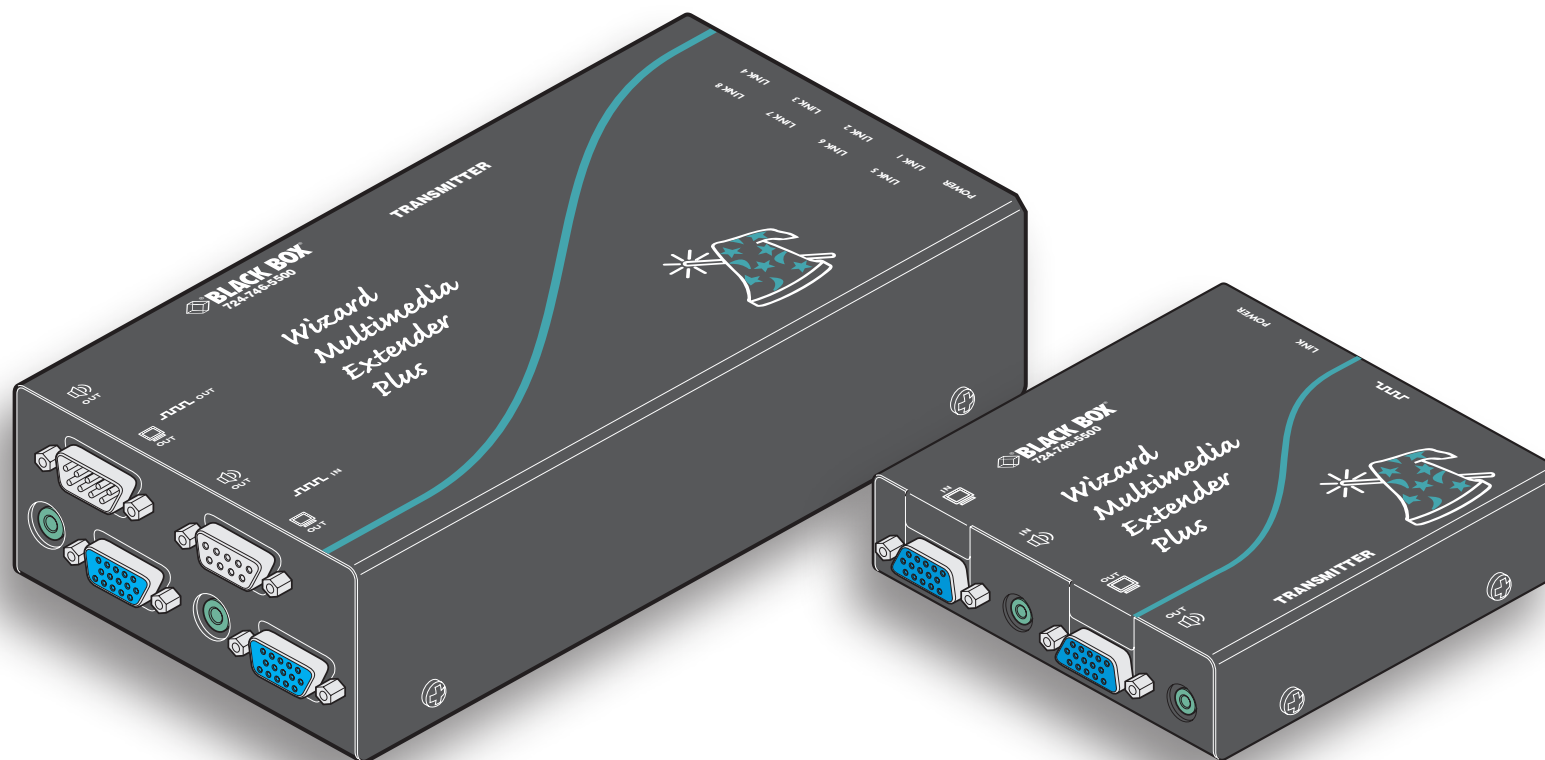




# Wizard™ MultiMedia Plus

## USER GUIDE



**CUSTOMER  
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INFORMATION**

Order toll-free in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)  
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**  
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018  
Web site: [www.blackbox.com](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto:info@blackbox.com)

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# Welcome



## Introduction

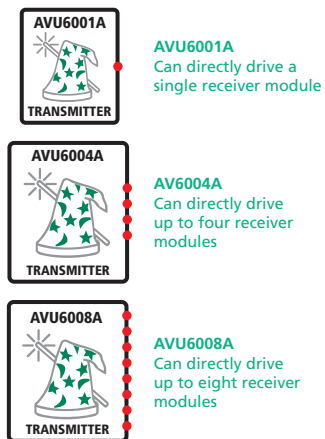
The Black Box Wizard MultiMedia Plus family of digital signage extenders provide a modular method to distribute high quality video and audio to remote display units as well as handling serial control signals. The various modules of the Wizard MultiMedia Plus family support a wide range of configurations: from individual point-to-point installations to multiple screen distributions, all via CATx cabling at distances up to 300m (1000 feet).

All Wizard MultiMedia Plus modules provide full support for RS232 serial communications between the host system and the display(s). This support extends not just to point-to-point connections, but also to larger scale installations using AVU6004A and AVU6008A transmitters.

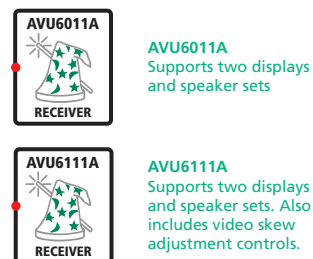
## Standard Wizard MultiMedia Plus models

There are three styles of Wizard MultiMedia Plus transmitters and two types of receiver modules available. The choice of each depends upon the quantity of devices that need to be supported and the layout of each installation as a whole:

### Transmitters



### Receivers



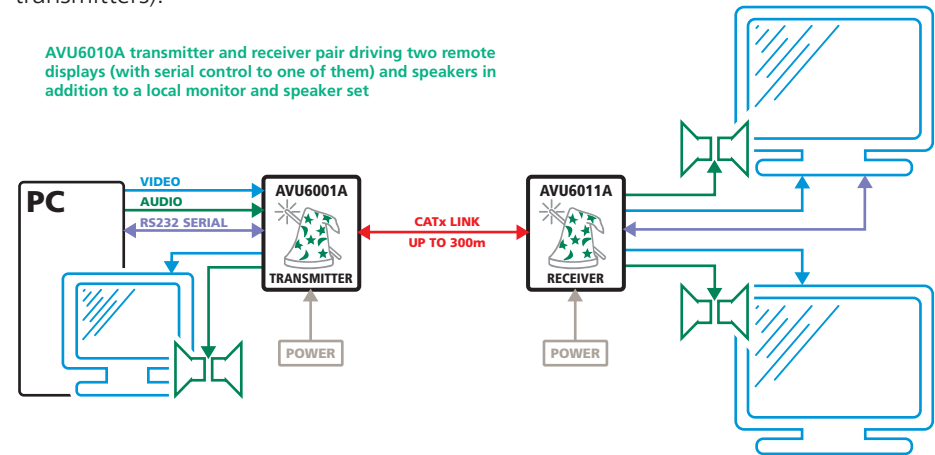
### Module mixing - IMPORTANT

When necessary, the AVU6004A and AVU6008A modules can be used to link with AVU5011A or AVU5111A receivers, however, the serial communications facilities must be first disabled using switch 10 on the AVU6004A or AVU6008A modules (see [Switch settings](#) for details)

## Wizard MultiMedia Plus AVU6010A point-to-point pair

The AVU6010A transmitter and receiver pair provide point to point operation capable of directly supporting dual displays and speaker sets. The transmitter can additionally support a local monitor and speaker set located adjacent to the source system. At the receiver a single RS232 serial connector is available for linking to a single display (AVU6011A receivers can support dual serial ports via a special [Y-cable](#) but only when linked to AVU6004A or AVU6008A transmitters).

AVU6010A transmitter and receiver pair driving two remote displays (with serial control to one of them) and speakers in addition to a local monitor and speaker set



The AVU6010A transmitter and receiver modules are also available separately and are known as the AVU6001A and AV6011A respectively. Expansion is made possible by connecting further transmitters to the original AVU6001A transmitter module, however, the serial connection cannot be cascaded in this manner. Where cascades with serial connections (as well as video and audio) are required, use the AVU6004A/AVU6008A transmitters.

## Wizard MultiMedia Plus AVU6111A

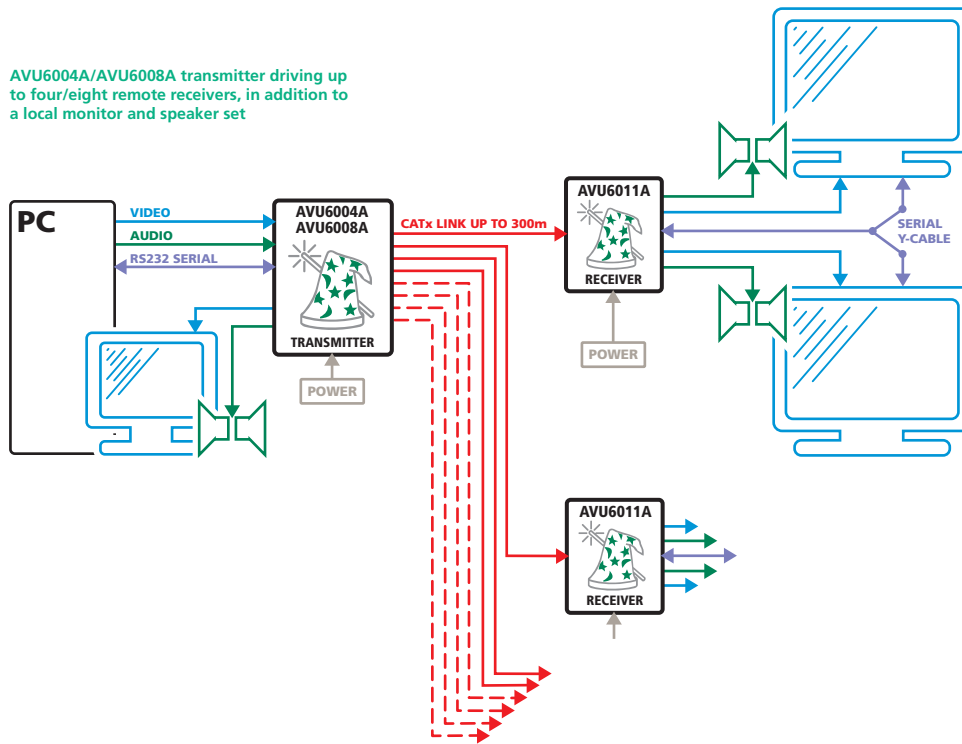
An AVU6111A receiver is also available which provides all of the functionality of the AVU6011A with the addition of special skew adjustments to correct cable-induced video timing errors on long CATx connections.

## Wizard MultiMedia Plus AVU6004A and AVU6008A transmitters

The AVU6004A transmitter provides four CATx outputs while the AVU6008A provides eight CATx output to directly drive AVU6011A/ AVU6111A receiver modules located at distances up to 300m (1000 feet).

*Note: An optional serial Y-cable is available, which allows a connected receiver to provide a serial link to each display.*

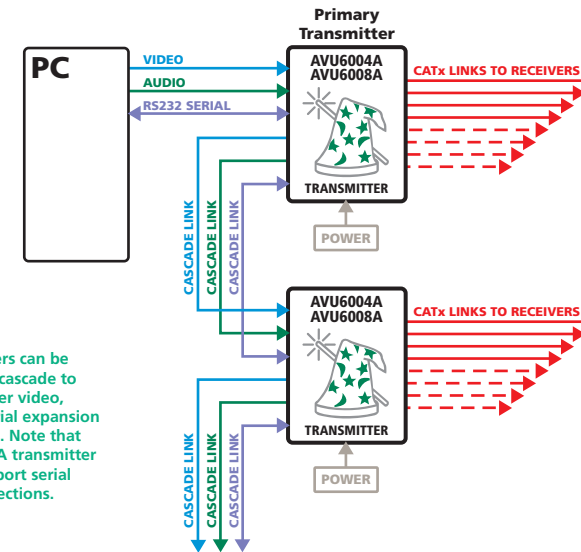
AVU6004A/AVU6008A transmitter driving up to four/eight remote receivers, in addition to a local monitor and speaker set



Additional expansion is also possible by connecting further transmitter modules to the original module in a cascade arrangement, each supporting their own multiple AVU6011A/ AVU6111A receiver modules - See *Expansion via cascade links* for details.

## Expansion via cascade links

In order to create small, medium and large digital signage networks, all Wizard MultiMedia Plus transmitters are designed to support additional transmitter modules (and their subsequent multiple receivers). This is achieved using the video, audio and serial out ports to provide the inputs into the next transmitter module, and so on.



AV transmitters can be connected in cascade to provide further video, audio and serial expansion opportunities. Note that the AVU6001A transmitter does not support serial cascade connections.

*Note: The AVU6001A transmitter supports video and audio cascade connections, however, the module does not include a serial out connector and cannot support cascaded serial connections.*

A limit of three cascade connections are possible between transmitter modules. Using the corresponding maximum of four AVU6008A transmitters, this gives an overall support for up to 64 remote displays on 32 separate CATx branches.



