



Avocent®

Emerge® EMS2000 series

Installer/User Guide





INSTRUCTIONS

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



Emerge[®] EMS2000 series

Installer/User Guide

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European approvals

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.

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Product Overview

Features and Benefits

The Avocent Emerge® EMS2000 series 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 Emerge® EMS2000 series support a wide range of configurations: from individual point-to-point installations to multiple screen distributions, all via CATx cabling at distances up to 1000 feet.

All Emerge® EMS2000 series 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 the EMS2400T transmitter. The inclusive Display Manager utility provides the final piece of the puzzle and allows remote, flexible control of all devices attached to the Emerge® EMS installation.

Configuration Possibilities

Within the Emerge EMS2000 series there are two transmitter types and two receiver types available, the choice of which unit you use depends upon how many display/speaker locations are required and how they are arranged.

Point-to-point operation

The Emerge EMS2100T transmitter used in conjunction with a EMS2100R receiver provides 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 (EMS2100R receivers can provide a serial link to each display when used with the optional [Y-cable](#). This is only available when linked to an EMS2400T transmitter).

Expansion is made possible by connecting further transmitters to the original EMS2100T 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 EMS2400T transmitter.

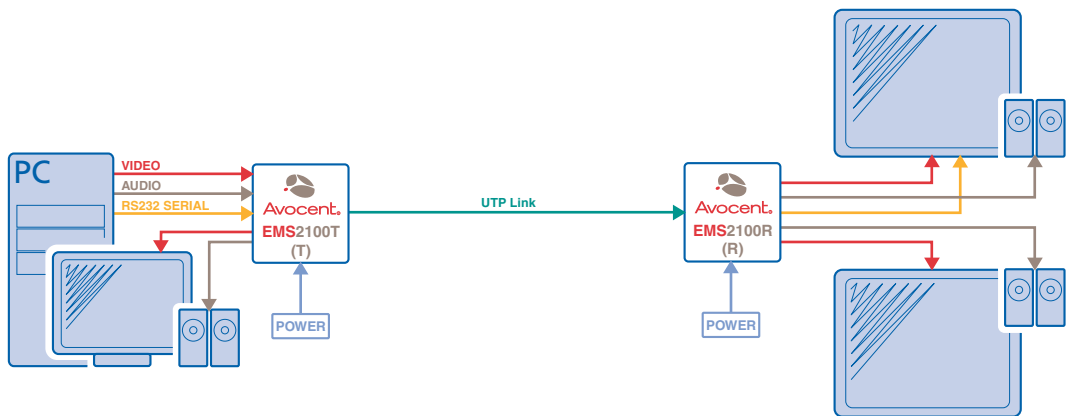


Figure 1.1: A standard Emerge EMS2100T configuration driving two display/speakers sets

Emerge EMS2110R

An EMS2110R receiver is also available which provides all of the functionality of the EMS2100R with the addition of special skew adjustments to correct cable-induced video timing errors on long CATx connections.

Emerge EMS2400T transmitter

The EMS2400T transmitter provides four CATx outputs to directly drive EMS2100R/EMS2110R receiver modules located at distances up to 1000 feet.

Note: An optional serial [Y-cable](#) is available, which allows a connected receiver to provide a serial link to each display.

Additional expansion is also possible by connecting further transmitter modules to the original module in a cascade arrangement, each supporting their own multiple EMS2100R/EMS2110R receiver modules - See the [Expansion via Cascade Links](#) section for details.

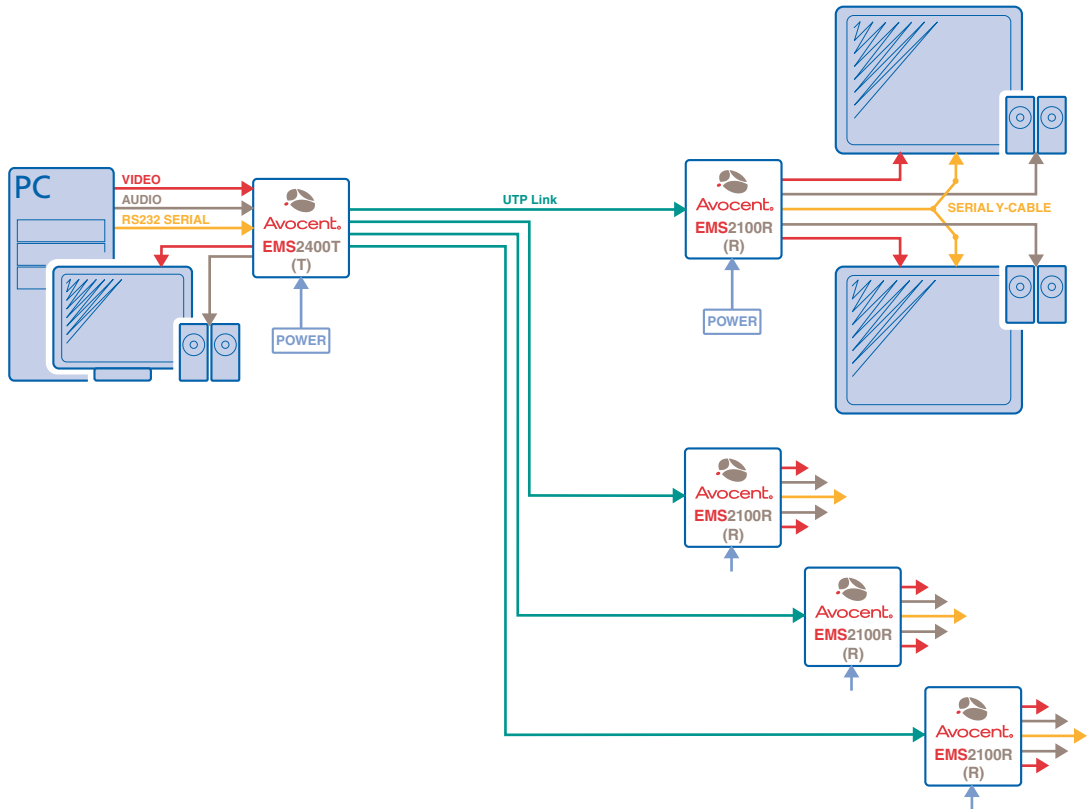


Figure 1.2: A typical Emerge EMS2400T configuration driving up to four pairs of displays

Expansion via Cascade Links

In order to create small, medium and large digital signage networks, all Emerge EMS 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.

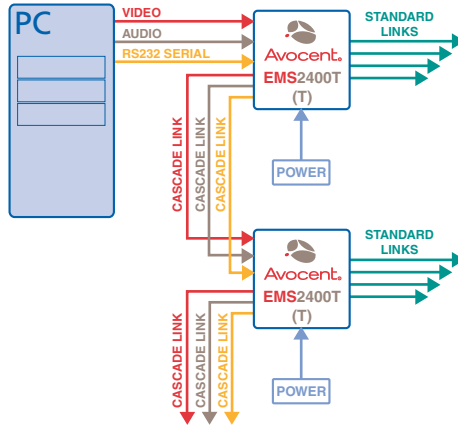


Figure 1.3: EMS2400T transmitters can be connected in cascade to provide further video, audio and serial expansion opportunities. Note that the EMS2100T transmitter does not support serial cascade connections.

Note: The EMS2100T 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 EMS2400T transmitters, this gives an overall support for up to 32 remote displays on 16 separate CATx branches.

Support for DDC (Display Data Channel)

The Display Data Channel standard allows video monitors to define their characteristics so that the source computers to which they are connected can optimize their video outputs accordingly. By their nature, the Emerge EMS2000 extenders enable multiple video displays to be attached to a single source computer. This causes a complication for handling the DDC standard, however, in characteristic style we have devised an elegant solution, as detailed below.

Whenever an Emerge EMS transmitter is powered on, it checks its local video port for a working display monitor with DDC information. The following rules are used to determine the outcome:

a series of strictly ordered actions occur to automatically locate the most suitable DDC data:

- If a display monitor is discovered on the local video port of the transmitter, the DDC data are cloned from it and stored within the transmitter.
- If no display monitor is discovered on the local video port of the transmitter, the DDC data held within the transmitter will remain unchanged.
- If the DDC data or clock lines of the transmitter's local video port are discovered to be connected to ground, then a default set of DDC data will be reloaded and used.

After the initial search period, the stored DDC data are then presented to the video port of the source computer. When transmitters are cascaded, only the primary transmitter (the one connected to the source computer) will perform the search for DDC data.

EMS2000 transmitters hold two pages of DDC data in order to support the most advanced display monitors. The DDC data are held within non-volatile memory so that they are retained when power is removed.

The manner in which the transmitters search for suitable 'DDC donors' could have an impact if your installation contains display units with differing capabilities. Generally, you should arrange for the display monitor with the most representative capabilities of your whole installation to be the one that the transmitter locates on its local port, either initially (and temporarily) while commissioning or permanently.

