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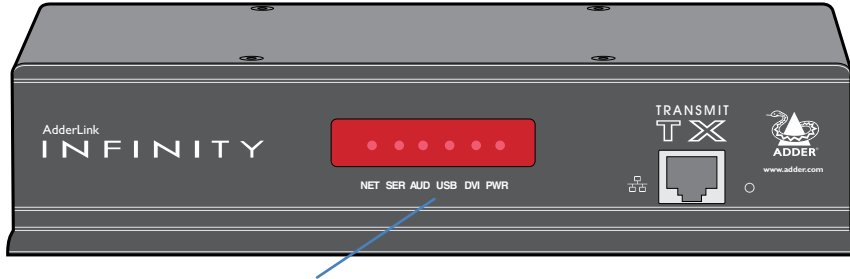
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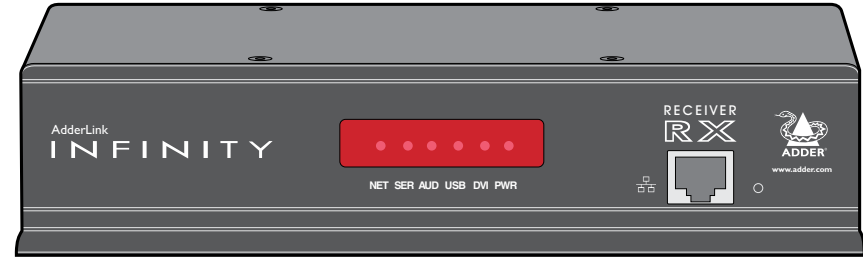
ADDERLINK INFINITY UNIT FEATURES

The ALIF units are housed within durable, metallic enclosures with most connectors situated at the rear panel - the Ethernet ports are situated on the front panels. The smart front faces also feature the operation indicators.