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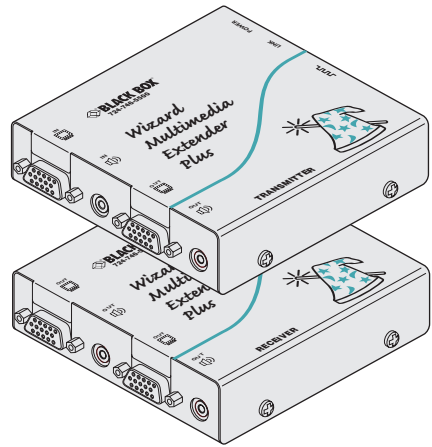
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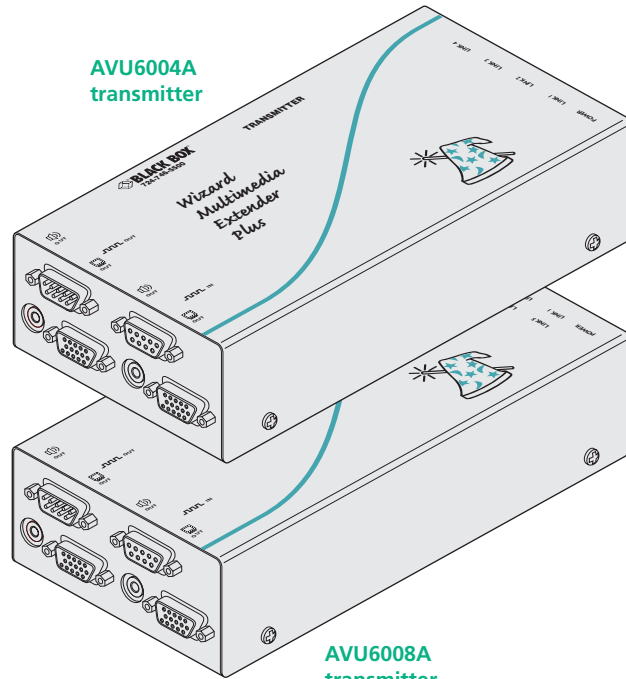
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# What's in the box

Supplied items depend upon ordered models

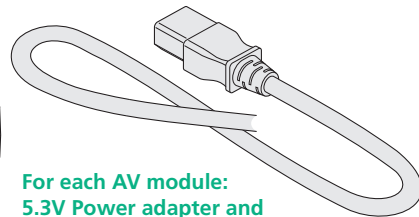
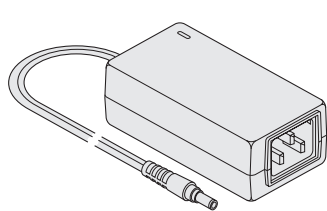


AVU6001A transmitter and/or AVU6011A/AVU6111A receiver. AVU6001A and AVU6011A modules can be supplied as a pair under the code AVU6010A

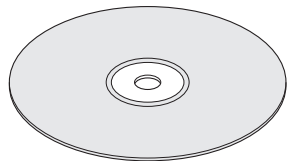


AVU6004A transmitter

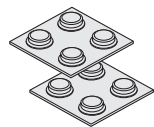
AVU6008A transmitter



For each AV module: 5.3V Power adapter and country-specific mains cable

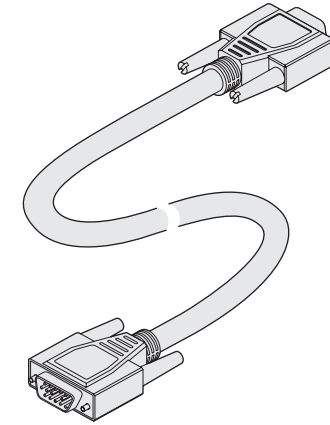


CD-ROM containing skew test pattern and documentation

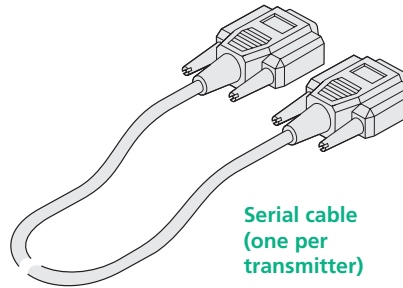


Self adhesive rubber feet

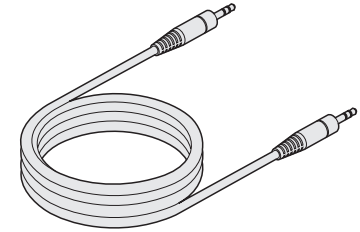
# What you may additionally need



Video cable to connect a transmitter to the source PC and optionally to connect additional transmitter modules in cascade.



Serial cable (one per transmitter)



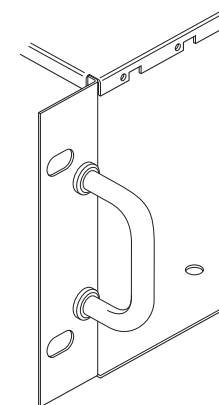
Stereo audio cable to connect a transmitter to the source PC and optionally to connect additional transmitter modules in cascade.

Rack mount fascia plates (not pictured)

Serial Y-cable (not pictured) to connect two serial devices to a receiver (when that receiver is linked to an AVU6004A or AVU6008A transmitter)

Upgrade cable (not pictured)

19" rack mount chassis



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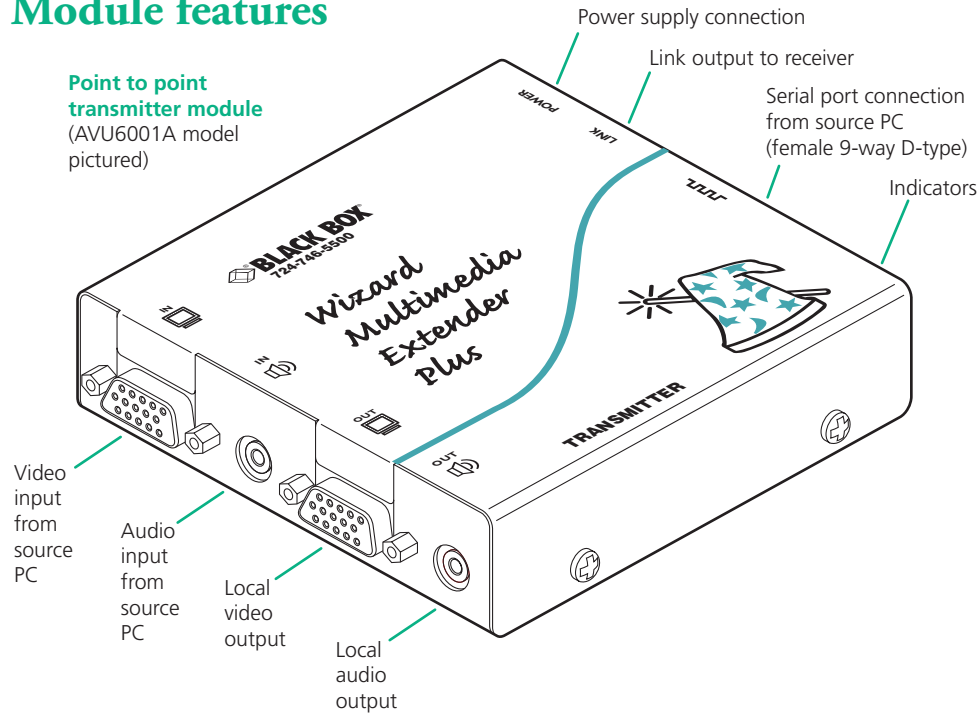
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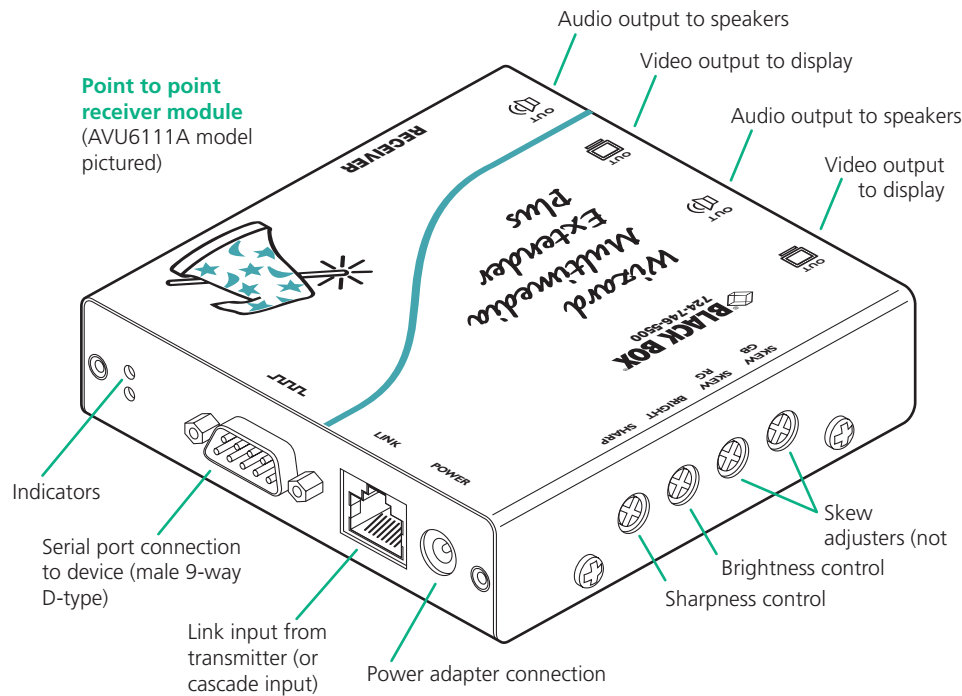
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# Module features

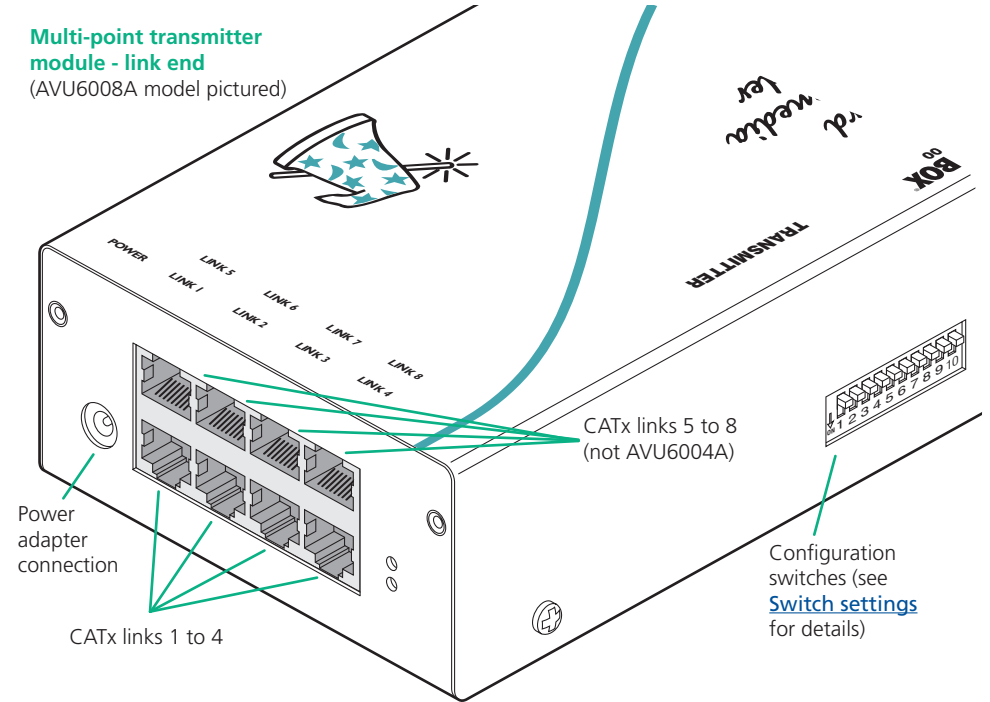
**Point to point transmitter module**  
(AVU6001A model pictured)



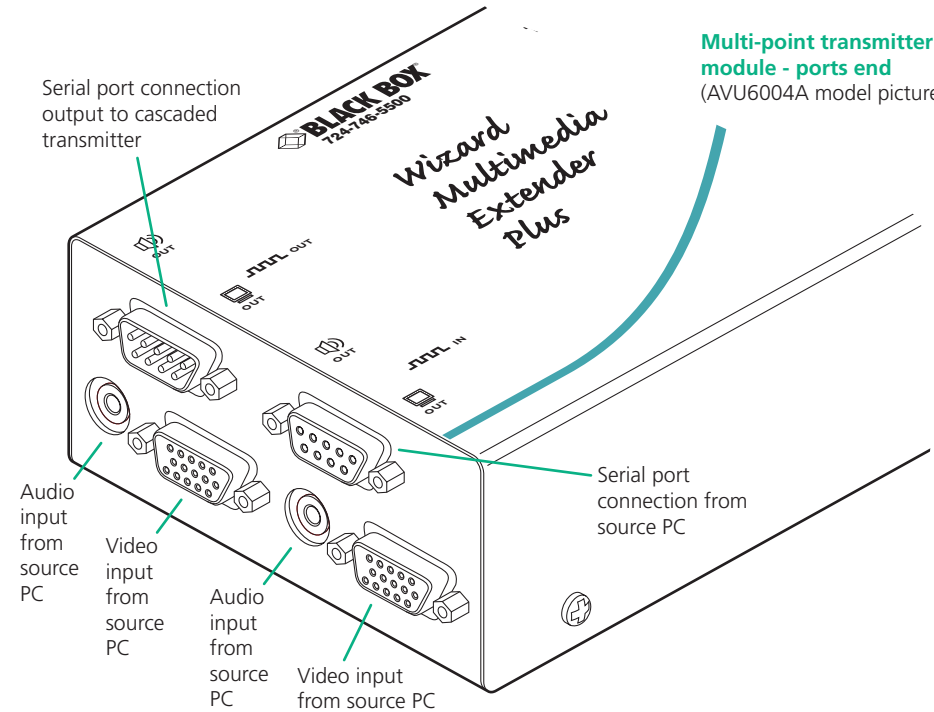
**Point to point receiver module**  
(AVU6111A model pictured)



**Multi-point transmitter module - link end**  
(AVU6008A model pictured)



**Multi-point transmitter module - ports end**  
(AVU6004A model pictured)



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# Installation



## Locations

Please consider the following important points when planning the positions of your Wizard MultiMedia Plus modules:

- Take care not to exceed the maximum link cable lengths (please refer to the section [Making cascade connections](#)).
- Ensure that the transmitters are as close as possible to the source PC system and the receivers are similarly close to the display modules. Use video connection cables that are correctly shielded and are no longer than 6m in length.
- Wherever possible, choose routes for the CATx twisted pair link cables that avoid mains power cables.
- Remember a mains power socket is required for each transmitter and receiver.
- Consult the precautions listed within the [Safety information](#) section.