Safety Precautions

- 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 UTP link interfaces (RJ45 style connectors) to any other equipment, particularly network or telecommunications equipment.
- Warning – the power adaptor contains live parts. No user serviceable parts are contained within the power adaptor - do not dismantle.
- Do not use the power adaptor if the power adaptor case becomes damaged, cracked or broken or if you suspect that it is not operating properly. Replace the power adaptor with a manufacturer approved type only.
- The Emerge units 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 Emerge unit off the supply.
- If the building has 3-phase AC power, ensure that the computer and monitor are on the same phase. For best results, they should be on the same circuit.
- The primary means to cease operation of the units is to remove the power adaptor lead. Ensure that the power adaptor is positioned near to the equipment and is easily accessible.
- Test AC outlets at the computer and monitor for proper polarity and grounding.
- Do not use a 2-wire extension cord in any Avocent product configuration.
- If you use a power extension cord with the Emerge 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 Emerge units yourself.
- The Emerge units and power adaptors can get warm in operation – do not situate them in an enclosed space without any ventilation.
- For correct operation, the local and remote units must have ground connections. At the computer end, this is achieved by ensuring that the computer that the Emerge unit 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.
- Where possible, try to avoid laying the interconnect cable(s) alongside power cables.

Installation

Locations

Please consider the following important points when planning the positions of your Emerge EMS units:

- 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 units. Use video connection cables that are correctly shielded and are no longer than 6 feet in length.
- Choose routes for the twisted pair link cables that avoid mains power cables as much as possible.
- Remember a mains power socket is required for each transmitter and receiver.

Mounting

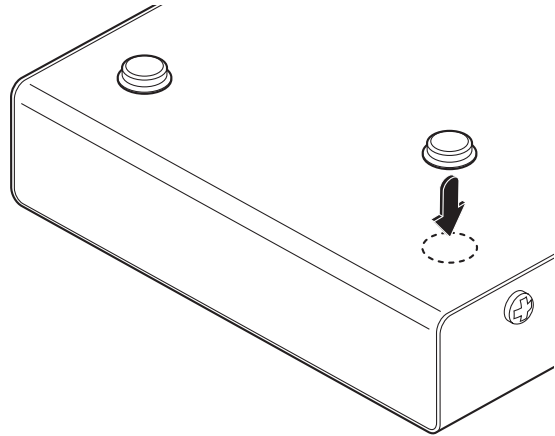
Before you begin connecting to the source PC system and display units, it is advisable to mount the Emerge EMS units in place. There are a number of mounting possibilities for the transmitter and receiver units:

- On a horizontal surface using the supplied self adhesive feet,
- Mounted on a screw using the rear slot,
- On inclined surfaces using self adhesive Velcro® strips (not supplied).

Using the supplied self adhesive feet

Apply the supplied self-adhesive rubber feet to the underside corners of the Emerge EMS units.

Figure 2.1: Applying the self adhesive rubber feet



Using the rear mounting slot

The slot at the rear of each unit allows it 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 the mounting screw protrudes no further than ½" (12.5mm) into the unit casing - serious electrical damage will be caused if the screw makes contact with the internal circuitry.

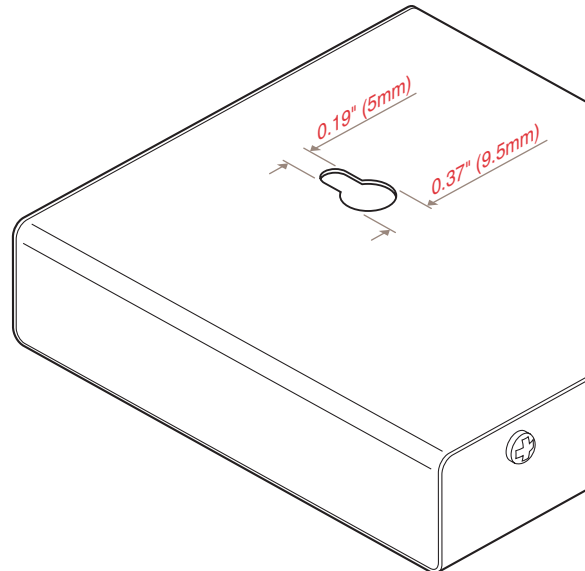


Figure 2.2: The rear mounting slot

Making Standard Connections

Connections to the Emerge units 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 units until all other connections have been made.

Note: Unless stated otherwise, all connection information given here applies to all models in the Emerge EMS2000 series.

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 – 6 feet or less) to the socket labeled **RGBHV IN** on the Emerge EMS 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 labeled **(🔊) IN** on the Emerge EMS transmitter.
4. Attach the other end of the stereo audio cable to the appropriate audio output socket on the source PC system.

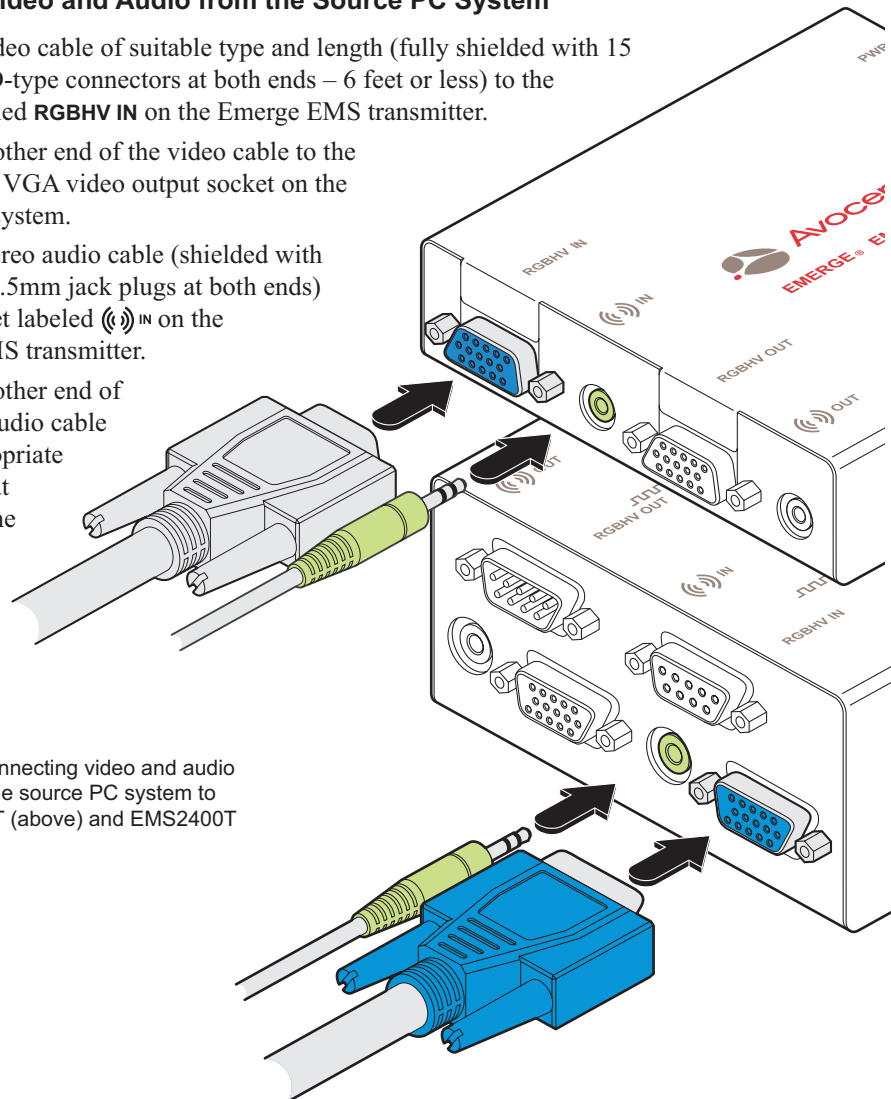


Figure 2.3: Connecting video and audio signals from the source PC system to the EMS2100T (above) and EMS2400T (below)

To Connect a Monitor and Speakers

The video and audio out ports of the Emerge EMS 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 unit – Please refer to the section [Making Cascade Connections – To Connect Cascaded Transmitters.](#)

1. Attach the video cable from the monitor to the socket labeled **RGBHV OUT** on the Emerge EMS transmitter.
2. Attach the stereo audio cable from the speakers to the socket labeled **(()) OUT** on the Emerge EMS transmitter.