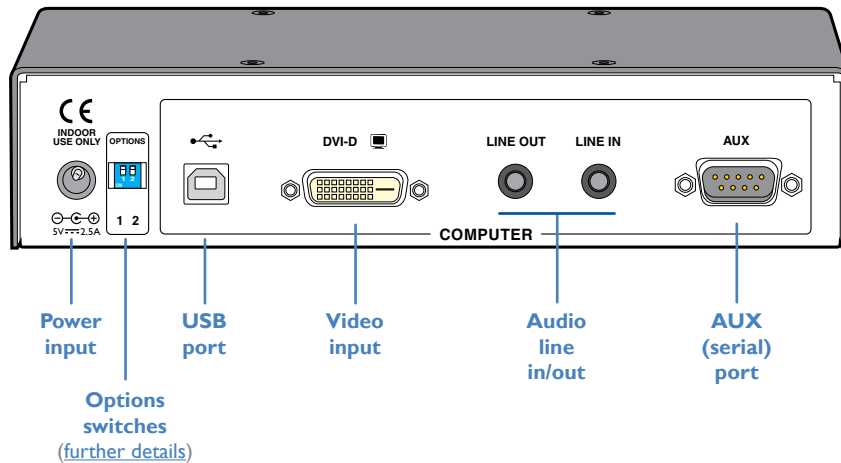
ALIF transmitter - front



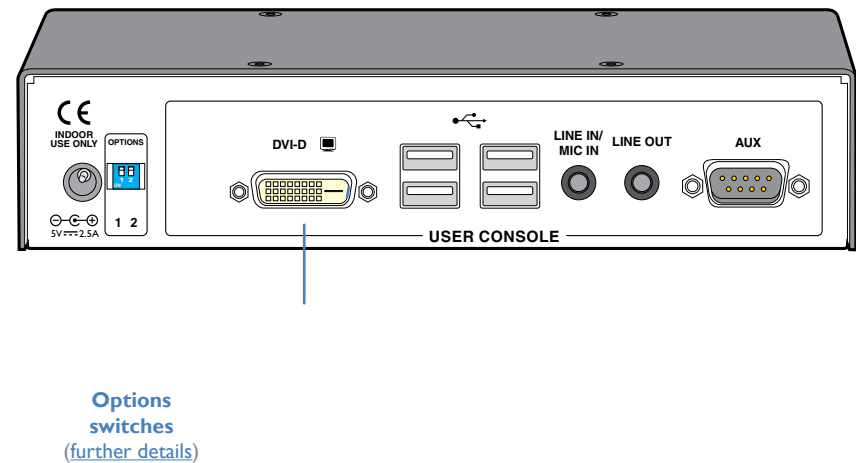
ALIF receiver - front



ALIF transmitter - rear



ALIF receiver - rear

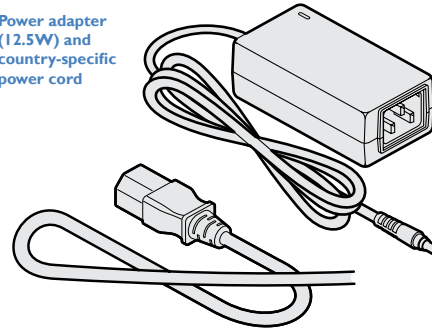


ALIF transmitter (1000T) package

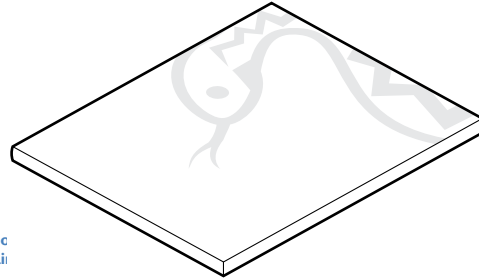
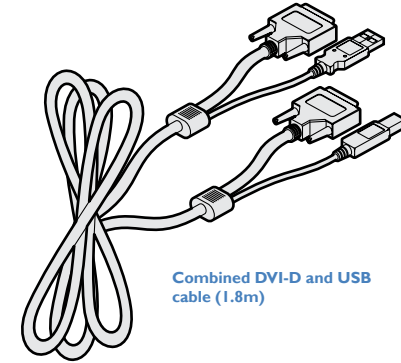


ALIF1000T unit

Power adapter (12.5W) and country-specific power cord

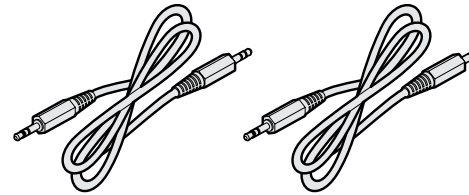


Combined DVI-D and USB cable (1.8m)

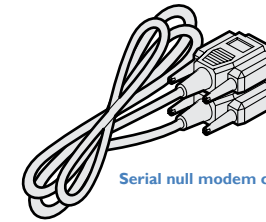


Informatic container

- Four self-adhesive rubber feet
- Quick start guide
- Safety document

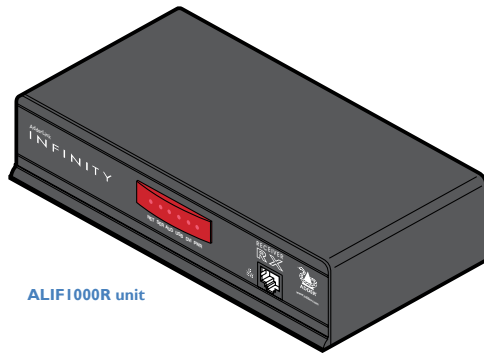


2 x Audio cable 2m (3.5mm stereo jacks)

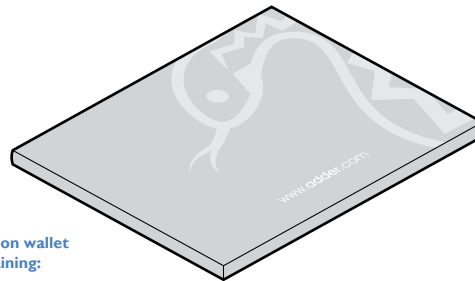


Serial null modem cable 2m

ALIF receiver (1000R) package



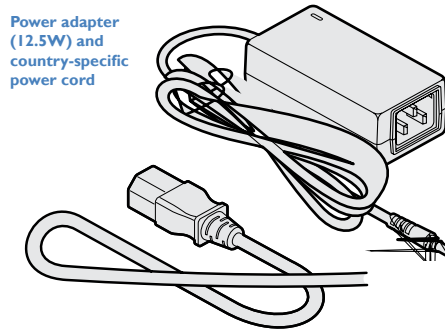
ALIF1000R unit



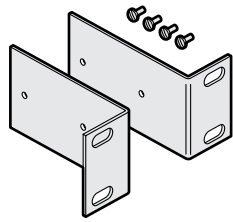
Information wallet containing:

- Four self-adhesive rubber feet
- Quick start guide
- Safety document

Power adapter (12.5W) and country-specific power cord

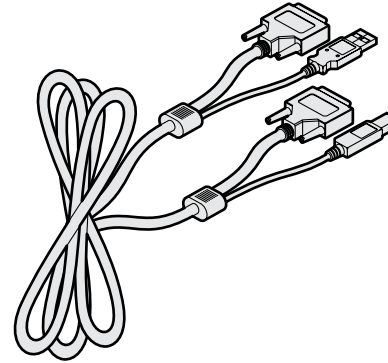


OPTIONAL EXTRAS



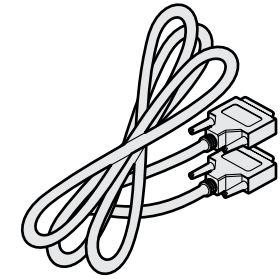
Two 19" rack-mount brackets and four screws

Part numbers:
One unit per 1U rack slot: RMK4S
Two units per 1U rack slot: RMK4D



Combined dual link DVI-D and USB (USB type A to B) cable

Part numbers: VSCD3 (1.8m length)
VSCD4 (5m length)

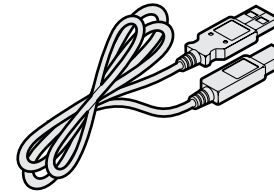
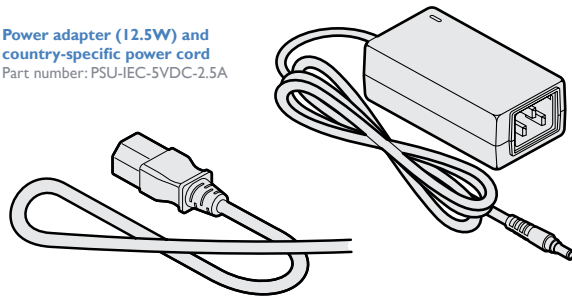


Single link DVI-D to DVI-D video cable

Part number: VSCD1

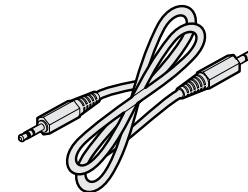
Power adapter (12.5W) and country-specific power cord

Part number: PSU-IEC-5VDC-2.5A



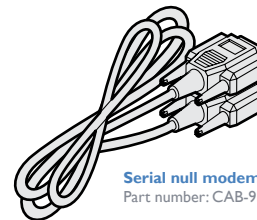
USB cable 2m (type A to B)

Part number: VSC24



Audio cable 2m (3.5mm stereo jacks)