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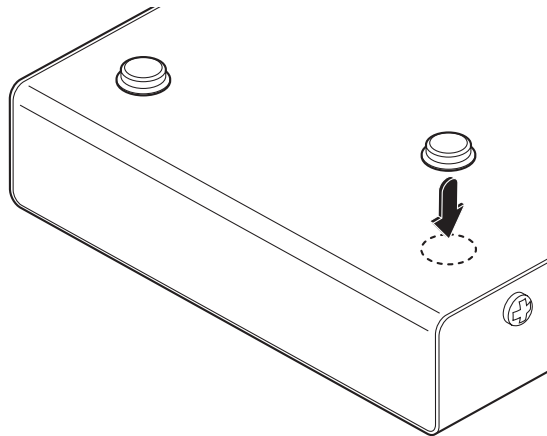
# Mounting

Before you begin connecting to the source PC system and display devices, it is advisable to mount the Wizard MultiMedia Plus modules in place. There are a number of mounting possibilities for the transmitter and receiver modules:

- On a horizontal surface using the supplied self adhesive feet,
- Mounted on a screw using the rear slot,
- Within the [optional rack mount chassis](#),
- On inclined surfaces using self adhesive Velcro® strips (not supplied).

## Using the self adhesive feet

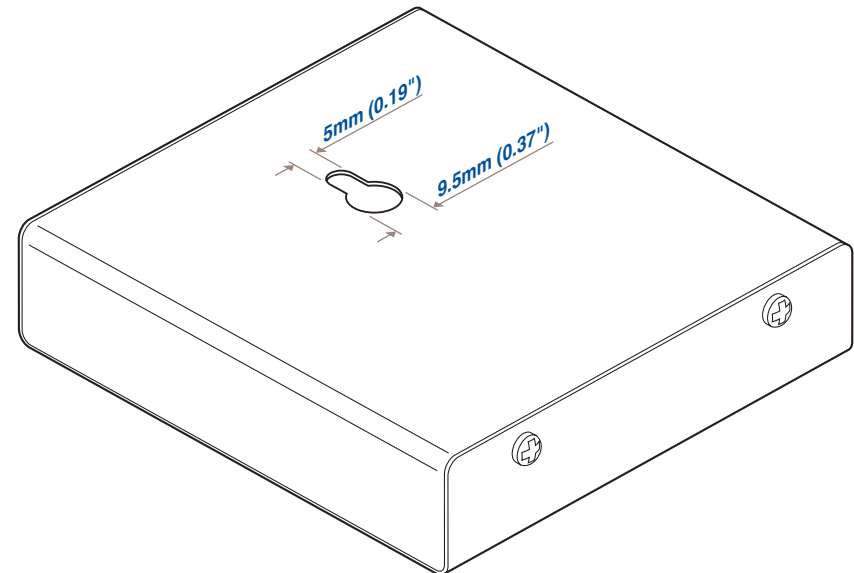
Apply the supplied self-adhesive rubber feet to the underside corners of the Wizard MultiMedia Plus modules.



## Using the rear mounting slot

The slot at the rear of AVU6011A and AVU6111A modules allow them to be hung upon a fixed screw that protrudes from the mounting surface.

*IMPORTANT: The internal circuit board is accessible through the mounting slot. Ensure that any mounting screws protrudes no further than 1/2" (12.5mm) into the module casing - serious electrical damage will be caused if the screw makes contact with the internal circuitry.*



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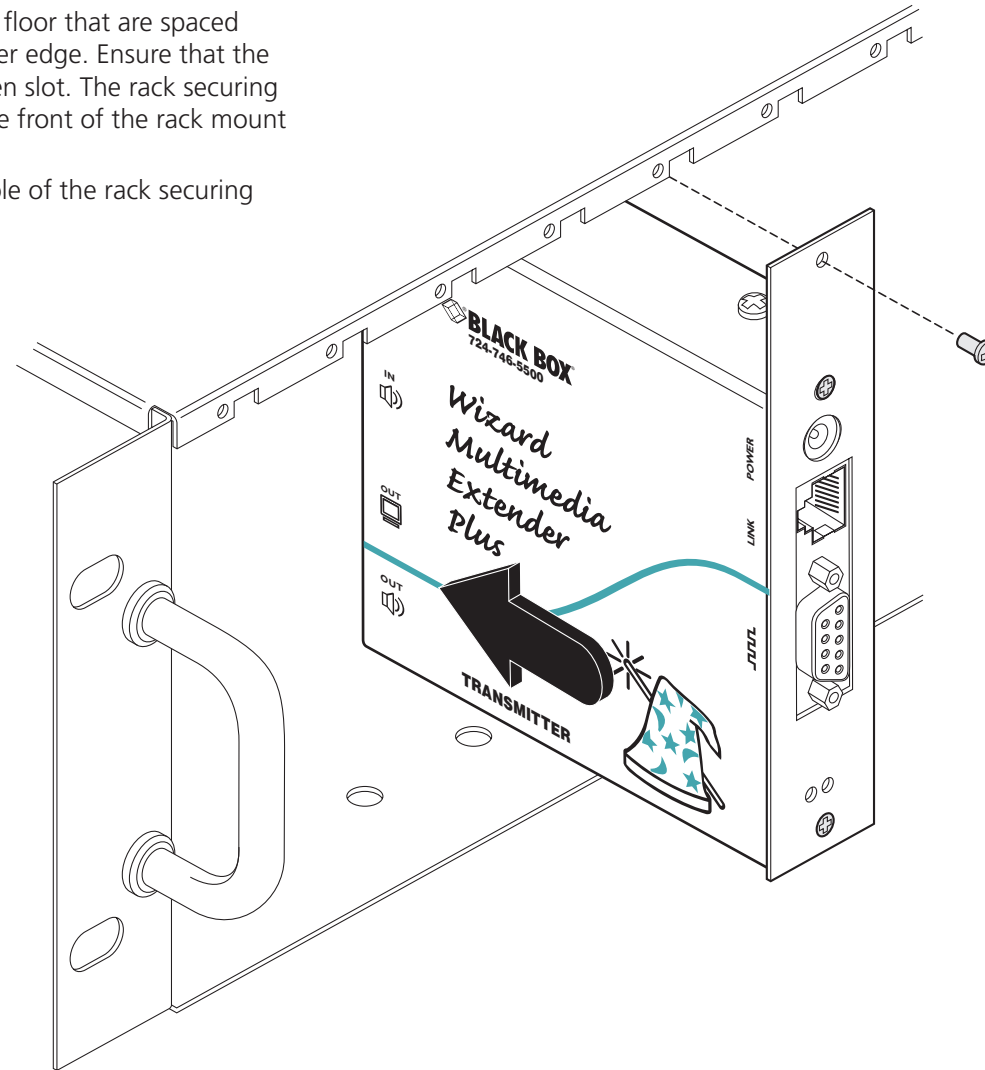
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## Using the optional rack mount chassis

- 1 Place the optional rack plate onto the front of the transmitter or receiver module and secure it with the countersunk screws.
- 2 Orient the module on its side so that its labelled face is the correct way up and the securing plate is facing away from the rack.
- 3 Slide the module into the required rack position.
- 4 The rack mount chassis has a series of holes in its floor that are spaced to accommodate the screws on the module's lower edge. Ensure that the screws correctly locate into the 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 supplied (pan-head) screws, in the top hole of the rack securing plate to fasten the module to the rack.



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## Making standard connections

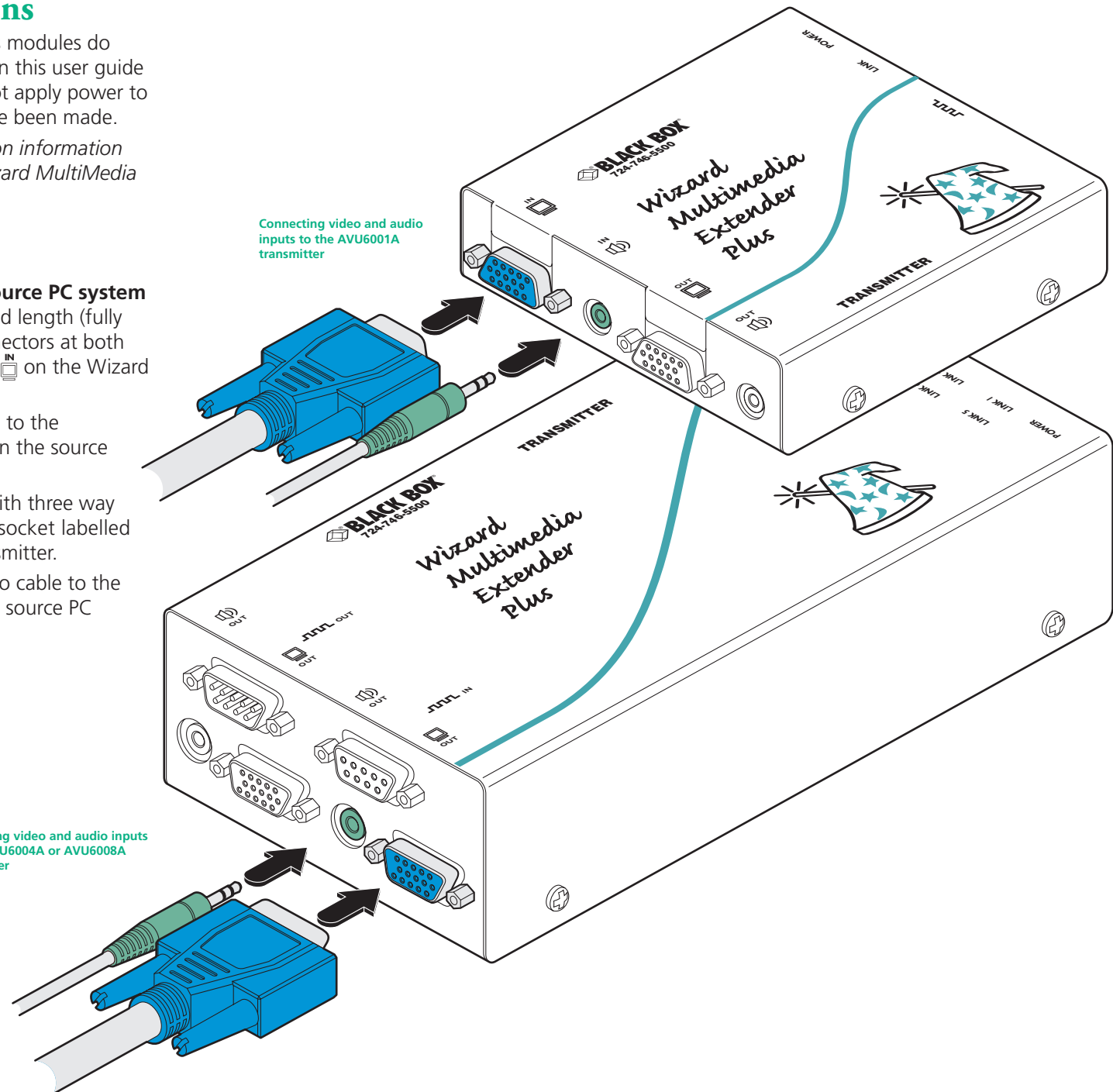
Connections to the Wizard MultiMedia Plus modules do not need to follow the precise order given in this user guide although it is recommended that you do not apply power to the modules until all other connections have been made.

*Note: Unless stated otherwise, all connection information given here applies to all modules in the Wizard MultiMedia Plus family.*

### Connections at the transmitter

#### To connect video and audio from the source PC system

- 1 Attach a video cable of suitable type and length (fully shielded with 15 way male D-type connectors at both ends, 2m or less) to the socket labelled **IN** on the Wizard MultiMedia Plus transmitter.
- 2 Attach the other end of the video cable to the appropriate VGA video output socket on the source PC system.
- 3 Attach a stereo audio cable (shielded with three way 3.5mm jack plugs at both ends) to the socket labelled **IN** on the Wizard MultiMedia Plus transmitter.
- 4 Attach the other end of the stereo audio cable to the appropriate audio output socket on the source PC system.



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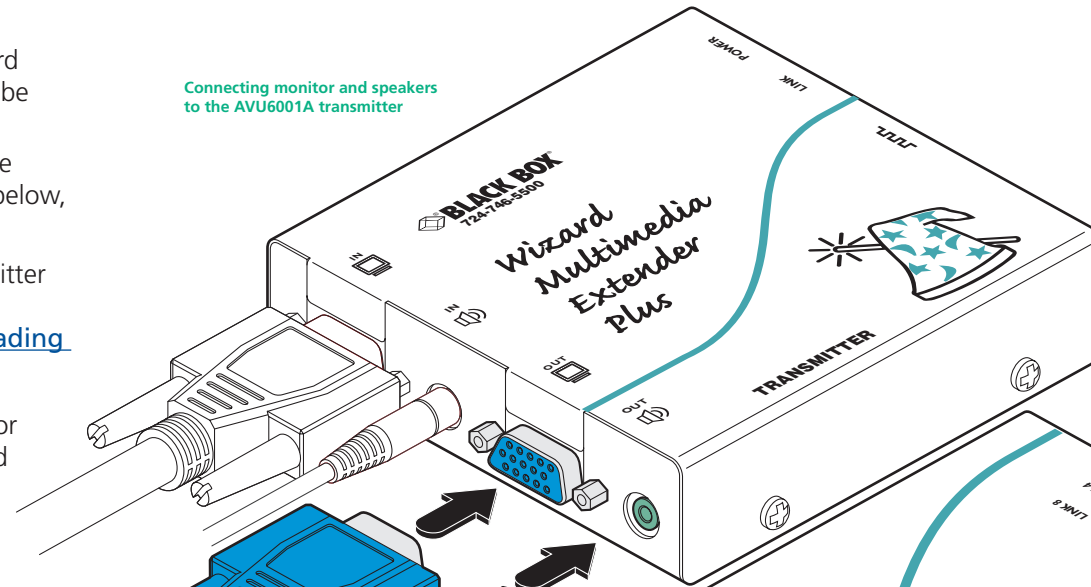
## To connect a monitor and speakers

The video and audio out ports of the Wizard MultiMedia Plus transmitter can optionally be used either to:

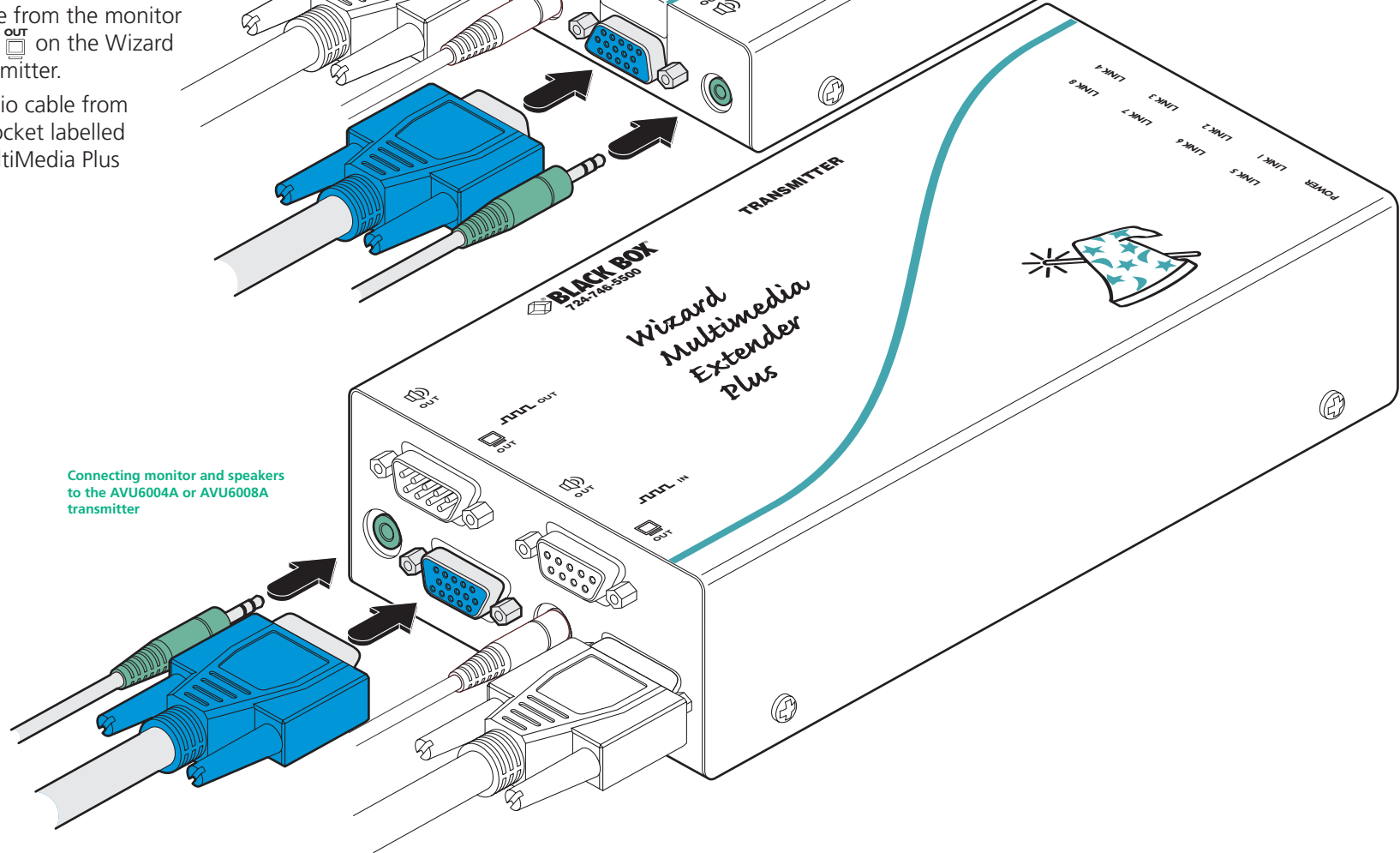
- Attach a monitor and/or speakers in the vicinity of the source PC system – See below, or
- Make a cascade link to another transmitter module – Please refer to the section [Making cascade connections – Cascading transmitters.](#)

- 1 Attach the video cable from the monitor to the socket labelled **OUT** on the Wizard MultiMedia Plus transmitter.
- 2 Attach the stereo audio cable from the speakers to the socket labelled **OUT** on the Wizard MultiMedia Plus transmitter.

Connecting monitor and speakers to the AVU6001A transmitter



Connecting monitor and speakers to the AVU6004A or AVU6008A transmitter





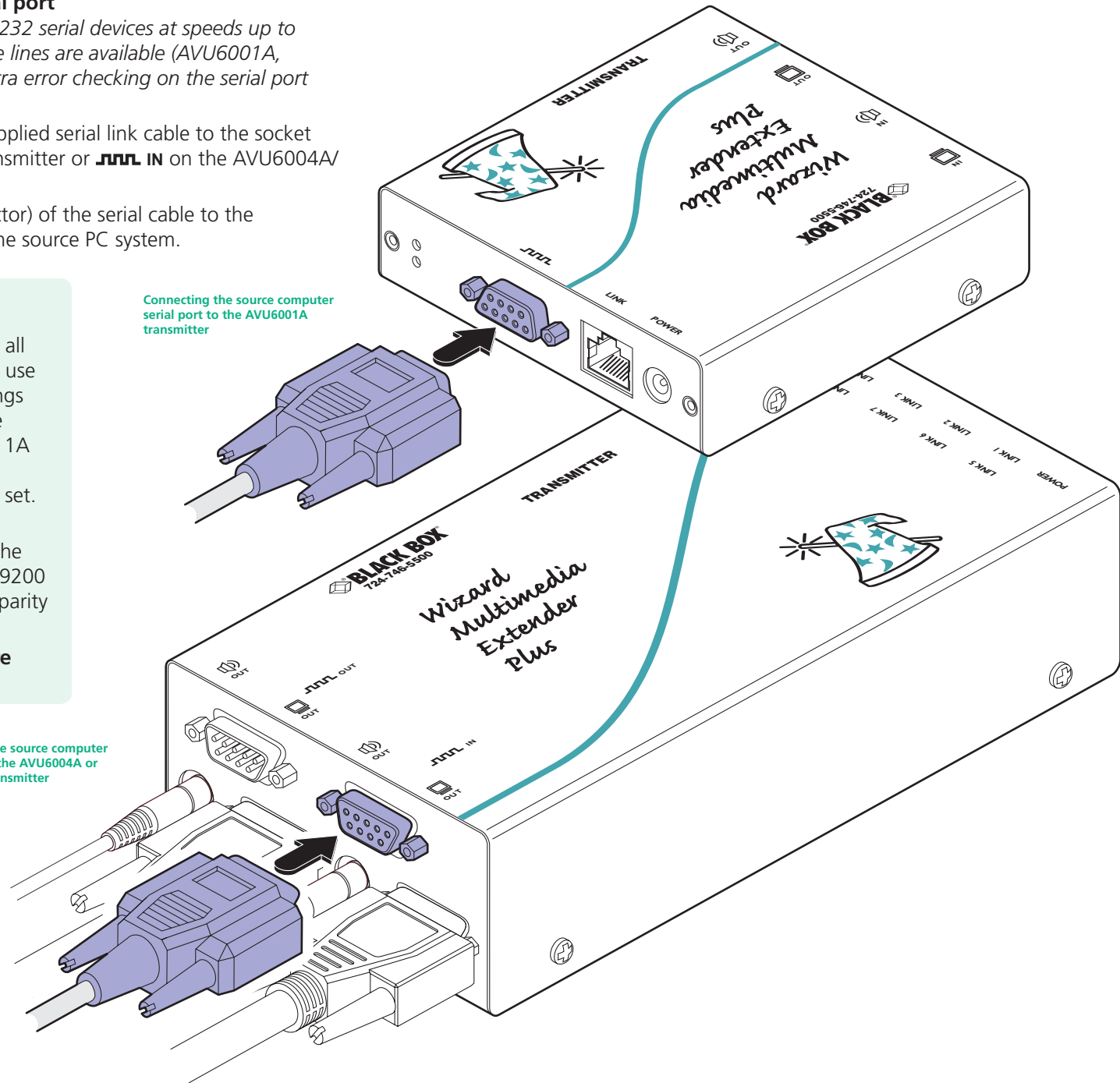
## To connect the source computer serial port

Note: The serial port feature supports RS232 serial devices at speeds up to 19200 baud and all hardware handshake lines are available (AVU6001A, AVU6011A and AVU6111A only). No extra error checking on the serial port signals is applied.

- 1 Attach the male connector of the supplied serial link cable to the socket labelled **TXRX** on the AVU6001A transmitter or **TXRX IN** on the AVU6004A/AVU6008A transmitters.
- 2 Attach the other end (female connector) of the serial cable to the appropriate RS232 serial socket on the source PC system.

### Important

- It is essential that the source PC, all AVU2004A/AVU2008A modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The AVU6001A, AVU6011A and AVU6111A modules all auto-sense the serial configuration and do not need to be set.
- When switches SW2 to SW10 are all OFF, the AV module is set to expect the following serial port configuration: 19200 baud, 8-bit data byte, 1 stop bit, no parity checking, software handshake.
- Remember to set the switches **before** power is applied to the unit.





## To connect the link cable(s)

The links between the transmitter and receiver modules are made using between one and eight twisted pair cables, specified to Category 5 or higher. Each cable carries video, audio and serial communication signals to each receiver module. When a single receiver is attached to a link cable, the maximum length of that link cable is 300m (1000 feet).

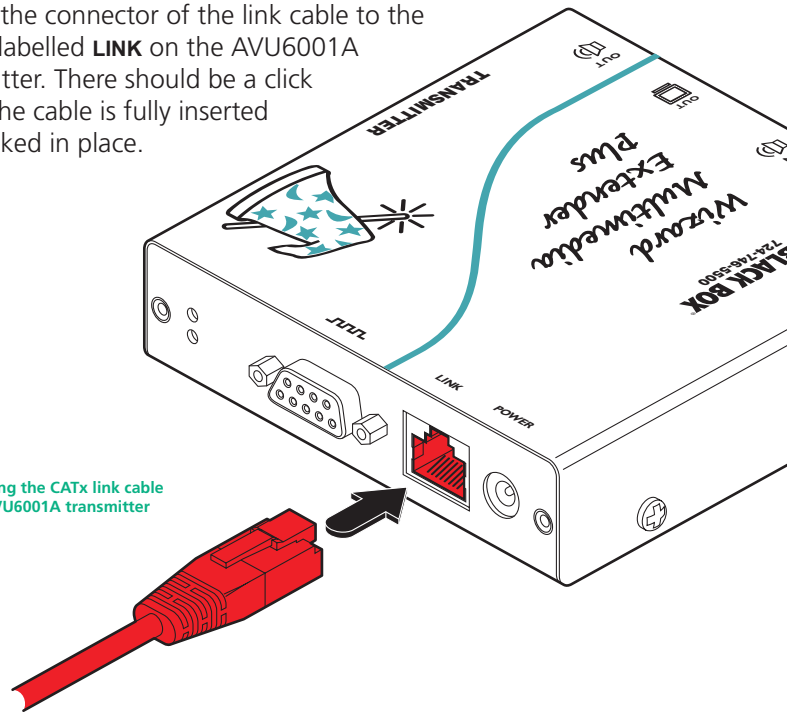


Note: Long cable lengths may induce colour separation effects. AVU6111A receivers contain the necessary circuitry to minimise such effects.

However, if further transmitters are connected in cascade to the initial transmitter, then the overall length of the link cables used must be reduced. For further information, please refer to the section [Making cascade connections](#).

### AVU6001A models

- 1 Attach the connector of the link cable to the socket labelled **LINK** on the AVU6001A transmitter. There should be a click when the cable is fully inserted and locked in place.



### Important

Category 5, 5e or 6 (CATx) cabling is used to form the links between transmitters and receivers. However, the signals used are **not** Ethernet or IP-related and must never be connected via network switches or to any other networking equipment.

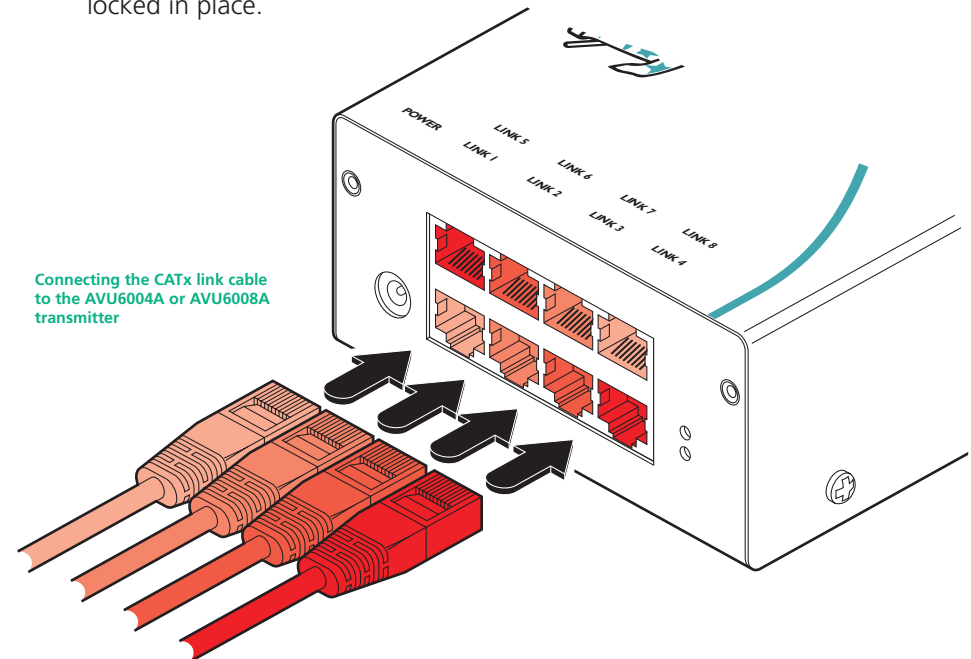
Where possible, avoid laying the CATx twisted pair link cable(s) alongside power cables.