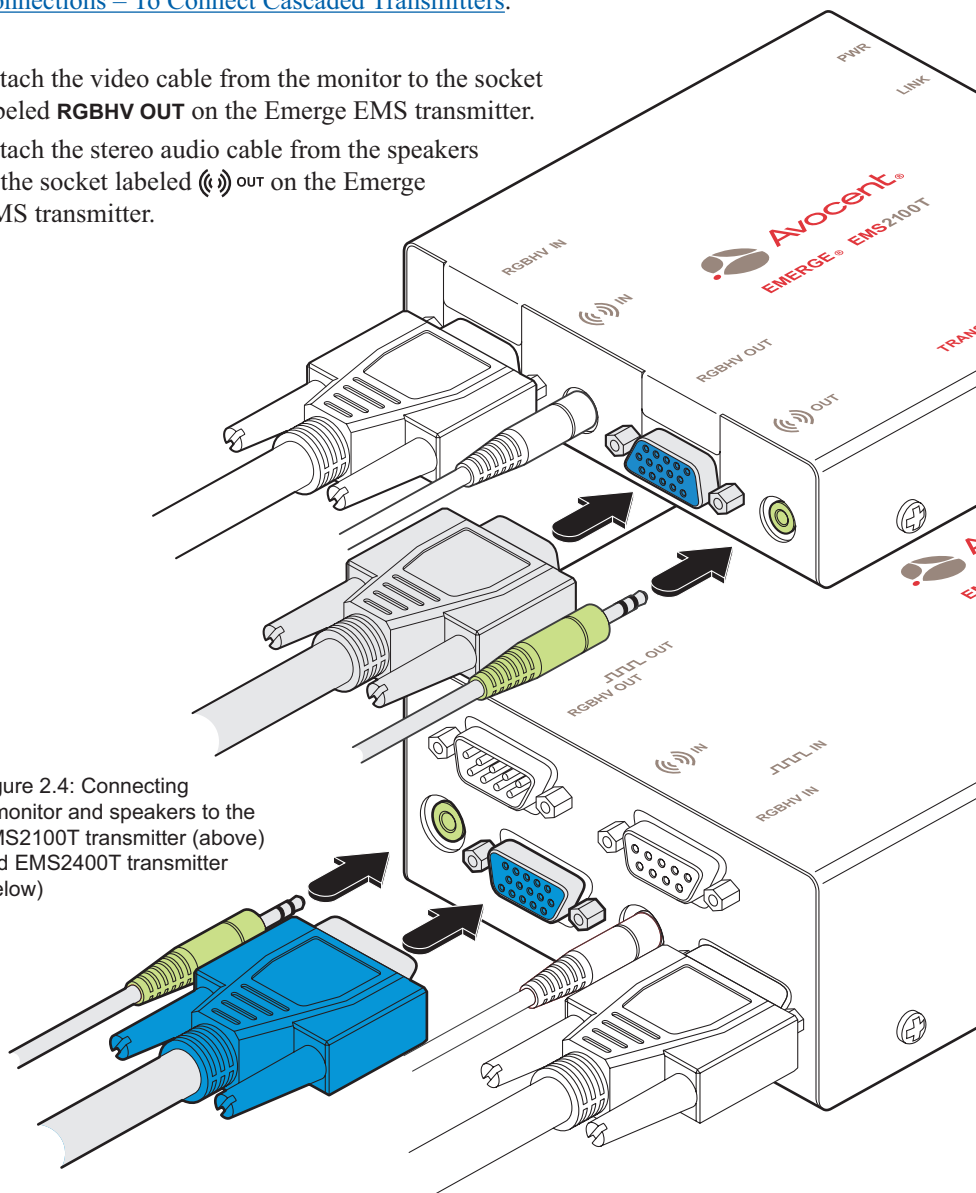


Figure 2.4: Connecting a monitor and speakers to the EMS2100T transmitter (above) and EMS2400T transmitter (below)

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 (EMS2100T, EMS2100R & EMS2110R only). No extra error checking on the serial port signals is applied.

1. Attach the male connector of a suitable serial link cable (all nine connections present pin 1 to pin1, pin 2 to pin 2, etc.) to the socket labelled **TXRX** on the EMS2100T transmitter or **TXRX IN** on the EMS2400T transmitter.
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 EMS2400T modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The EMS2100T, EMS2100R & EMS2110R modules all auto-sense the serial configuration and do not need to be set.

When switches SW2 to SW10 are all OFF, the EMS2400T 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.

See [Guidelines for connecting serial equipment](#).

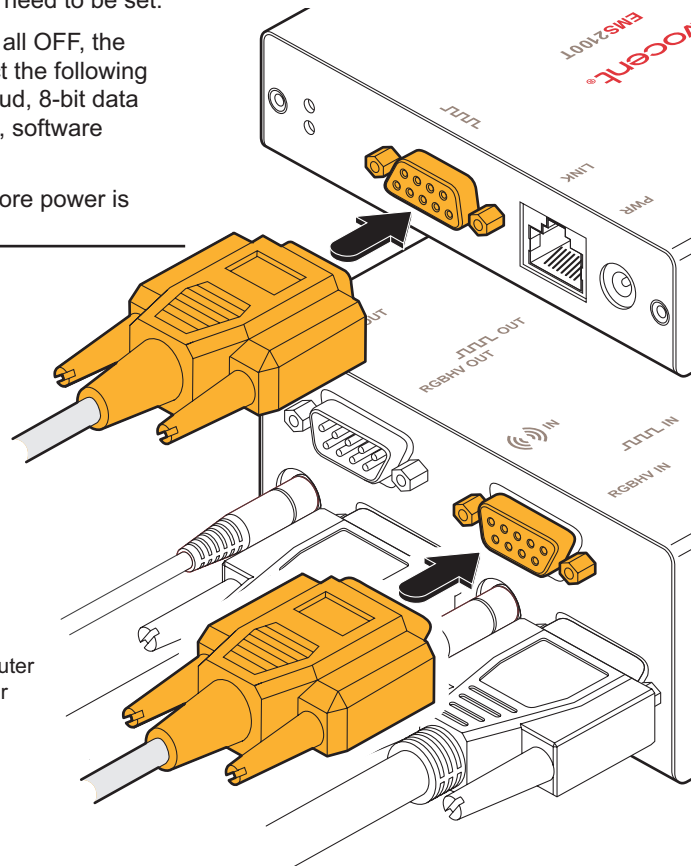


Figure 2.5: Connecting a source computer serial port to the EMS2100T transmitter (above) and EMS2400T transmitter (below)

To Connect the Link Cable(s)

The links between the transmitter and receiver units are made using between one and four twisted pair cables, specified to Category 5 or higher. Each cable carries video and audio signals to each receiver unit.

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

Note: Long cable lengths may induce colour separation effects. Emerge EMS2110R receivers contain the necessary circuitry to minimise such effects.

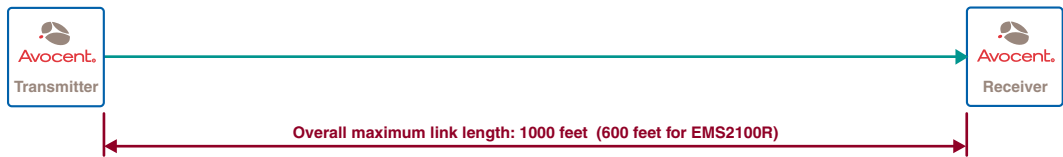


Figure 2.6: Overall maximum link length (1000 feet) when one receiver is connected

Emerge EMS2100T models

1. Attach the connector of the link cable to the socket labeled **LINK** on the Emerge EMS2100T transmitter. There should be a click when the cable is fully inserted and locked in place.

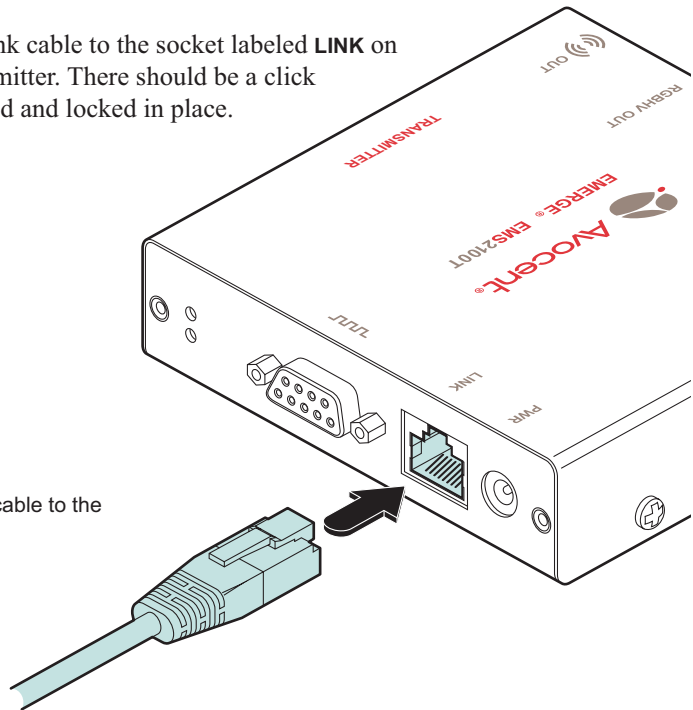


Figure 2.7: Connecting the link cable to the EMS2100T transmitter unit

Emerge EMS2400T models

1. Attach the connector of the first link cable to the socket labeled **LINK 1** on the Emerge EMS2400T 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 labeled **LINK 2** to **LINK 4**, as required.