Part number: VSC22



Serial null modem cable 2m

Part number: CAB-9F/9F-NULL-MODEM

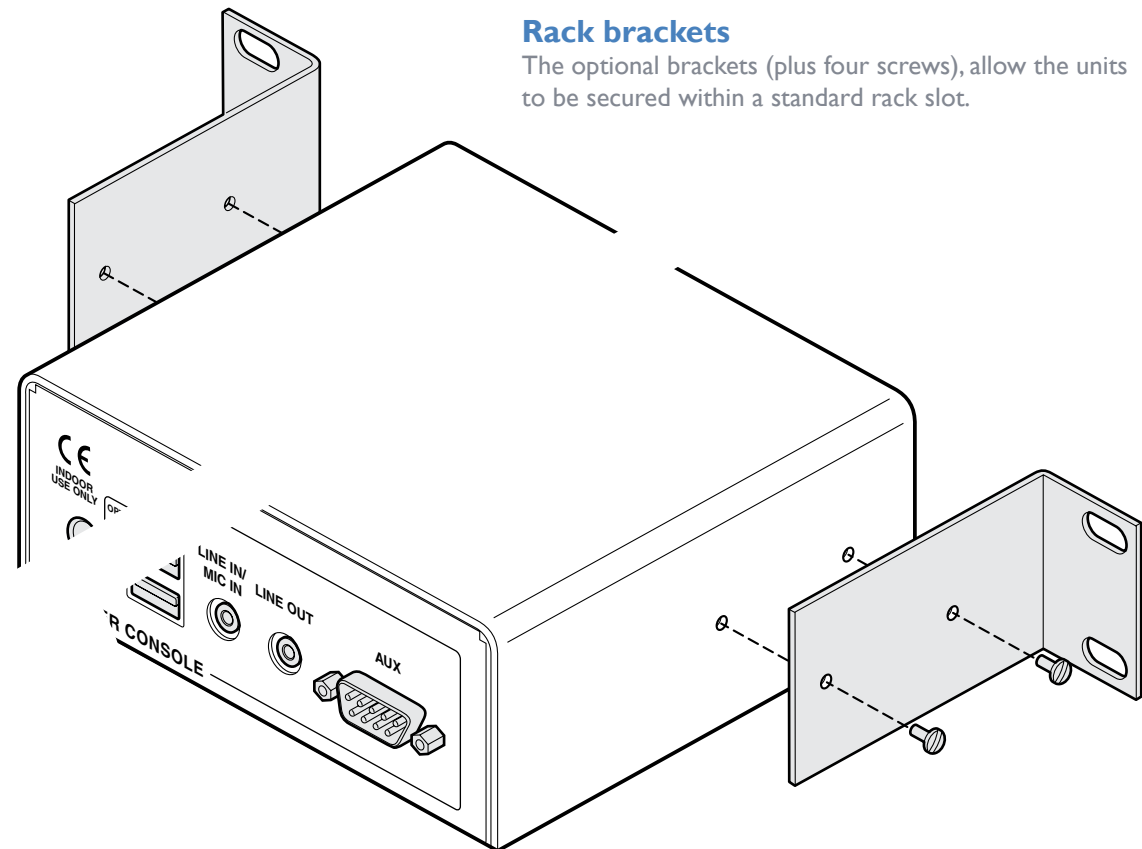
MOUNTING

There are two main mounting methods for transmitter and receiver units:

- The supplied four self-adhesive rubber feet
- Optional rack brackets

[Connections](#)

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

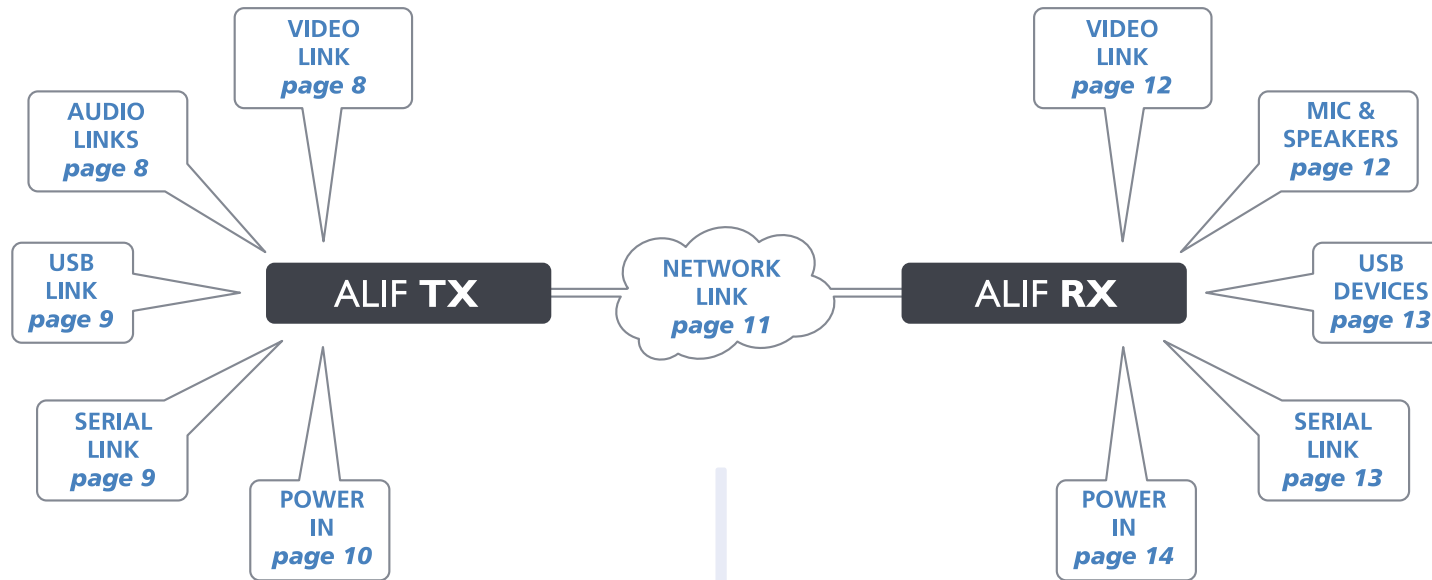


Rack brackets

The optional brackets (plus four screws), allow the units to be secured within a standard rack slot.