Wizard MultiMedia **Plus** transmitters and receivers must not be connected, via a CATx link, to Wizard MultiMedia AVU5001A, AVU5011A or AVU5004A modules.

### AVU6004A & AVU6008A models

- 1 Attach the connector of the first link cable to the socket labelled **LINK1** on the AVU6004A/AVU6008A transmitter. There should be a click when the cable is fully inserted and locked in place.
- 2 Attach the connectors of the remaining link cables to the sockets labelled **LINK 2 to LINK 4**, (**LINK 2 to LINK 8** on AVU6008A), as required.

In all cases, there should be a click when the cable is fully inserted and locked in place.





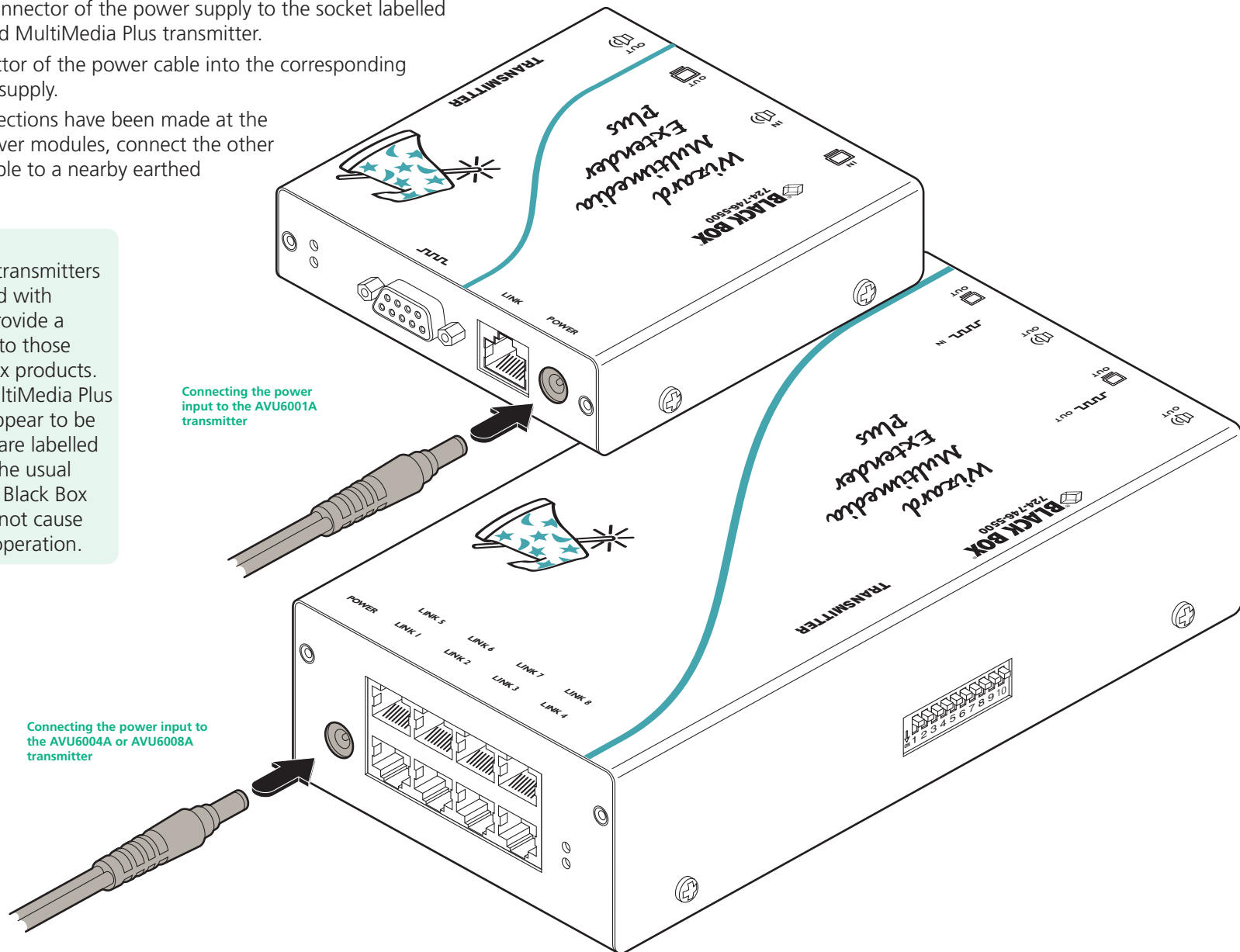
## To connect the power supply

*NOTE: Please read and adhere to the electrical safety information given within the [Safety information](#) section of this guide. In particular, do not use an unearthed power socket or extension cable.*

- 1 Attach the output connector of the power supply to the socket labelled **POWER** on the Wizard MultiMedia Plus transmitter.
- 2 Insert the IEC connector of the power cable into the corresponding socket of the power supply.
- 3 When all other connections have been made at the transmitter and receiver modules, connect the other end of the power cable to a nearby earthed mains socket.

### Important

Wizard MultiMedia Plus transmitters and receivers are supplied with power adapters which provide a slightly different voltage to those used with other Black Box products. Although the Wizard MultiMedia Plus family power adapters appear to be physically identical, they are labelled as **5.3VDC** (rather than the usual 5VDC). Using a standard Black Box 5VDC power supply will not cause damage but may affect operation.

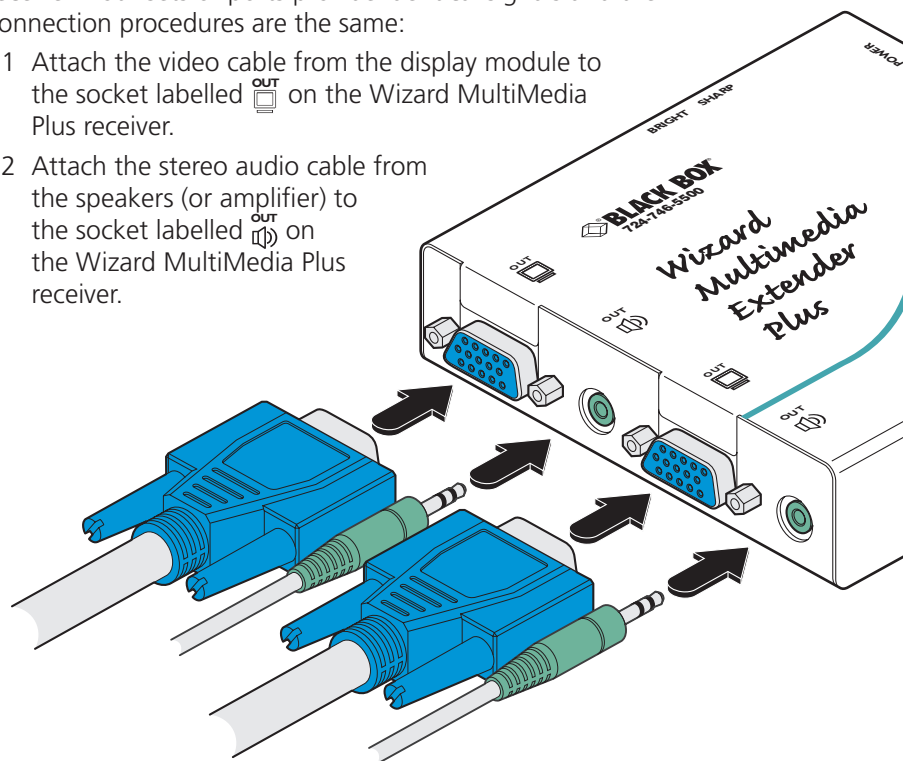


## Connections at the receiver

### To connect displays and speakers

Dual video and audio outputs are provided on the AVU6011A/AVU6111A receiver. Both sets of ports provide identical signals and their connection procedures are the same:

- 1 Attach the video cable from the display module to the socket labelled **OUT** on the Wizard MultiMedia Plus receiver.
- 2 Attach the stereo audio cable from the speakers (or amplifier) to the socket labelled **OUT** on the Wizard MultiMedia Plus receiver.



### Important

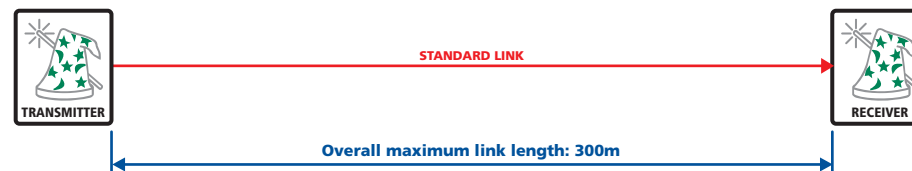
Category 5, 5e or 6 (CATx) cabling is used to form the links between transmitters and receivers. However, the signals used are **not** Ethernet or IP-related and must never be connected via network switches or to any other networking equipment. Where possible, avoid laying the CATx twisted pair link cable(s) alongside power cables.

Wizard MultiMedia Plus transmitters and receivers must not be connected, via a CATx link, to Wizard MultiMedia AVU5001A, AVU5011A or AVU5004A modules.

### Link in

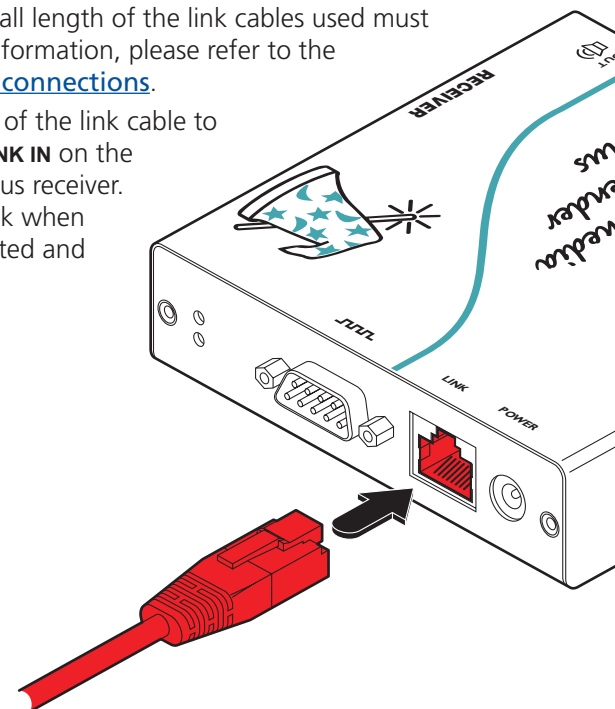
The link from the transmitter to each receiver module is made using a twisted pair cable, specified to Category 5 or higher.

When a single receiver is attached to a link cable, the maximum length of that link cable is 300 metres (1000 feet).



However, if other transmitters are connected in cascade to the initial transmitter, then the overall length of the link cables used must be reduced. For further information, please refer to the section [Making cascade connections](#).

- 1 Attach the connector of the link cable to the socket labelled **LINK IN** on the Wizard MultiMedia Plus receiver. There should be a click when the cable is fully inserted and locked in place.



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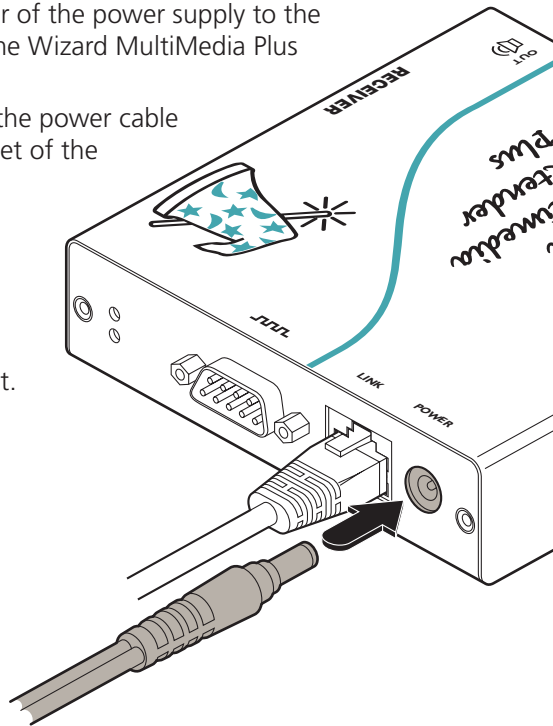
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## To connect the power supply

*NOTE: Please read and adhere to the electrical safety information given within the [Safety information](#) section of this guide. In particular, do not use an unearthed power socket or extension cable.*

- 1 Attach the output connector of the power supply to the socket labelled **POWER** on the Wizard MultiMedia Plus receiver.
- 2 Insert the IEC connector of the power cable into the corresponding socket of the power supply.
- 3 When all other connections have been made at the transmitter and receiver modules, connect the other end of the power cable to a nearby earthed mains socket.



### Important

Wizard MultiMedia Plus transmitters and receivers are supplied with power adapters which provide a slightly different voltage to those used with other Black Box products. Although the Wizard MultiMedia Plus family power adapters appear to be physically identical, they are labelled as **5.3VDC** (rather than the usual 5VDC). Using a standard Black Box 5VDC power supply will not cause damage but may affect operation.

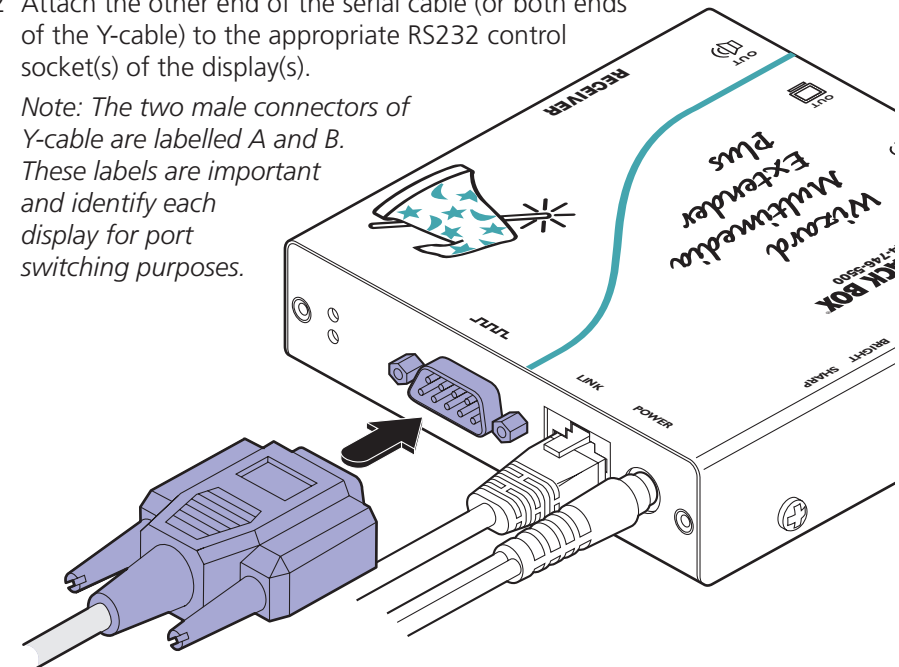
## To connect the serial port

The AVU6011A/AVU6111A receivers provide a single RS232 serial socket for use with display control circuitry, etc. Where two connected displays both require serial control, a special [Y-cable](#) is available.