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

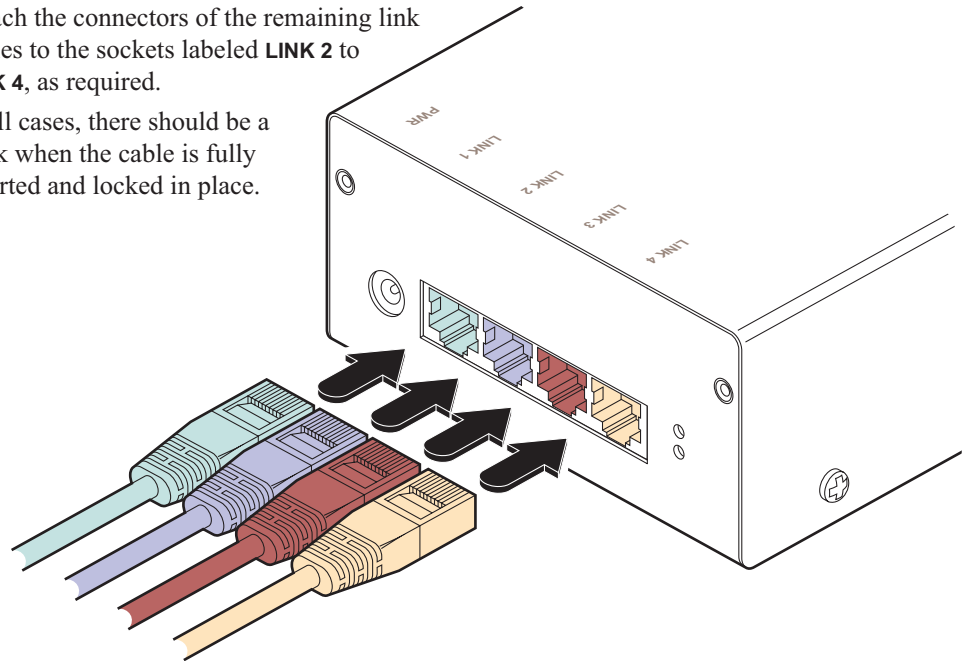


Figure 2.8: Connecting up to four link cables to the EMS2400T transmitter unit



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.

It is possible to connect receiver modules from the Emerge EMS1000 series to the Emerge EMS2400T transmitter providing switch SW10 on the EMS2400T module is switched to ON to disable the serial communication circuitry (compatibility mode).

To Connect the Power Adaptor



IMPORTANT: Please read and adhere to the electrical safety information given within the [Safety Precautions](#) section of this guide. In particular, do not use a 2-wire (unearthed) extension cord.

1. Locate the supplied power adaptor and attach its output connector to the socket labeled **PWR** on the Emerge EMS transmitter.

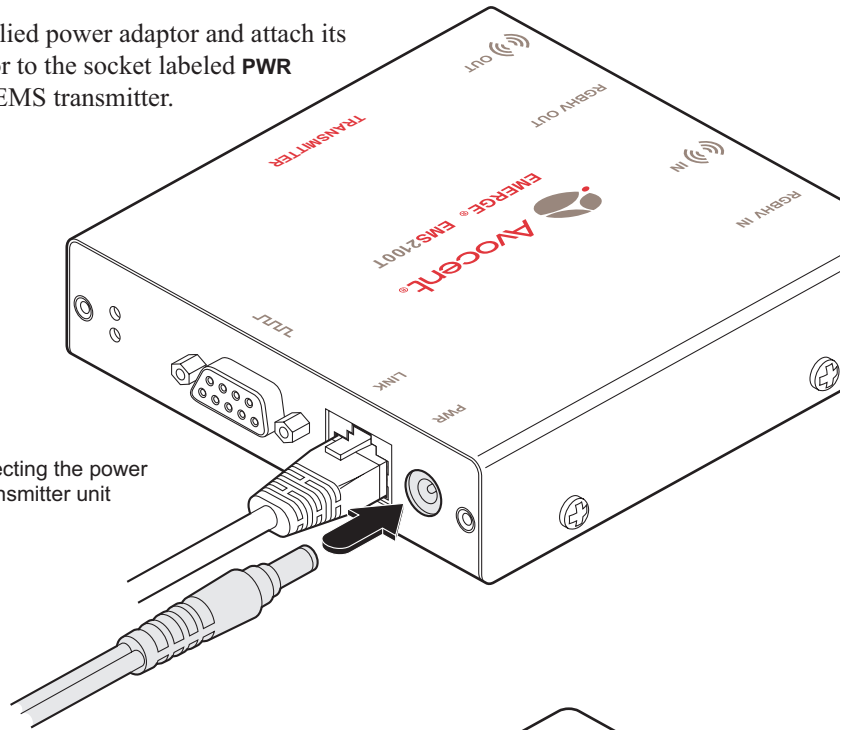


Figure 2.9: Connecting the power adaptor to the transmitter unit

2. Insert the IEC connector of the supplied power cord into the corresponding socket of the power supply.
3. When all other connections have been made at the transmitter and receiver units, connect the other end of the power cord to a nearby earthed mains socket.

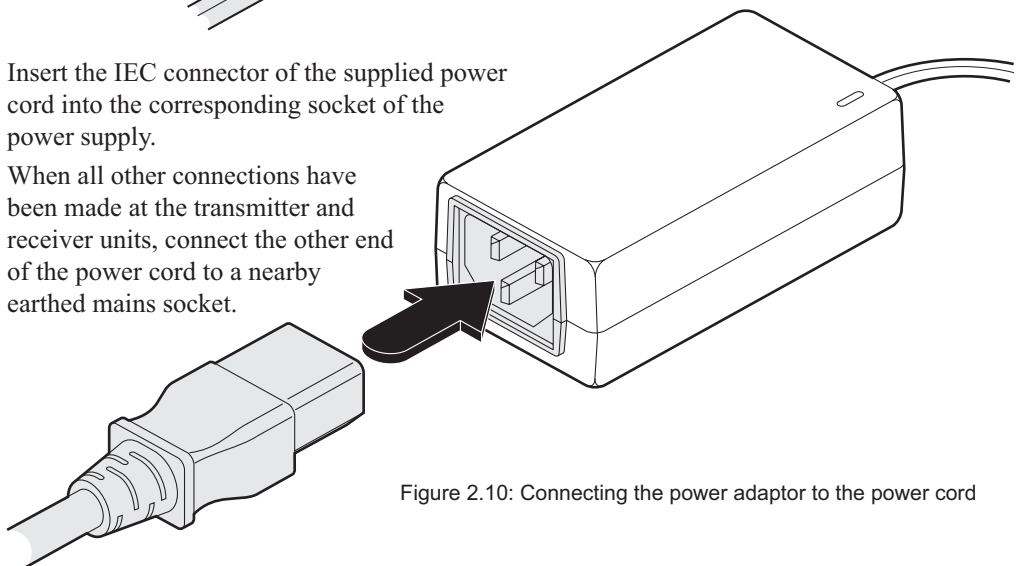


Figure 2.10: Connecting the power adaptor to the power cord

Connections at the Receiver

To Connect Displays and Speakers

Dual video and audio outputs are provided on the Emerge EMS receivers. Both sets of ports provide identical signals and their connection procedures are the same:

1. Attach the video cable from the display unit to the socket labeled **RGBHV OUT** on the Emerge EMS receiver.
2. Attach the stereo audio cable from the speakers (or amplifier) to the socket labeled **(()) OUT** on the Emerge EMS receiver.