CONNECTIONS

Installation involves linking the ALIF TX unit to various ports on the host computer, while the ALIF RX unit is attached to your peripherals:



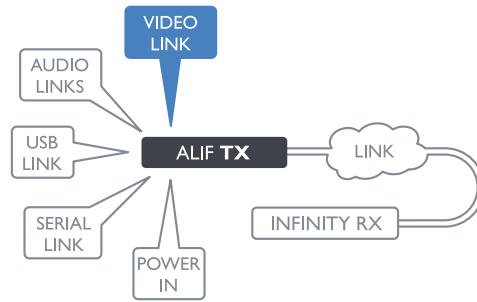
Click a connection to see details

IMPORTANT: When using an AdderLink Infinity Management box to configure ALIF units, it is vital that all ALIF units that you wish to locate and control are set to their factory default settings. Otherwise they will not be located by the A.I.M. server. If necessary, perform a [factory reset](#) on each ALIF unit.

Please also see [Appendix C - Tips for success when networking ALIF units](#)

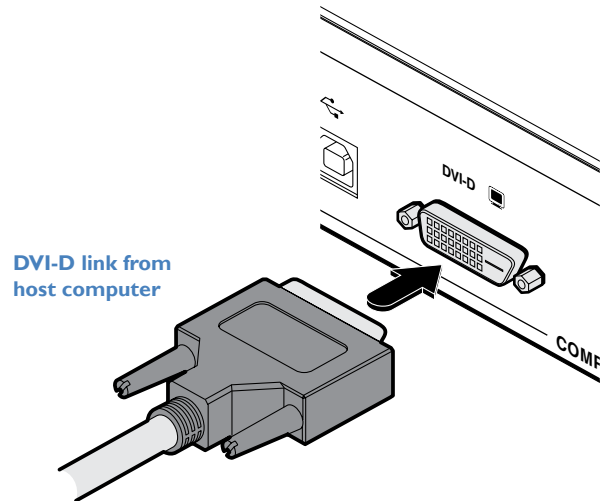
TX video link

ALIF units support a single high resolution DVI-D digital video display at pixel clocks up to 165MHz (equating to an example display mode of 1920 x 1200 at 60Hz refresh).



To make a video link

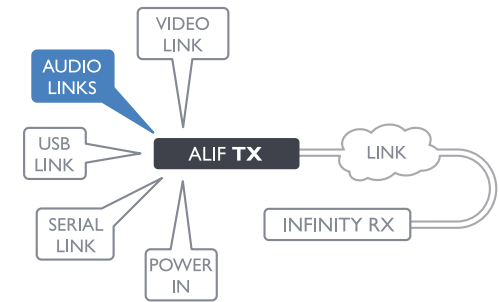
- 1 Wherever possible, ensure that power is disconnected from the ALIF and the host computer.
- 2 Connect a digital video link cable to the DVI-D socket on the TX unit rear panel:



- 3 Connect the plug at the other end of the cable to the corresponding DVI-D video output socket of the host computer.

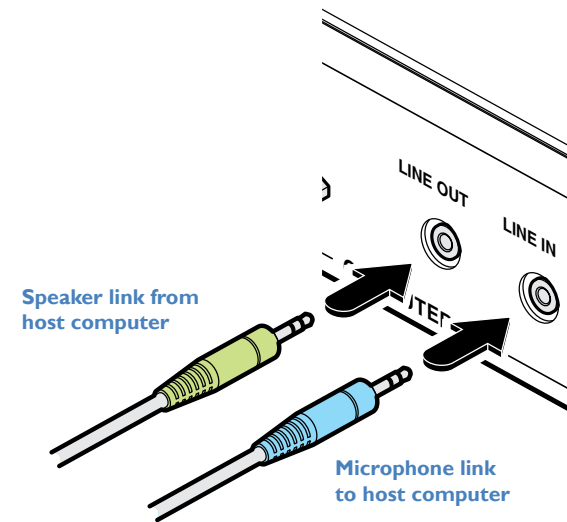
TX audio links

ALIF units support two way stereo digital sound so that you can use a remote digital microphone as well as speakers.



