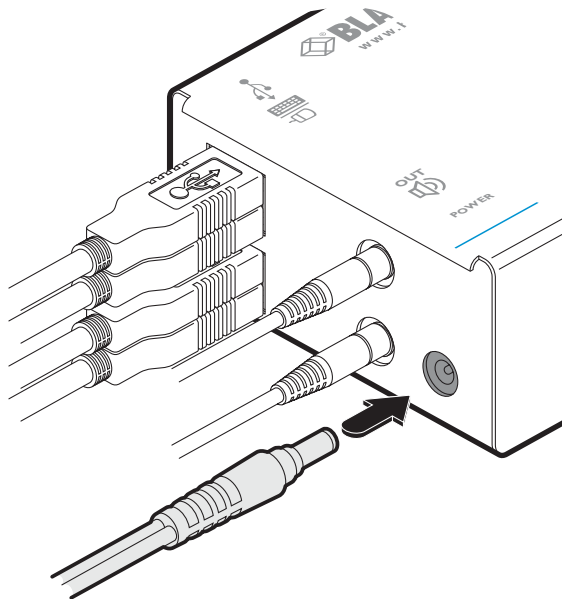


Figure 3-22. Attaching the power adapter connection on the dual-variant remote module

- 2 Insert the IEC connector of the separate power cord into the corresponding socket of the power adapter. Connect the other end of the power cord to a nearby mains socket.
- 3 After all connections are made, power up the monitor and remote module and then switch on the computer.

## 4. Operation

### 4.1 General use

In use, the ServSwitch Wizard DVI/USB SRX modules should be transparent - the system and its peripherals should operate exactly as normal, the only difference being that they are now up to 196 feet (60 meters) apart.

### 4.2 Video display (EDID) information

Extended Display Identification Data (or EDID) is an industry standard scheme which allows video monitors to declare their capabilities to the computer's video adapter circuitry, allowing the latter to optimise their outputs accordingly. Since the widespread adoption of the scheme, video adapters have become increasingly dependent on receiving relevant EDID information during start-up, before they will output anything more than a rudimentary video signal.

Each time that the remote module is powered on, it attempts to read the EDID information from the connected DVI video monitor. If the attempt is successful, the information is transferred to the local module and stored within non-volatile memory. This information is then made available to the computer's video adapter when required.

On dual-variants, EDID is handled independently for the two video connections, allowing completely different video display configurations on the two ports.

### 4.3 HDMI 1.3a operation

Using optional HDMI to DVI converter cables, the dual-variant ServSwitch Wizard DVI/USB SRX can support HDMI video and audio up to the 165MHz clock rate (1920 x 1080 at 60Hz, 24-bit colour).

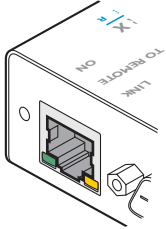
Eight channels of HDMI audio are supported with sample sizes of 16, 20 or 24-bits at 32KHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, or 192kHz (simultaneously with the jack audio).

*Note: The High-bandwidth Digital Content Protection (HDCP) and Consumer Electronics Control (CEC) schemes are not supported.*

## 4.4 Power and activity indicators

Each module provides two indicators to confirm power status and also feedback about the various input signals:

### Local module



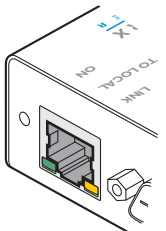
**Green:**

- On when power is present.

**Yellow:**

- On when a valid DVI video input signal is being received from the computer.
- Off when the CATx link cable is disconnected.

### Remote module



**Green:**

- On when power is present.

**Yellow:**

- On when a valid DVI video input signal is being received from the local module.
- Flashes regularly (twice per second) when no valid DVI video signal is being received from the local module.

### Appendix A. Troubleshooting

#### A.1 No video image is displayed on the remote monitor

- Check the yellow indicators on the local and remote modules while no keys are pressed on the keyboard and no mouse movements are being made - both indicators should be continually on when a valid video signal is present.

LOCAL: If the yellow indicator is giving a regular flash (twice per second), then the video feed to the local module is not valid. Try connecting a DVI monitor (preferably using the same DVI link cable as used with the local module) directly to the computer and check for a correct image.

REMOTE: If the yellow indicator is giving a regular flash (twice per second), then the video feed via the link cable is not valid. If the link cable is long, try using a short link cable temporarily to check for basic operation.

If the yellow indicators are off, then the link cable is not properly connected.

### Appendix B. 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.

**Black Box Tech Support: FREE! Live. 24/7.**

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### About Black Box

Black Box Network Services is your source for an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

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