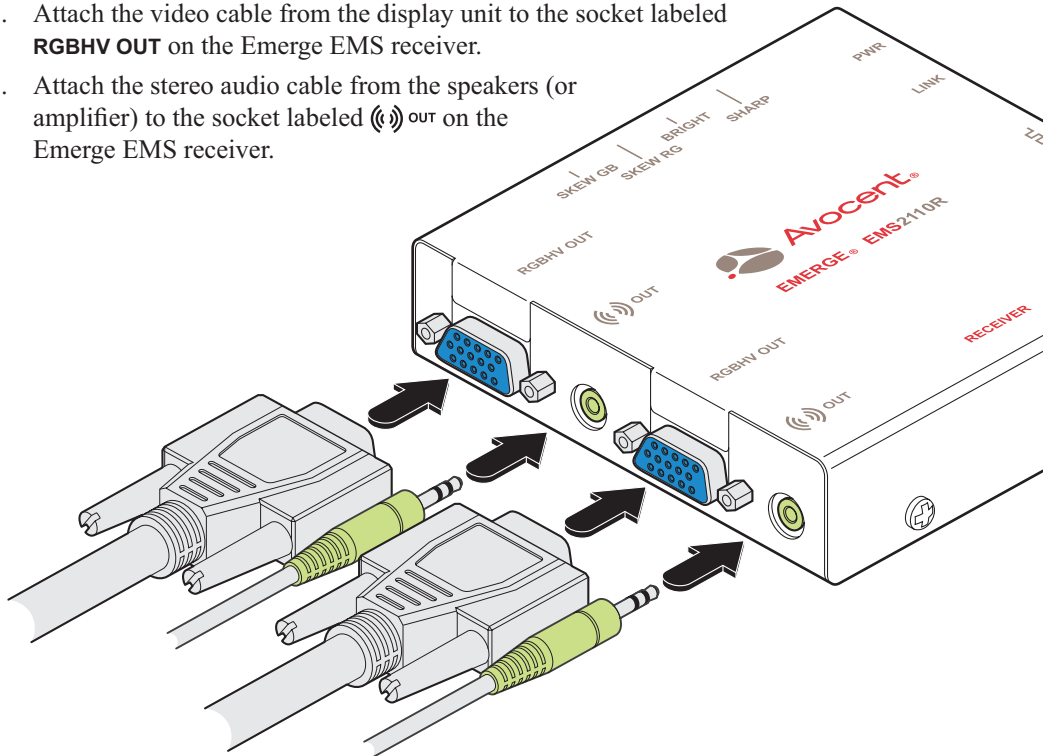


Figure 2.11: Connecting displays and speakers to the receiver unit

Link In

The link from the transmitter to each receiver unit 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 1000 feet.

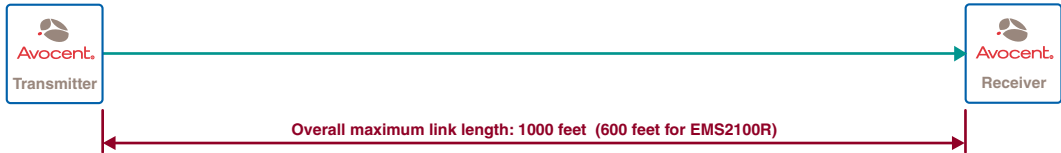


Figure 2.12: Overall maximum link length (1000 feet) when one receiver is connected

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

1. Attach the connector of the link cable to the socket labeled **LINK** on the Emerge EMS receiver. There should be a click when the cable is fully inserted and locked in place.

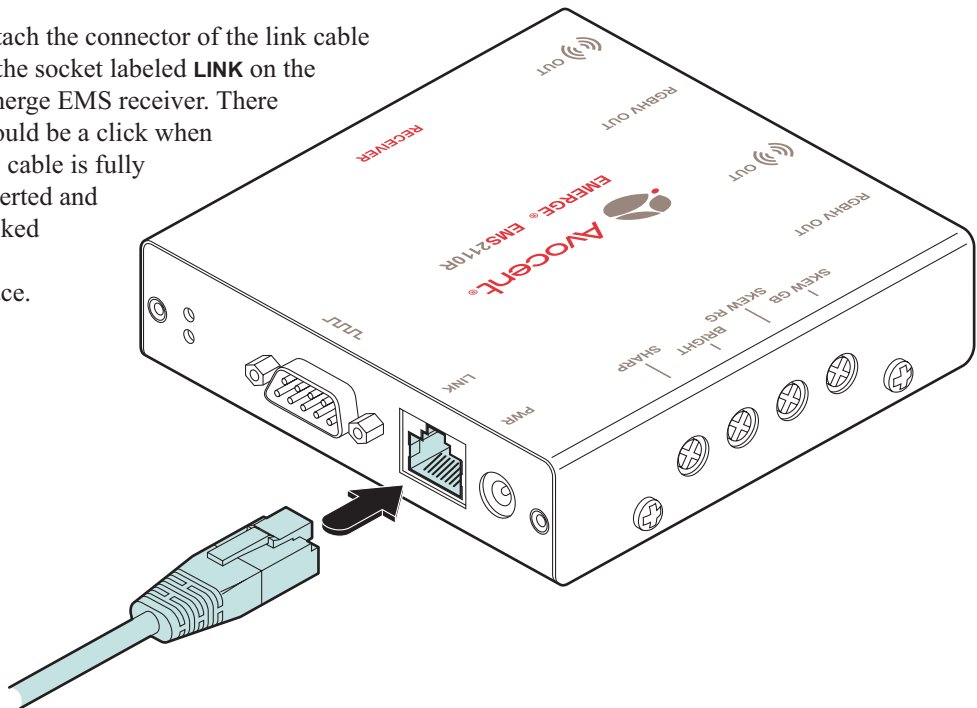


Figure 2.13: Connecting the link cable to the receiver unit

To Connect the Power Adaptor



IMPORTANT: Please read and adhere to the electrical safety information given within the [Safety Precautions](#) section of this guide. In particular, do not use a 2-wire (unearthed) extension cord.

1. Locate the supplied power adaptor and attach its output connector to the socket labeled **PWR** on the Emerge EMS receiver.

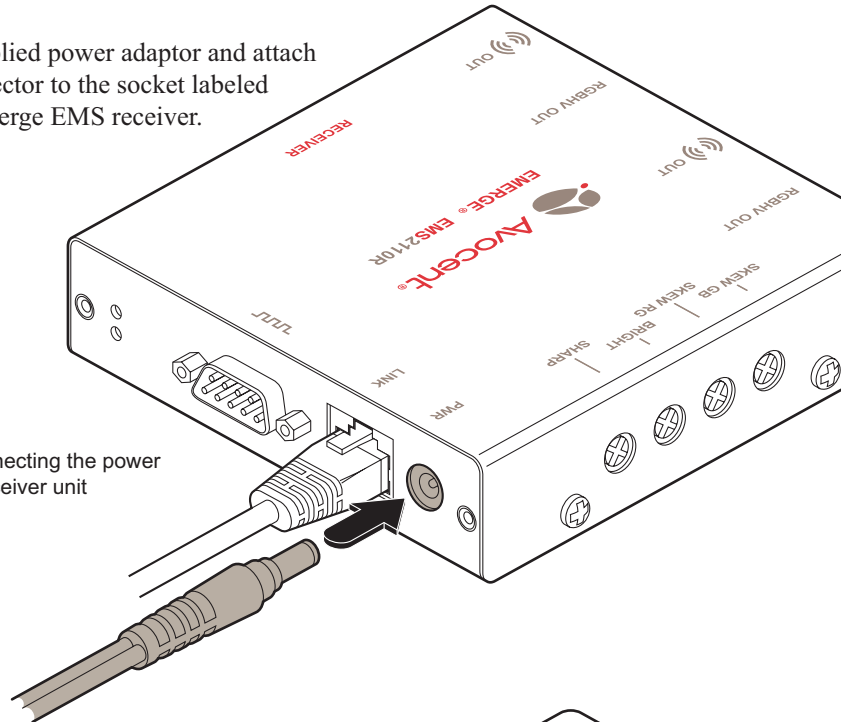


Figure 2.14: Connecting the power adaptor to the receiver unit

2. Insert the IEC connector of the supplied power cord into the corresponding socket of the power supply.
3. When all other connections have been made at the transmitter and receiver units, connect the other end of the power cord to a nearby earthed mains socket.

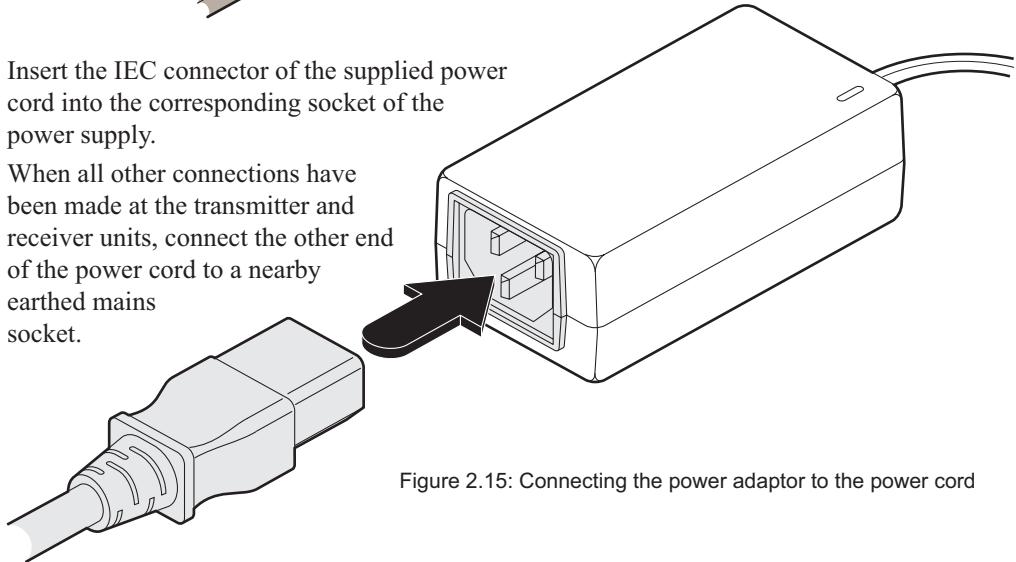


Figure 2.15: Connecting the power adaptor to the power cord

To connect the serial port

The EMS 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 Emerge EMS receiver is linked to an EMS2400T transmitter. If the receiver is linked to an EMS2100T transmitter, only a single display may be connected to the serial connector of the EMS receiver.