To make audio links

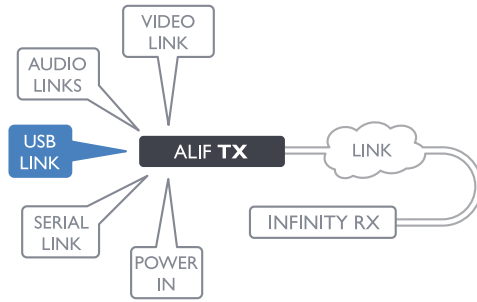
- 1 Connect an audio link cable between the LINE OUT socket on the TX unit rear panel and the speaker output socket of the host computer.



- 2 [Where a microphone is to be used]: Connect a second audio link cable between the LINE IN socket on the TX unit rear panel and the Line In socket of the host computer.

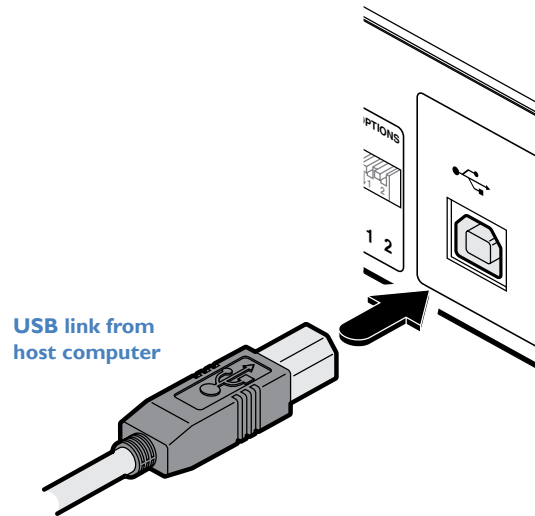
TX USB link

ALIF units act as USB 2.0 hubs and so can provide four sockets at the RX unit with only a single connection at the TX unit.



To make a USB link

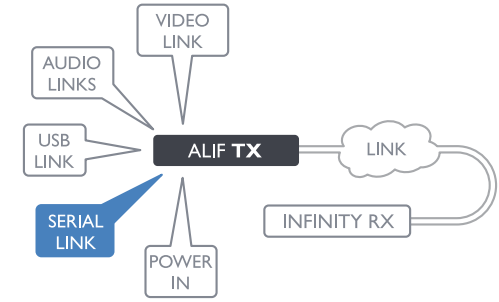
- 1 Connect the type B connector of the supplied USB cable to the USB port on the TX unit rear panel.



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

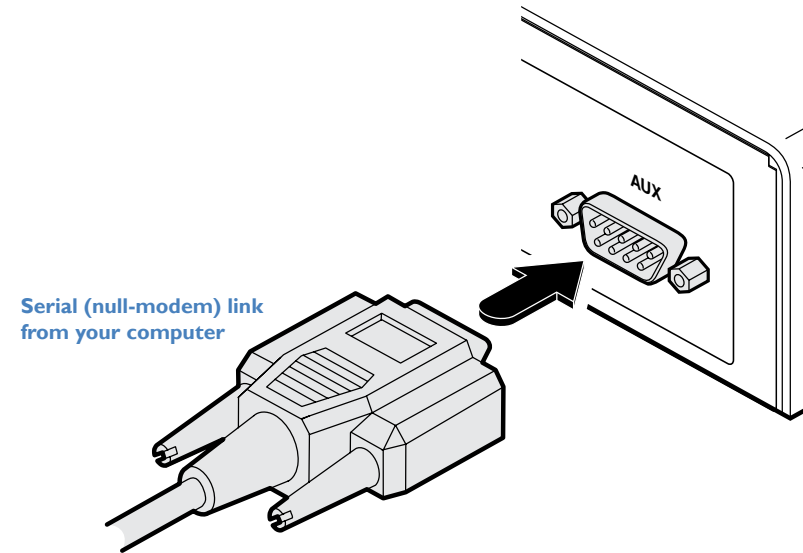
TX AUX port

The AUX port is an RS232 serial port that allows extension of RS232 signals up to a baud rate of 115200. The port has software flow control, but no hardware flow control.