*Note: The Y-cable is supported only when the AVU6011A/AVU6111A receiver is linked to an AVU6004A or AVU6008A transmitter. If the receiver is linked to an AVU6001A transmitter, only a single display may be connected to the serial connector of the AVU6011A/AVU6111A receiver.*

- 1 Attach the female connector of the Y-cable or serial device link cable to the socket labelled **LINK** on the AVU6011A/AVU6111A receiver.
- 2 Attach the other end of the serial cable (or both ends of the Y-cable) to the appropriate RS232 control socket(s) of the display(s).

*Note: The two male connectors of Y-cable are labelled A and B. These labels are important and identify each display for port switching purposes.*



### Important

- It is essential that the source PC, all AVU6004A/AVU6008A modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The AVU6001A, AVU6011A and AVU6111A modules all auto-sense the serial configuration and do not have switches.
- When switches SW2 to SW10 are all OFF, the module is set to expect the following serial port configuration: 19200 baud, 8-bit data byte, 1 stop bit, no parity checking, software handshake.





## Making cascade connections

The Wizard MultiMedia Plus series of products have been specifically designed to be flexible in order to support both your immediate and future needs for media streaming. In addition to the standard connections made from transmitters to receivers, you can also link extra transmitters to transmitters in order to provide more display/speaker outputs. These non-standard links are called *cascade connections*.

### Important limitations when cascading

- There should never be more than three cascade connections between the *primary transmitter* (the one connected to the source PC) and any receiver. Cascade connections are possible only at the transmitter end of the link cable(s).
- It is essential that the source PC, all AVU6004A/AVU6008A modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The AVU6001A, AVU6011A and AVU6111A modules all auto-sense the serial configuration and do not need to be set.
- Each cascade connection reduces the overall link length permissible from a transmitter to the final receiver in a branch. To calculate the recommended overall maximum link length for a branch, count the number of cascade connections between the primary transmitter and the final receiver in that branch. The effects of cascade connections on overall branch link lengths are as follows:

Number of cascade connections (in a branch)	Overall length of links for a branch (from transmitter to furthest receiver)
0	300m (1000 feet)
1	250m (800 feet)
2	200m (650 feet)
3	175m (600 feet)

#### Notes

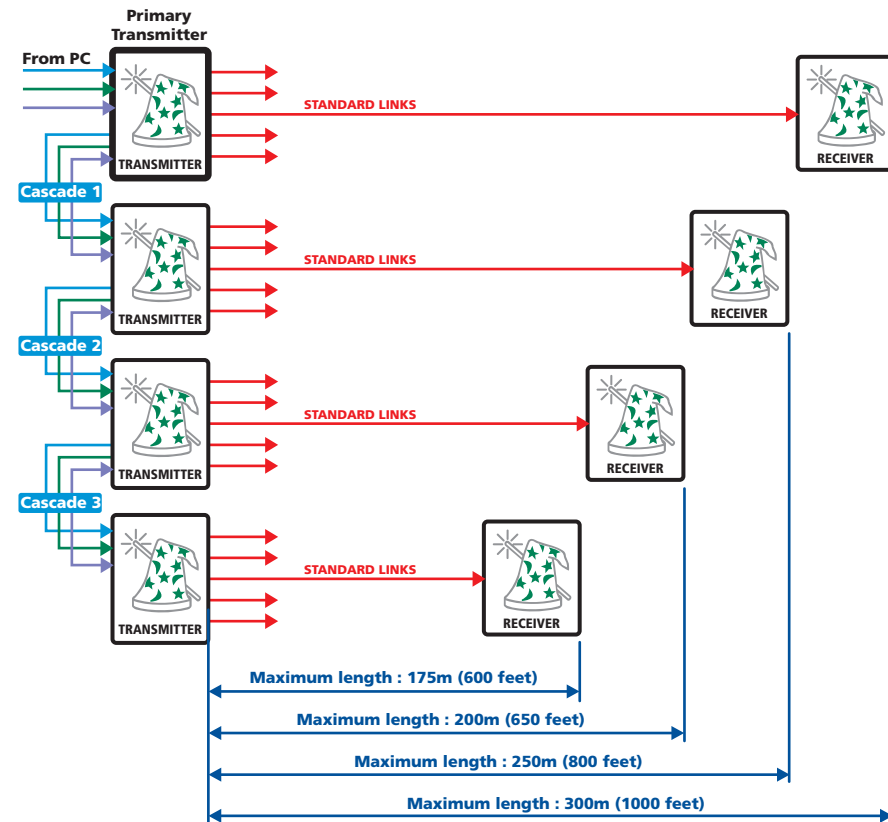
The lengths of transmitter cascade (video) connections should never be longer than 2m (6 feet) and can be considered to have a negligible effect upon overall link lengths.

The maximum resolutions achievable are: 1600 x 1200 x 60Hz at 200m and 1280 x 1024 x 60Hz at 300m. If you are using lower resolutions then it may be possible to achieve longer transmission distances than shown in the above table although we do not recommend runs longer than 300m in any installation. If you are running shorter cables then it may be possible to use more cascades than shown in the above table.

Long cable lengths may induce colour separation effects. AVU6111A receivers contain the necessary circuitry to minimise such effects.

### Cascade connection example

This example demonstrates the effect of cascade connections upon overall link lengths:



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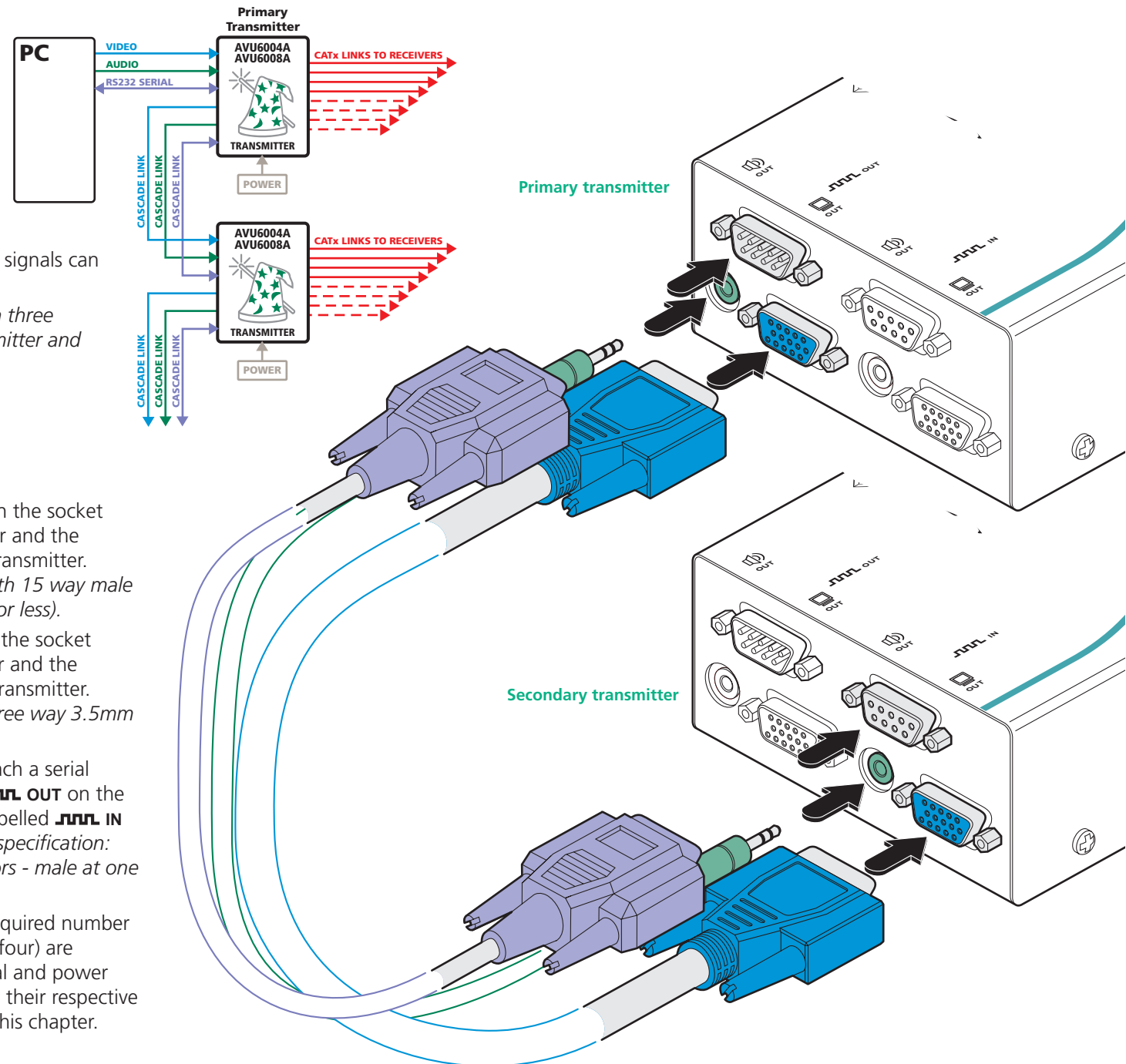
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## Cascading transmitters

Expansion is achieved by linking the video, audio and serial ports of transmitters. The output ports of one transmitter are connected to the inputs of the next transmitter and so on.

The RS232 serial ports of AVU6004A and AVU6008A transmitters can be cascaded. However, it is not possible to cascade the serial port of the AVU6001A, although its video and audio signals can be cascaded to lower level modules.

*Note: Ensure that there are no more than three cascade links between the primary transmitter and the furthest receiver.*



### To connect cascaded transmitters

- 1 Attach a suitable video cable between the socket labelled **OUT** on the primary transmitter and the socket labelled **IN** on the secondary transmitter. (Cable specification: Fully shielded with 15 way male D-type connectors at both ends, 2m or less).
- 2 Attach a stereo audio cable between the socket labelled **OUT** on the primary transmitter and the socket labelled **IN** on the secondary transmitter. (Cable specification: Shielded with three way 3.5mm jack plugs at both ends).
- 3 If serial connections are required, attach a serial cable between the socket labelled **OUT** on the primary transmitter and the socket labelled **IN** on the secondary transmitter. (Cable specification: Shielded with 9 way D-type connectors - male at one end, female at the other).
- 4 Repeat such cascade links until the required number of transmitters (up to a maximum of four) are present. Connect the remaining signal and power cables to the added transmitters (and their respective receivers) as discussed earlier within this chapter.



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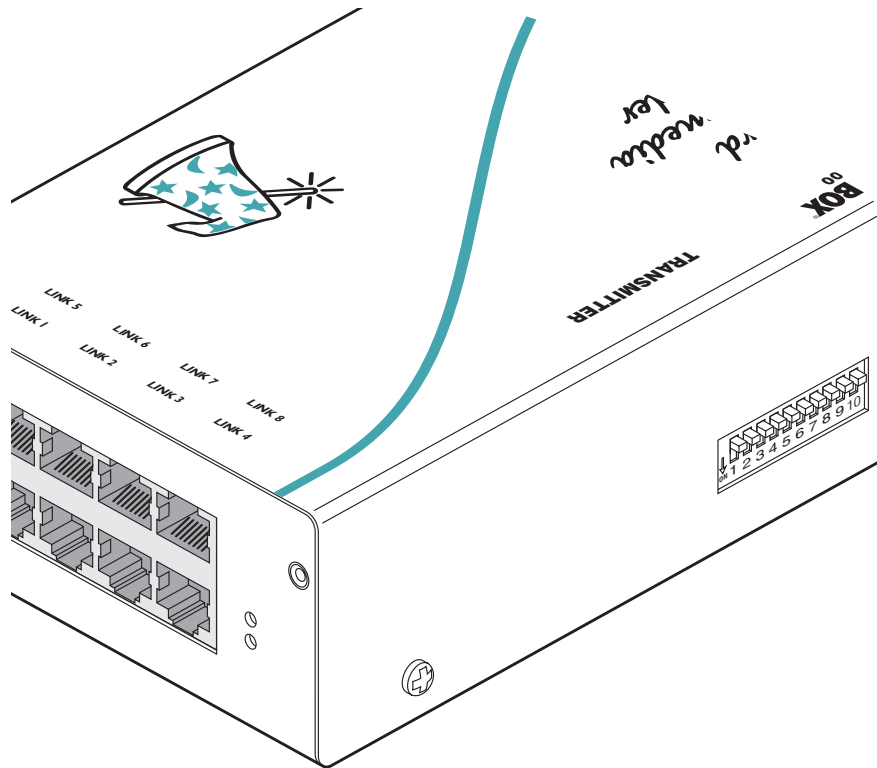
FURTHER INFORMATION

## Switch settings - AVU6004A/AVU6008A only

The AVU6004A and AVU6008A transmitter modules are both equipped with 10-way mini switches to allow quick configuration of various items. For normal operation in the majority of cases, all switches should be OFF.

Switch 1 is used when upgrading the internal firmware and switches 2 to 10 are all related to various aspects of serial communications.

Note: All switch settings must be selected before power is applied.