1. Attach the female connector of the Y-cable or serial device link cable to the socket labelled **LINK** on the EMS 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).

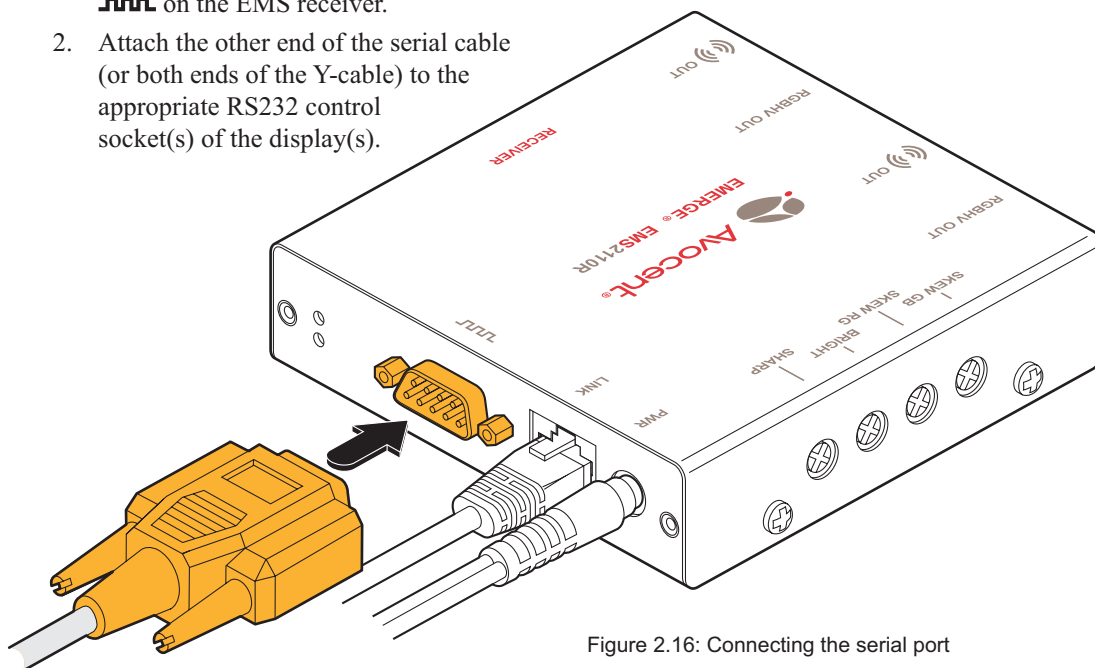


Figure 2.16: Connecting the serial port

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 EMS2400T modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The EMS2100T, EMS2100R & EMS2110R modules all auto-sense the serial configuration and do not need to be set.

When switches SW2 to SW10 are all OFF, the EMS2400T 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.

See [Guidelines for connecting serial equipment](#).

Making Cascade Connections

The Emerge EMS 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 Emerge EMS units

- 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 EMS2400T modules and all connected displays are configured to use the same serial communication settings (see [Switch settings](#) for details). The EMS2100T, EMS2100R & EMS2110R 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:

Table 2.1: How cascade connections affect overall maximum link cable lengths (EMS2400T)

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

Notes

EMS2100R models should always be limited to link lengths of 600 feet or less, regardless of cascade connections, due to a lack of skew compensation adjustments.

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

The maximum resolutions achievable are: 1600 x 1200 x 60 Hz 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 1000ft in any installation. If you are running shorter cables then it may be possible to use more cascades than shown in the above table.

Cascade connection example

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

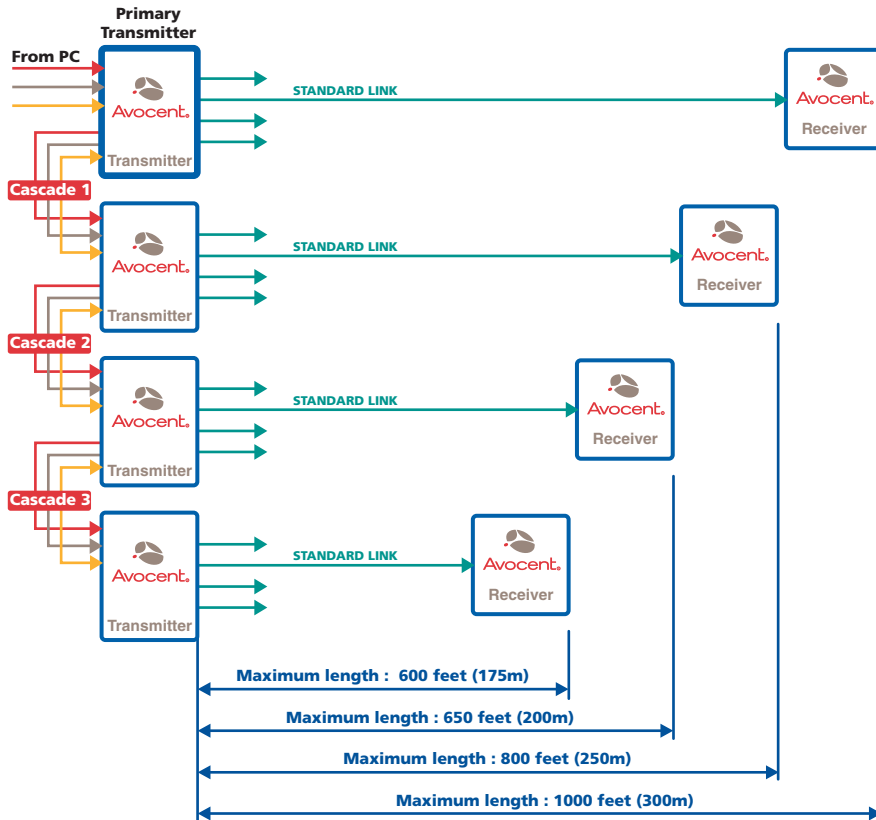


Figure 2.17: The effect of cascade connections on overall link lengths

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 the EMS2400T transmitter can be cascaded. However, it is not possible to cascade the serial port of the EMS2100T, 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.

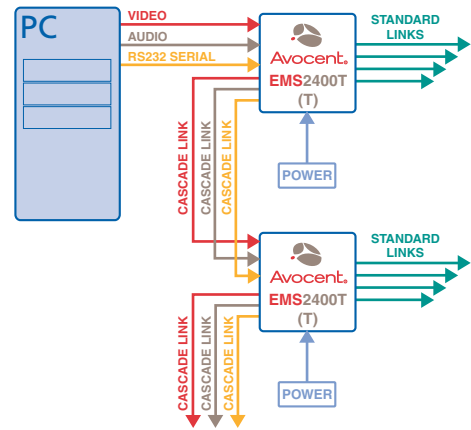


Figure 2.18: Connecting multiple transmitters in a cascade arrangement

To Connect Cascaded Transmitters

1. Attach a suitable video cable between the socket labelled **RGBHV OUT** on the primary transmitter and the socket labelled **RGBHV IN** on the secondary transmitter. (Cable specification: Fully shielded with 15 way male D-type connectors at both ends, 6 feet or less).
2. Attach a stereo audio cable between the socket labelled **(A) OUT** on the primary transmitter and the socket labelled **(A) IN** on the secondary transmitter. (Cable specification: Shielded with three way 3.5mm jack plugs at both ends).