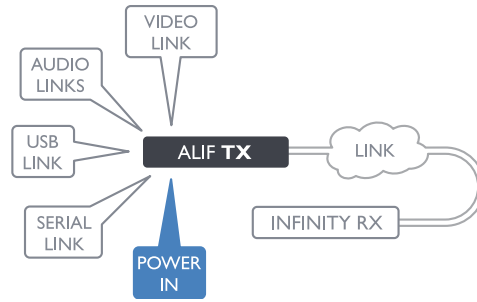
To connect the AUX port

- 1 Ensure that power is removed from the ALIF unit.
- 2 Connect a suitable serial 'null-modem' cable (see [Appendix F](#) for pin-out) between a vacant serial port on your computer and the AUX port on the right hand side of the ALIF rear panel.



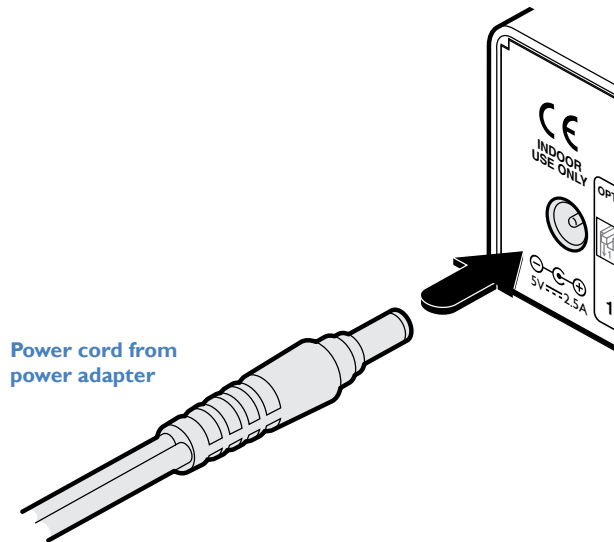
TX power in

Each ALIF unit is supplied with an appropriate power adapter. When all other connections have been made, connect and switch on the power adapter unit.



To apply power in

1 Attach the output lead from the power adapter to the 5V socket on the rear panel of the unit.



Note: Ensure that Option switches 1 and 2 are both in the 'off' (up) position to enable normal operation of the unit.

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

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

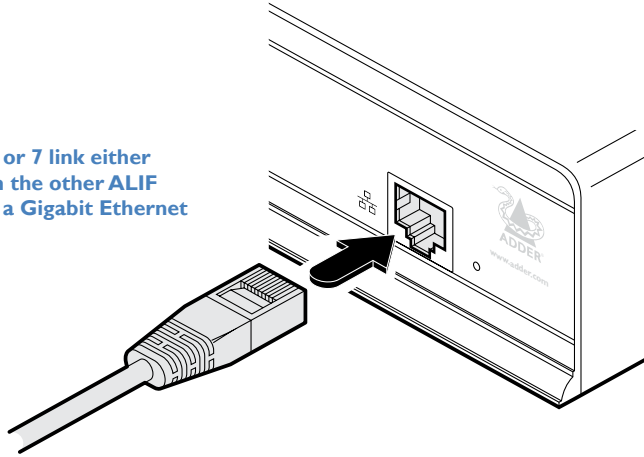
TX/RX network link

ALIF units can be either connected directly to each other or via a Gigabit Ethernet network. For direct links via Ethernet cable, the length of cable should not exceed 100 metres (328 feet). Network cables used for connections may be category 5, 5e, 6 or 7 twisted-pair cable. ALIF TX units have an autosensing capability on their network interfaces, so for direct point-to-point connections, no 'crossover' Ethernet cable is required.

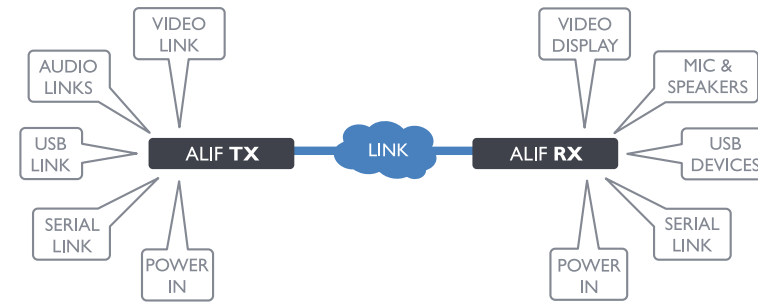
To link ALIF units using the System port

- 1 Connect a CAT 5, 5e, 6, or 7 cable to the System port socket on the front panel of the ALIF unit.