### Important

- It is essential that the source PC, all AVU6004A/AVU6008A modules and all connected displays are configured to use the same serial communication settings. The AVU6001A, AVU6011A and AVU6111A modules all auto-sense the serial configuration and do not need to be set.
- When switches SW2 to SW10 are all OFF, the module is set to expect the following serial port configuration: 19200 baud, 8-bit data byte, 1 stop bit, no parity checking, software handshake.

### Operation mode (SW1 - select before powering on)

SW1	OFF	Normal operation
SW1	ON	Upgrade mode

### Serial communications data byte length (SW2)

SW2	OFF	8-bits per character
SW2	ON	7-bits per character

### Serial communications stop bits (SW3)

SW3	OFF	1 stop bit
SW3	ON	2 stop bits

### Serial communications parity checking (SW4 & SW5)

	None	Odd	Even
SW4	OFF	ON	ON
SW5	OFF	OFF	ON

### Serial communications baud rate (SW6, SW7 & SW8)

	19200	9600	2400	1200
SW6	OFF	ON	OFF	ON
SW7	OFF	OFF	ON	ON
SW8	OFF	OFF	OFF	OFF

### Serial communications hardware handshaking (SW9)

SW9	OFF	Software handshaking only
SW9	ON	Hardware handshaking enabled (RTS/CTS)

### Compatibility mode (SW10 - select before powering on)

SW10	OFF	AV200 mode (RS232 enabled)
SW10	ON	AV100 mode (RS232 disabled)



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# Operation

In operation, the Wizard MultiMedia Plus modules are designed to be as transparent - high quality video and audio signals from the source PC system are distributed to the various display units and control signals are similarly routed back to the system.

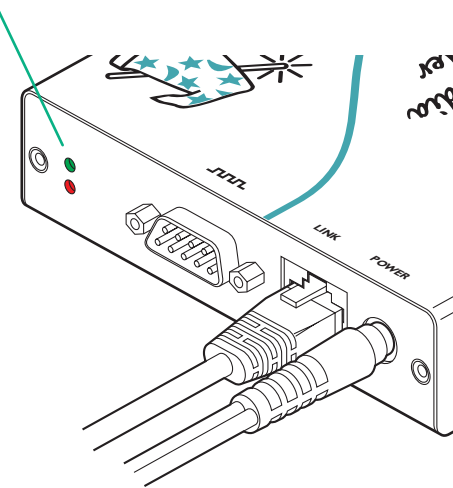
## Indicators

All Wizard MultiMedia Plus modules are equipped with two indicators to confirm operation and, if necessary, assist with quick troubleshooting of potential problems.

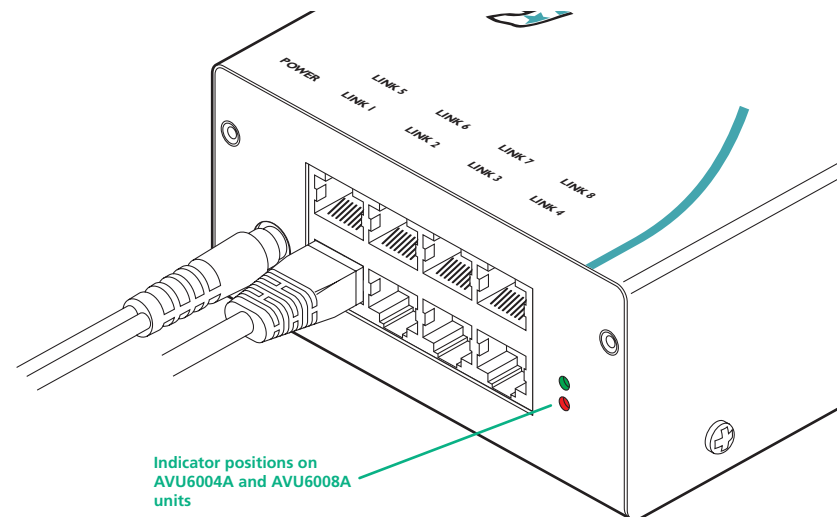
The indicators are located on one of the end panels, near to the **LINK** port and operate as follows:

- **GREEN** When lit, indicates the presence of a video input into the module.
- **RED** Indicates the following states:
  - **Slow flash (once every second)** AVU6004A and AVU6008A only - module is in upgrade mode
  - **Continually lit** - module is operating normally with its serial ports enabled.

Indicator positions on AVU6001A, AVU6011A and AVU6111A units



Indicator positions on AVU6004A and AVU6008A units



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# Serial port switching

The AVU6004A and AVU6008A modules use a sophisticated switching system to extend the ordinarily point-to-point nature of serial communications across a network of connected display units. The Wizard MultiMedia Plus system allows you to communicate with any display individually or to broadcast commands across the network as a whole. When switching to a single display, it is then possible to receive responses back from that display. When 'broadcasting' to all, it is only possible to send commands in a uni-directional manner (such as 'on' and 'off').

A simple system of ASCII commands is used to effect the switching. You can issue such commands directly via an ASCII console or use a utility to provide an intuitive graphical interface. Once a switching command is issued, the network will remain fixed at that setting until a new command is sent, therefore there is no need to precede every RS232 command with a header sequence.

## Port switching commands

The ASCII port switching command structure is as follows:

**Cascade**  
[1 to 4]

**Port**  
[1 to 8]

**Display**  
[A, B or X]

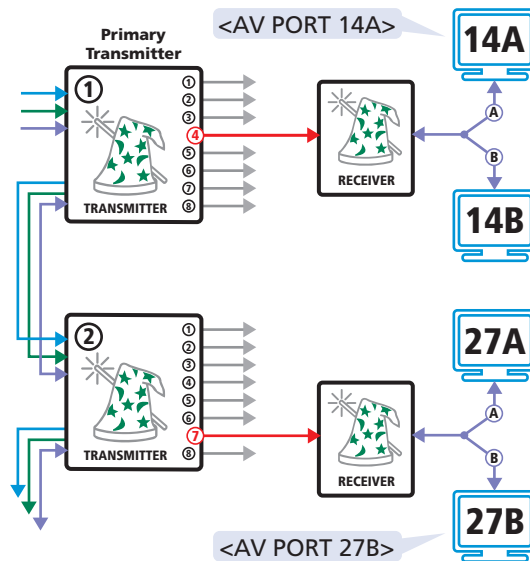
*Note: The command must use capital letters and there must be a space between 'AV' and 'PORT', and also between 'PORT' and the cascade number.*

## <AV PORT CPD>

The primary transmitter is automatically numbered as *Cascade 1*, with successive cascaded transmitters taking numbers 2 to 4. The *Port* number is determined by the link cable port on the transmitter to which a given receiver is connected. The *Display* character is determined by which of the **Y-cable** connectors is used (X opens a one-way link to both displays). If no Y-cable is used, a single display will be A.

To connect with all displays, issue the following command:

## <AV PORT ALL>



## Module switching commands

In addition to affecting individual ports, it is also possible to collectively enable and disable all of the CATx outputs from a particular transmitter (at power on, all CATx outputs are enabled by default). Disabling the outputs of one transmitter will not affect the operation of other transmitters that are cascaded through the disabled module.

To disable all CATx outputs on a transmitter:

**<AV DISABLE n>** where *n* is the transmitter number (1, 2, 3 or 4)

To enable all CATx outputs on a transmitter:

**<AV ENABLE n>** where *n* is the transmitter number (1, 2, 3 or 4)



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# Adjustments

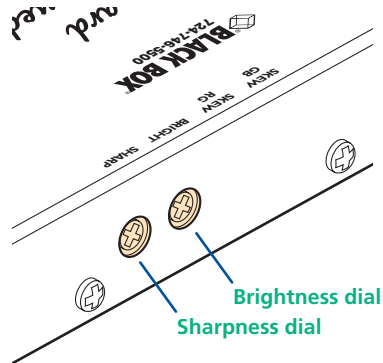
The AVU6011A and AVU6111A receivers both include brightness and sharpness adjustment dials. Additionally, the AVU6111A receiver is also equipped with two extra dials to eliminate the effects of colour skew within the video image.

## Brightness and sharpness adjustments

The brightness and sharpness adjustments provided on every receiver allow you to compensate for any losses incurred within long cable links.

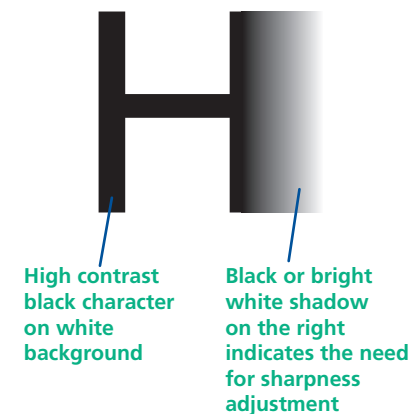
When making adjustments it is necessary to have access to the receiver and to be able to view one or both connected display screens. Both adjustments, sharpness in particular, are made easier when viewing high contrast images with vertical edges, such as black lines on a white background.

*NOTE: Both video outputs are equally affected by your brightness and/or sharpness adjustments.*



### To display a suitable high contrast image

- Open a word processor, type the capital letter 'H', or 'M' and increase the point size to 72 or higher. For best results, the background should be white and the character should be black.
- A BLACK shadow on the right of the character indicates UNDER compensation.
- A WHITE shadow on the right of the character indicates OVER compensation.



### To adjust brightness and/or sharpness

- 1 Carefully insert a small screwdriver into the dial labelled **BRIGHT** or **SHARP**, as appropriate.
- 2 Slowly turn the dial clockwise or anticlockwise and observe the effect shown on the screen. Withdraw the screwdriver when the displayed image is shown at its optimum clarity.
- 3 If necessary, repeat step 2 for the other dial.

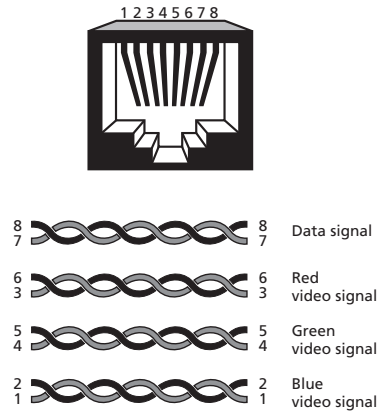
*Note: If the sharpness control is set too high, the monitor may not be able to display a picture. If this occurs, reduce the sharpness setting.*



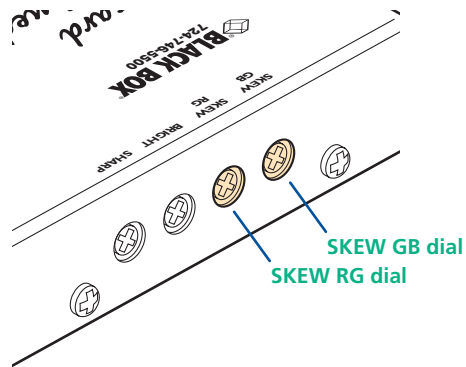
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## Skew compensation adjustments (AVU6111A only)

The twisted pair cabling used to link the modules consists of four pairs of wires per cable. Three of these pairs are used to convey the red, green and blue video signals. Due to slight differences in twist rate between the wire pairs, the red, green and blue video signals may not arrive at precisely the same time. This effect is visible as separate colour shadows on high contrast images and is particularly apparent when using higher screen resolutions over long distances and also when using certain types of category 5e cables.



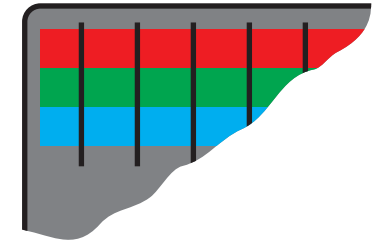
Skew compensation adjustments are made using two rotary dials, the first affects the relationship between the green and blue colour signals (**SKEW GB**) while the second (**SKEW RG**) operates similarly on the red and green signals. Each dial delays one of its stated colours in relation to the other. By using both dials it is possible to correctly align all three colours. The effects of skew are easiest to view and adjust when distinct red, green and blue elements, in close proximity, are present within the screen image. An appropriate test pattern is supplied on the CD-ROM or alternatively you can create your own test pattern as discussed opposite.



*NOTE: Both video outputs are equally affected by your skew adjustments.*

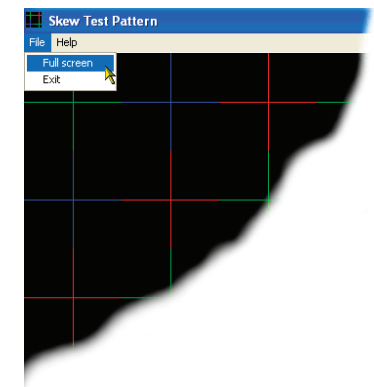
### To create a skew test pattern

- 1 Run any image creation/editing application, such as the Paint program supplied with Windows.
- 2 Using the image application create three stacked horizontal rectangles (one red, one green and one blue) that fill the width of the screen.
- 3 Draw a vertical black line down across the coloured bars and then repeat this vertical line at intervals along the width of the coloured bars. These lines create breaks across the colours and give you more opportunities to view the horizontal position of each colour relative to the others.



### To display the supplied skew test pattern

- 1 Insert the supplied CD-ROM into the CD player of the computer.
- 2 Within Windows, use the My Computer option (usually available as a desktop icon or within the Start menu) to view the contents of the CD-ROM. Double-click the *SkewTest* entry to display the standard test pattern. If necessary, select the *Full screen* option from the *File* menu to maximise the application window so that the image fills the screen.



The screen will show a series of fine red, green and blue crosses which should all be in line, vertically and horizontally- skew affects the horizontal placement of the colours.



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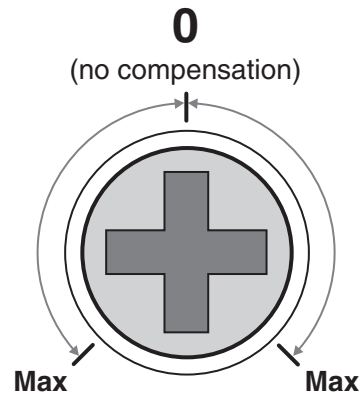
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## To zero the skew adjustment dials

When supplied, the two skew dials are set in their neutral positions. i.e. no delay to either of its colours. However, if the module has been previously used and adjusted then you may need to relocate the zero point. There are no setting markers around the two skew dials and the dial itself does not have a pointer.