continued

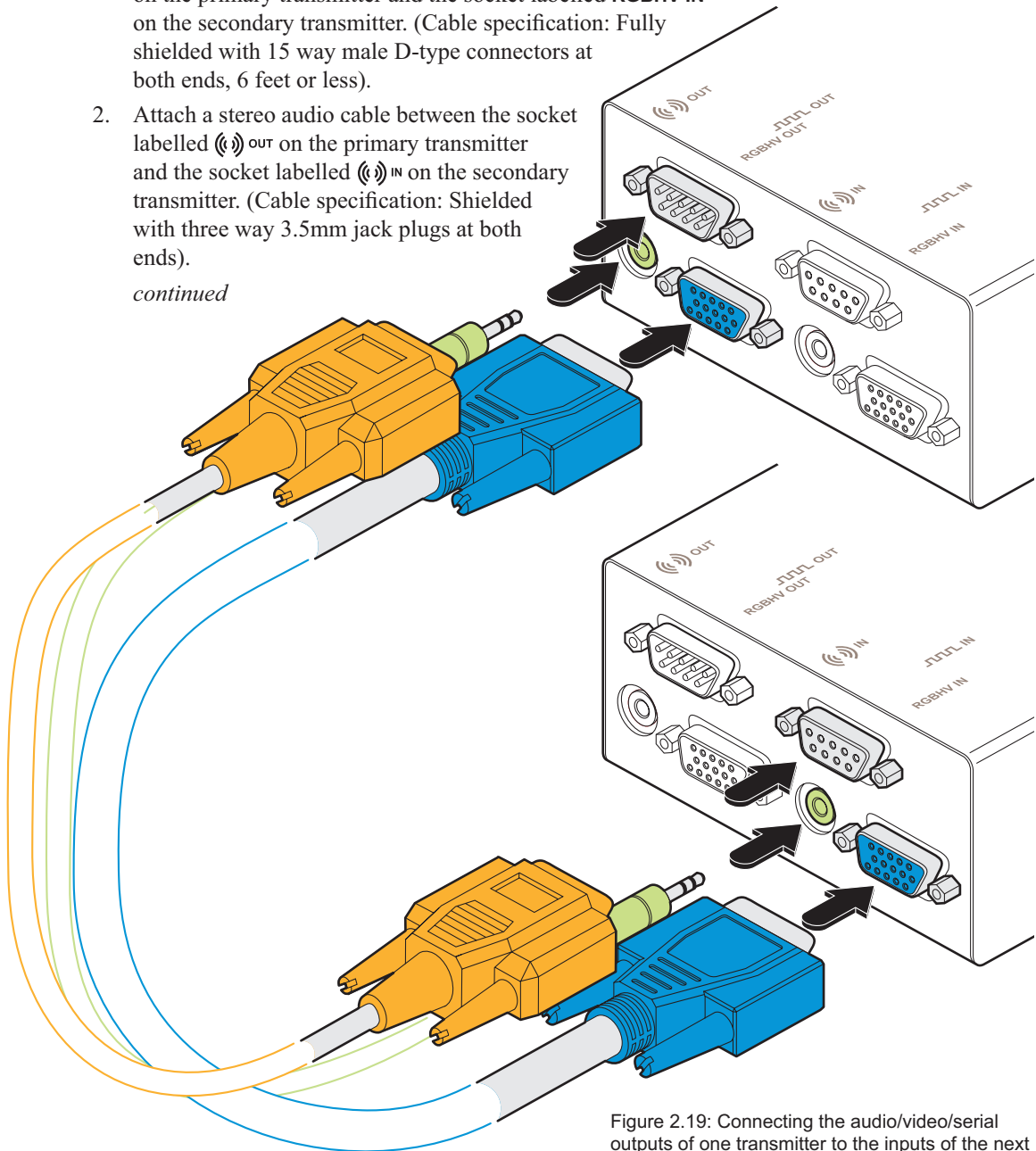


Figure 2.19: Connecting the audio/video/serial outputs of one transmitter to the inputs of the next

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. All lines connected i.e. Pin 1 to Pin 1, Pin 2 to Pin 2 etc.).
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.

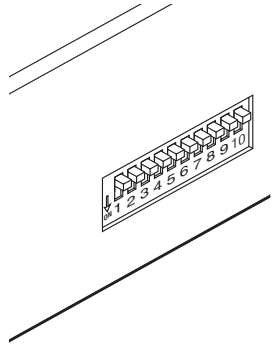
Video Image Adjustments

As link cable lengths increase, color separation effects may become noticeable within displayed video images, particularly at higher resolutions. These effects are called ‘skew’ and result from differing delays on the red, green and blue color signals as they travel to the receivers. Each Emerge EMS2110R receiver provides two extra adjustment dials to counter skew effects. For further information, please refer to the section [Skew Compensation Adjustments](#) within Chapter 3.

Switch Settings (Emerge EMS2400T Transmitter Only)

The Emerge EMS2400T transmitter module is 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.



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	EMS2000 series mode (RS232 enabled)
SW10	ON	EMS1000 series mode (RS232 disabled)



IMPORTANT

It is essential that the source PC, all EMS2400T modules and all connected displays are configured to use the same serial communication settings. The EMS2100T, EMS2100R & EMS2110R 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.

Operations

In operation, the Emerge EMS units are designed to be completely 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 Emerge EMS units 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 unit.
- **RED** Indicates the following states:
 - Slow flash (once every second) EMS2400T only - module is in upgrade mode
 - Continually lit - module is operating normally with its serial ports enabled.

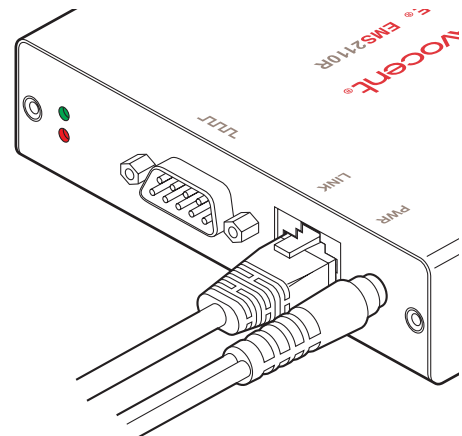


Figure 3.1: Location of the red and green operation indicators

Serial port switching

The Emerge EMS2400T module uses a sophisticated switching system to extend the ordinarily point-to-point nature of serial communications across a network of connected display units. The 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 such as the Display Manager to provide an intuitive graphical interface. Once a switching command is issued, the network will remain fixed at that setting until a new switching 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:



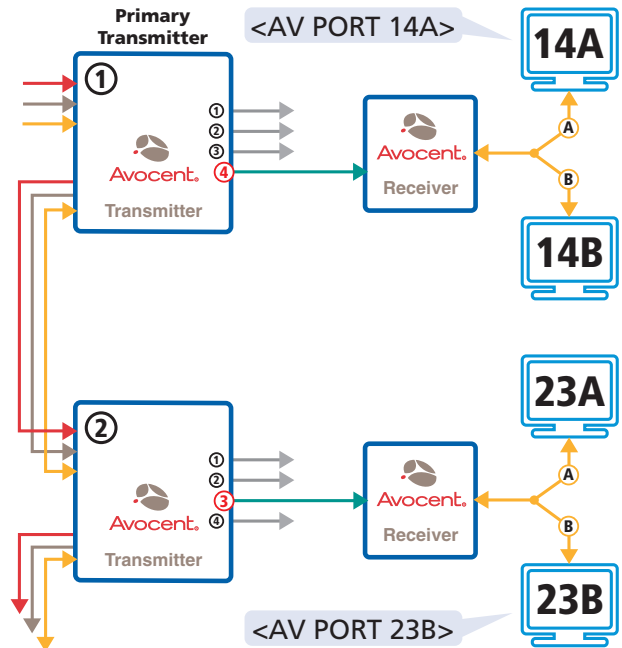
Note: The command must use capital letters and there must be a space between ‘AV’ and ‘PORT’, and also between ‘PORT’ and the cascade number.

<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)

Adjustments

Video signals are susceptible to the effects of long distance cables and for this reason, every Emerge EMS receiver includes brightness and sharpness adjustment dials. Additionally, the Emerge EMS2110R receivers are also equipped with two extra dials to eliminate the effects of color skew within the video image.

Brightness and Sharpness Adjustments

The brightness and sharpness adjustments provided on every Emerge EMS receiver allow you to compensate for any losses incurred within long cable links. These two adjustments can be made in any order and independently of each other.

When making adjustments it is necessary to have access to the Emerge EMS 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.

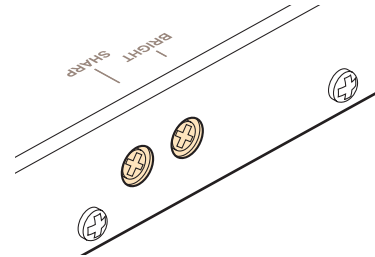


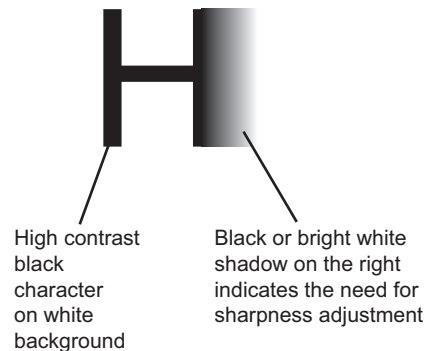
Figure 3.2: Location of the brightness and sharpness adjustment dials

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.

Figure 3.3: Using a high contrast image to assist with sharpness adjustments



To Adjust Brightness and/or Sharpness

1. Carefully insert a small screwdriver into the dial labeled **BRIGHT** or **SHARP**, as appropriate.
2. Slowly turn the dial clockwise or counterclockwise 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.

Skew Compensation Adjustments (Emerge EMS2110R Receivers Only)

The twisted pair cabling used to link the Emerge EMS units 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 color 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 color signals (**SKEW GB**) while the second (**SKEW RG**) operates similarly on the red and green signals. Each dial delays one of its stated colors in relation to the other. By using both dials it is possible to correctly align all three colors. 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 Emerge EMS CD-ROM ([To Display the Supplied Skew Test Pattern](#)) or alternatively you can create your own test pattern as discussed below.

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 colored bars and then repeat this vertical line at intervals along the width of the colored bars. These lines create breaks across the colors and give you more opportunities to view the horizontal position of each color relative to the others.

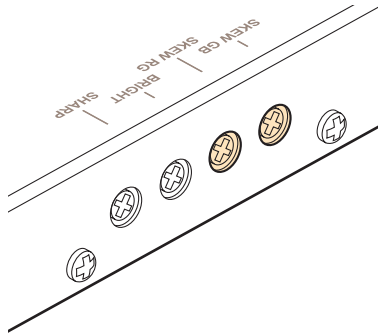


Figure 3.4: Location of the skew compensation adjustment dials

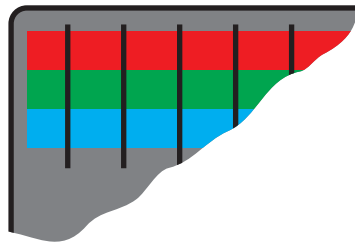


Figure 3.5: Creating a suitable skew test pattern within a paint package

To Display the Supplied Skew Test Pattern

1. Insert the supplied Avocent 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 Skew entry to display the standard test pattern. If necessary, maximize 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 colors.

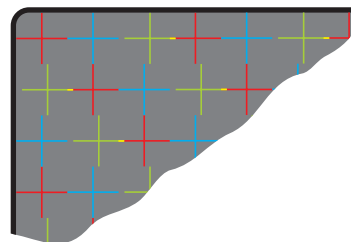


Figure 3.6: The supplied skew test pattern showing green slightly retarded relative to the red and blue

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 colors. However, if the unit 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 counterclockwise. 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 counterclockwise 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.

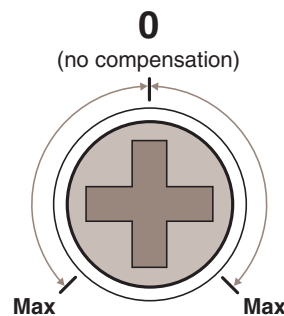


Figure 3.7: A skew compensation dial showing its middle neutral position and its two maximum positions

To Adjust Skew

Your chances of achieving a successful skew 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 unit 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](#).
1. Turn the **SKEW RG** dial clockwise or counterclockwise until you observe that the red and green colors are aligned.
 2. Turn the **SKEW GB** dial clockwise or counterclockwise until you observe that the green and blue colors 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 counterclockwise until you observe that the Red and Green colors are aligned, at which point all of the colors will be aligned.

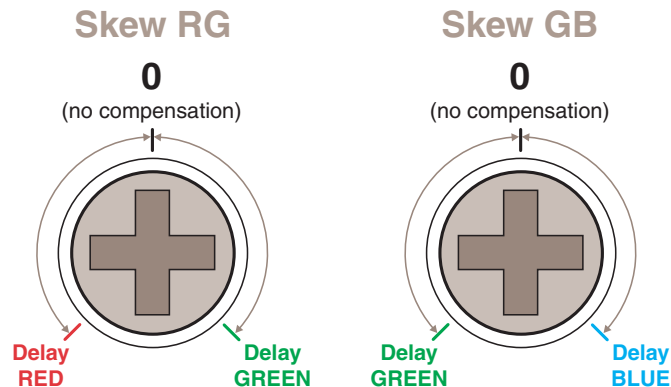


Figure 3.8: The two skew compensation dials showing how they affect each of the colors. When delay is applied to a color, it moves further to the right of the screen.

Y-cable pinout

Used to split serial communications between two displays. For use only on Emerge EMS2100R or EMS2110R receivers when linked to a EMS2400T transmitter.

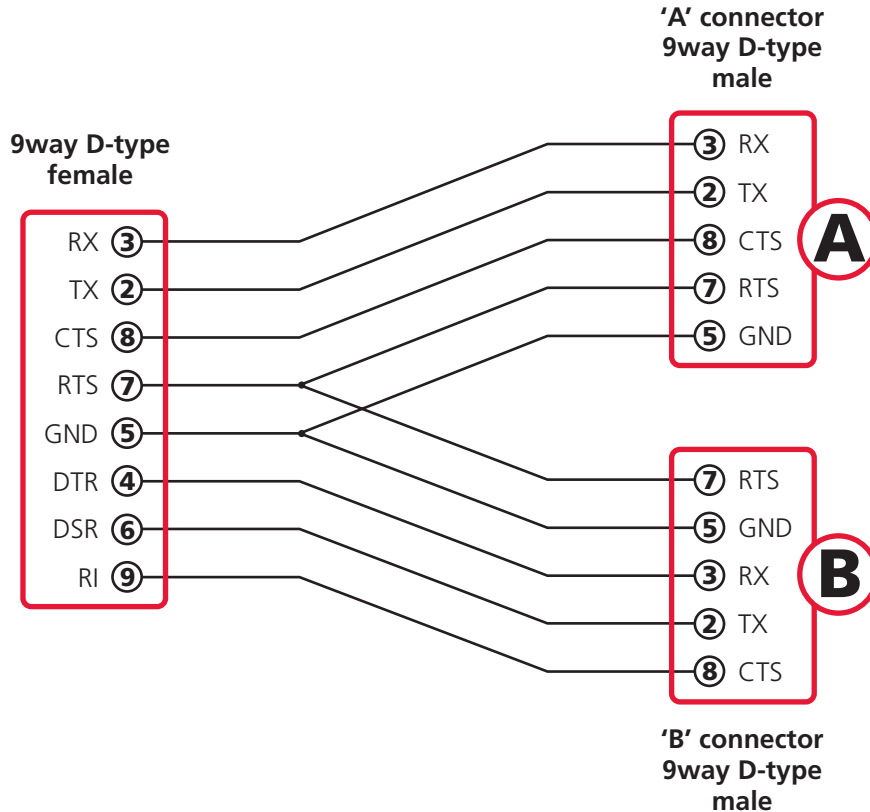


Figure 3.9: A pin-out diagram of the connections required within a serial Y-cable

Guidelines for connecting serial equipment

- A 'straight through' 9M-9F serial cable with all wires connected should be used to connect the transmitter unit to the source PC (i.e. 1-1, 2-2, 3-3 etc.)
- The 9-way male connector on the receiver has the same pinning as a serial port on a computer so any cable that may be used between a computer and a device can be used between a receiver and the device.
- The equipment works by rapidly sampling the RS232 signals and transferring the signal states between the receiver and the transmitter and vice versa.
- The transmitter and receiver combination can be thought of as being equivalent to a 9M-9F serial cable with all wires connected straight through (1-1, 2-2, 3-3 etc.)

APPENDICES

Appendix A: Technical Support

Our Technical Support staff are ready to assist you with any installation or operating issues you encounter with your Avocent product. If an issue should develop, follow the steps below for the fastest possible service.

To resolve an issue:

1. Check the pertinent section of the manual to see if the issue can be resolved by following the procedures outlined.
2. Check our web site at www.avocent.com/support to search the knowledge base or use the online service request.
3. Call the Avocent Technical Support location nearest you.

Appendix B: Troubleshooting

No video image is received at the receiver unit.

- Check that the both the red power indicators are lit on both the transmitter and receiver units - if they are not, then there is a power problem. Both units require power from their supplied power adaptors.
- Check that the green video input indicators are lit on both the transmitter and receiver units - if one or both are not lit, then a valid video input signal is not present at the input to that unit.
- Check the link cable(s) that connect the transmitter and receiver unit(s) for soundness.
- If possible, try using an alternative twisted pair link connection between the units.
- 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 ‘Operations’ chapter.
- If not already fitted, connect a monitor to the **RGBHV OUT** port of the transmitter unit and check for a correct video image output.

Video image at the receiver unit 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 ‘Operations’ chapter.
- If the overall video image is ‘fuzzy’ and/or has colored shadows you may need to make skew adjustments (EMS2110R receivers only). This procedure allows you to finely tune the red, green and blue video signal timings to overcome most color separation problems. Please refer to the ‘Skew Compensation Adjustments’ section in the ‘Operations’ chapter.

Serial communications are not functioning

- Check that SW10 on the EMS2400T is set to OFF.

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

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

No sound can be heard on the speakers connected to the receiver unit

- If not already fitted, connect speakers to the $(\text{Ⓔ})^{\text{OUT}}$ port of the transmitter unit and check for a correct audio output.
- Check that the both the red power indicators are lit on both the transmitter and receiver units - if they are not, then there is a power problem. Both units require power from their supplied power adaptors.

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