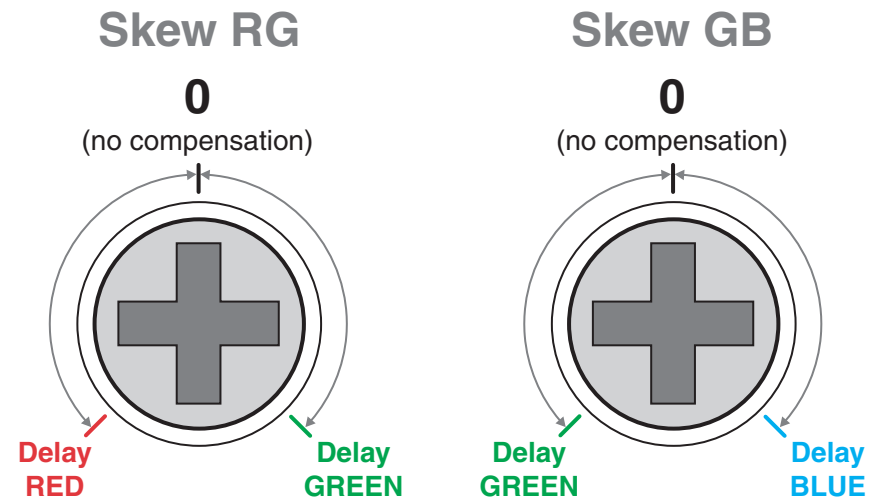
- 1 Insert a small screwdriver into the skew dial and twist it all the way anticlockwise. Note the position of the dial when it reaches its end point.
- 2 Rotate the screwdriver fully clockwise and again note the endpoint position of the dial.
- 3 Now rotate the screw driver anticlockwise until the dial reaches the position that lies midway between the two end points. This is the neutral position.
- 4 Repeat this procedure for the other skew dial, if necessary.



## To adjust the skew compensation

Your chances of achieving a successful skew compensation adjustment will be improved if you do the following:

- Ensure that you have a clear view of one or both display screens,
- Display a suitable RGB test pattern, either the [supplied pattern](#) or a [self-created version](#),
- Use a screwdriver of an appropriate size to adjust the dials,
- Begin with both skew dials in their neutral positions - if the module has been previously used and skew adjusted for an alternative installation, zero the dials as described in the section 'To zero the skew adjustment dials' left.



- 1 Turn the **SKEW RG** dial clockwise or anticlockwise until you observe that the red and green colours are aligned.
- 2 Turn the **SKEW GB** dial clockwise or anticlockwise until you observe that the green and blue colours are aligned.
- 3 Your actions in *step 2* may alter the Red/Green alignment. If so, go back to the **SKEW RG** dial and turn it clockwise or anticlockwise until you observe that the Red and Green colours are aligned, at which point all of the colours will be aligned.





## Upgrading

The internal software (firmware) of the AVU6004A and AVU6008A transmitters can be upgraded in order to take advantage of a continual process of improvement and innovation. The supplied serial cable is required to connect the AVU6004A/AVU6008A module to the serial port of a suitable system.

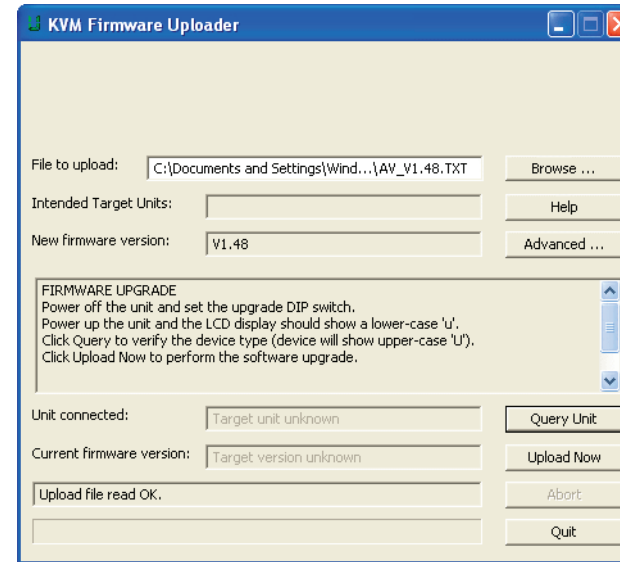
*Note: It is not possible to alter the firmware within the AVU6001A transmitter or the AVU6011A/AVU6111A receivers. The operation of these modules are not dependent on the revision of the AVU6004A/AVU6008A transmitters.*

You can discover the current version of your module using the upgrade application.

### To upgrade AVU6004A and AVU6008A transmitters

- 1 Download the latest AVU6004A/AVU6008A firmware upgrade file from Black Box (contact technical support for details). The upgrade files are compressed using pkzip format which you will need to decompress them. If you do not have pkzip, go to [www.pkware.com](http://www.pkware.com) to download the latest version. Place the decompressed upgrade files onto the Windows system that will be connected (via a vacant serial port) to the module.
- 2 Remove power from the module.
- 3 Connect the supplied serial cable between the port labelled **UART IN** on the module and a vacant serial port on the system containing the upgrade files.
- 4 On the side of the module, click mini switch 1 to its ON position.
- 5 Re-apply power to the module and switch on the system to be used for the upgrade.
- 6 Locate and run the application 'KVMUploader' to display this window:
- 7 Click the *Browse...* button and locate the TXT file that accompanied the upgrade utility. Highlight the TXT file and click the *Open* button.
- 8 Click the *Advanced...* button and in the subsequent dialog, ensure that the *Serial Port* entry matches the port to which the upgrade cable is attached. Also select the *Program and verify* option. Click the *OK* button.

- 9 Click the *Query Unit* button to check the name and version of the current firmware - the application will interrogate the module via the serial cable. Once the version information is displayed, check that the *Intended Target Units* field matches the *Unit Connected* field and the *New Firmware Version* field exceeds that of the *Current Firmware Version*.



- 10 Click the *Upload Now* button to begin transferring the upgrade data from the system to the module. The progress of the upload is shown in the status bar (indicating the advancement of the current task) and the progress bar (indicating the progress of the upload as a whole).  
During the upload, all buttons become disabled except for the *Abort* button. The upload can take as long as fifteen minutes. Should you need to abandon the upload at any stage, click the *Abort* button.  
Following the upload, a verification will be carried out and the results displayed within the upgrade application window.
- 11 When complete, switch off the module, disconnect the serial cable, return mini switch 1 to its OFF position and resume operation of the module in the usual manner.




# Further information



## Troubleshooting

If you experience problems when installing or using the Wizard MultiMedia Plus modules, please check through this section for a possible solution. If your problem is not listed here and you cannot resolve the issue, then please refer to the 'Getting assistance' section.

### No video image is received at the receiver module.

- Check that the both the red power indicators are lit on both the transmitter and receiver modules - if they are not, then there is a power problem. Both modules require power from their supplied power adapters.
- Check that the green video input indicators are lit on both the transmitter and receiver modules - if one or both are not lit, then a valid video input signal is not present at the input to that module.
- Check the link cable(s) that connect the transmitter and receiver module(s) for soundness and correct wiring as per the diagram in the 'Skew compensation adjustments' section in the 'Operation' chapter.
- If possible, try using an alternative twisted pair link connection between the modules.
- If the sharpness control is set too high, the monitor may not be able to display a picture. Try reducing the sharpness setting. Please refer to the 'Adjustments' section in the 'Special Configuration' chapter.
- If not already fitted, connect a monitor to the  port of the transmitter module and check for a correct video image output.

### Video image at the receiver module is distorted or shadows appear to the right of displayed objects.

Adjustments are required to compensate for the length of the twisted pair cable being used. If video problems persist:

- Please refer to the 'Brightness and sharpness adjustments' section in the 'Operation' chapter.
- If the overall video image is 'fuzzy' and/or has coloured shadows you may need to make skew adjustments (AV6111A receivers only). This procedure allows you to finely tune the red, green and blue video signal timings to overcome most colour separation problems. Please refer to the 'Skew compensation adjustment' section in the 'Operation' chapter.


### Serial communications are not functioning

- Check that SW10 on the AVU6004A/AVU6008A is set to OFF.

### Power is applied via the power supply but the module operation has stopped.

- Each module has an internal automatic cut-out fuse to protect against power surges. To reset, remove power from the module for one second and then reconnect.

### No sound can be heard on the speakers connected to the receiver module

- If not already fitted, connect speakers to the  port of the transmitter module and check for a correct audio output.
- Check that the both the red power indicators are lit on both the transmitter and receiver modules - if they are not, then there is a power problem. Both modules require power from their supplied power adapters.

## Getting assistance

If you are still experiencing problems after checking the list of solutions in the Troubleshooting section then we provide a number of other solutions:

- Email in the US: [techsupport@blackbox.com](mailto:techsupport@blackbox.com)  
in the UK: [techhelp@blackbox.co.uk](mailto:techhelp@blackbox.co.uk)
- Phone in the US: **724-746-5500**  
in the UK: **+44 (0)118 965 6000**

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## Safety information

- For use in dry, oil free indoor environments only.
- Do not use to link between buildings.
- Not suitable for use in hazardous or explosive environments or next to highly flammable materials.
- Ensure that all twisted pair interconnect cables are 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.
- Where possible, avoid laying the twisted pair link cable(s) alongside power cables.
- Warning – the power adapter contains live parts.
- No user serviceable parts are contained within the power adapter - do not dismantle.
- The primary means to cease operation of the modules is to remove the power adapter lead. Ensure that the power adapter is positioned near to the equipment and is easily accessible.
- 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.
- Replace the power adapter with a manufacturer approved type only.
- If you use a power extension cable with the modules, make sure the total ampere rating of the devices plugged into the extension cable do not exceed the cable'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 modules yourself.
- The modules and power supplies can get warm in operation – do not situate them in an enclosed space without any ventilation.
- The modules do not provide ground isolation and should not be used for any applications that require ground isolation or galvanic isolation.
- Use only with grounded outlets at both the computer and monitor. When using a backup power supply (UPS), power the computer, the monitor and the module from the same supply.
- For correct operation, the transmitter and receiver modules must have ground connections. At the computer end, this is achieved by ensuring that the computer that the module is connected to has a ground connection. At the audio/visual device end, this can be achieved by ensuring that the power supply is connected to a grounded power outlet. Alternatively, a ground connection will be made via the monitor, if the monitor is itself grounded.

## Certification notice for equipment used in Canada

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements.

The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company.

The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility—in this case, your supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.



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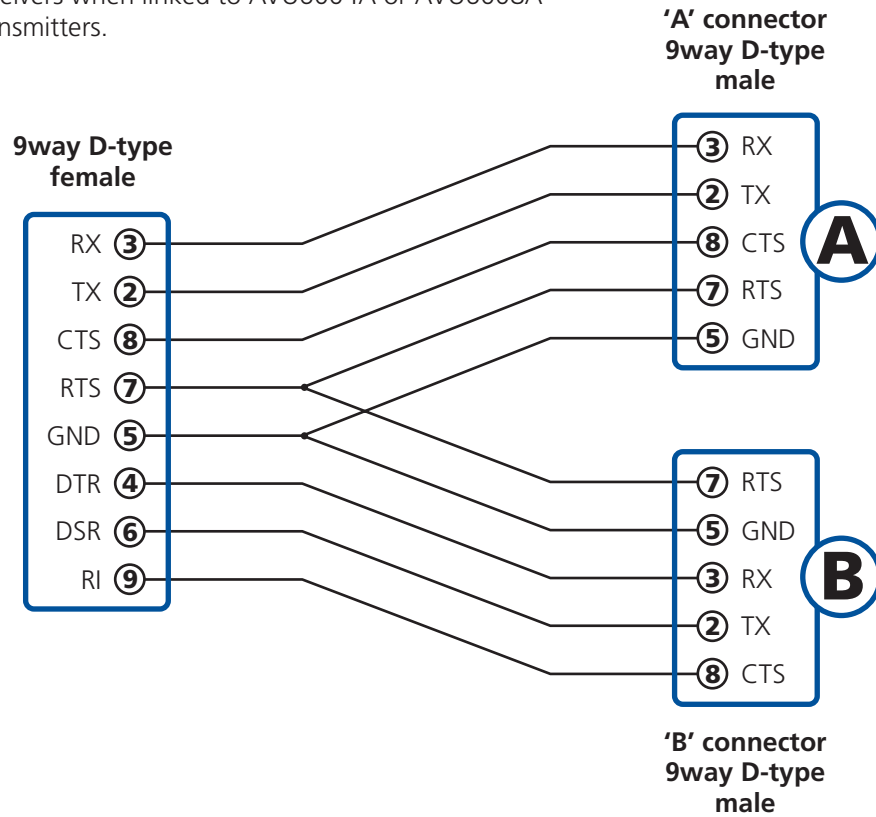
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# Cables

## Y-cable pinout

Used to split serial communications between two displays. For use only on AVU6011A or AVU6111A receivers when linked to AVU6004A or AVU6008A transmitters.



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## Emissions and Immunity

A Category 5 (or better) twisted pair cable must be used to connect the modules in order to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All other interface cables used with this equipment must be shielded in order to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

## European EMC directive 89/336/EEC

This equipment has been tested and found to comply with the limits for a class A computing device in accordance with the specifications in the European standard EN55022. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and



can radiate radio frequency energy and if not installed and used in accordance with the instructions may cause harmful interference to radio or television reception. However, there is no guarantee that harmful interference will not occur in a particular installation. If this equipment does cause

interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to correct the interference with one or more of the following measures: (a) Reorient or relocate the receiving antenna. (b) Increase the separation between the equipment and the receiver. (c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected. (d) Consult the supplier or an experienced radio/TV technician for help.

## FCC Compliance Statement (United States)

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 J 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 may 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 manufacturer could void the user's authority to operate the equipment.

## Canadian Department of Communications RFI statement

This equipment does not exceed the class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

*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 radioélectriques publié par le ministère des Communications du Canada.*



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# Normas Oficiales Mexicanas (NOM) electrical safety statement



## Instrucciones de seguridad

- 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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Documentation by:



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## BlackBox subsidiary contact details



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