CAT 5, 5e, 6, or 7 link either directly from the other ALIF unit or from a Gigabit Ethernet switch



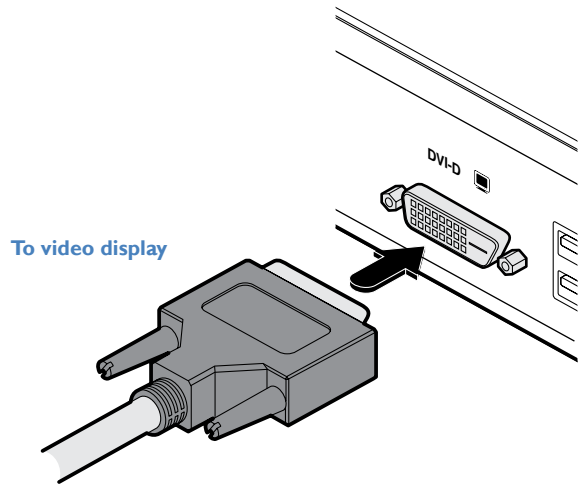
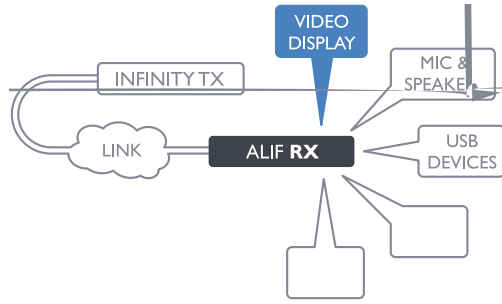
- 2 Connect the other end of the cable either to the other ALIF unit or to a Gigabit Ethernet switch, as appropriate.
- 3 [For connections via a network] repeat steps 1 and 2 for the other ALIF unit.



Please see [Appendix C](#) for important tips about networking ALIF units.

RX video display

ALIF units support a single high resolution DVI-D digital video display at pixel clocks up to 165MHz (equating to an example display mode of 1920 x 1200 at 60Hz refresh).

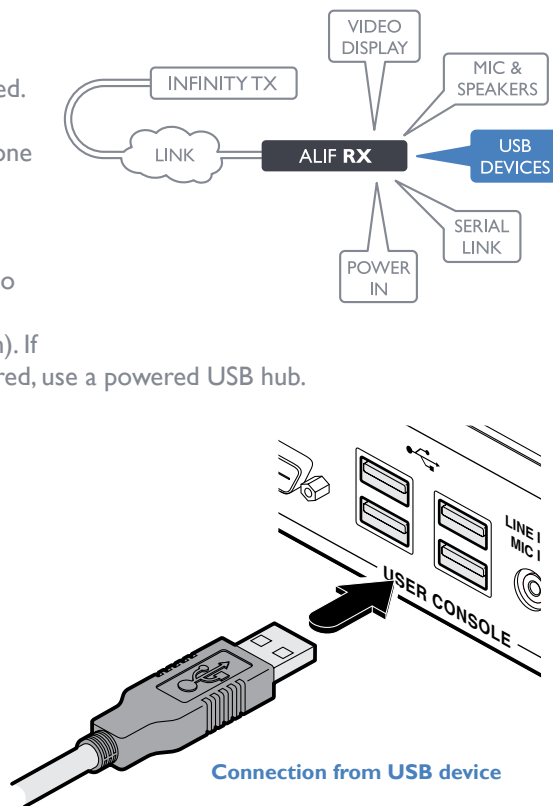


RX USB devices

The ALIF RX unit has four USB ports to which peripherals may be connected. The ports are interchangeable. To connect more than four peripherals, one or more USB hubs may be used. The total current that may be drawn from the USB ports is 1.2A, which should be sufficient for a keyboard, mouse (no more than 100mA each) and any two other devices (500mA maximum each). If more power for USB devices is required, use a powered USB hub.

To connect a USB device

- 1 Connect the lead from the device to any of the four USB sockets on the rear panel of the ALIF unit.



Connection from USB device

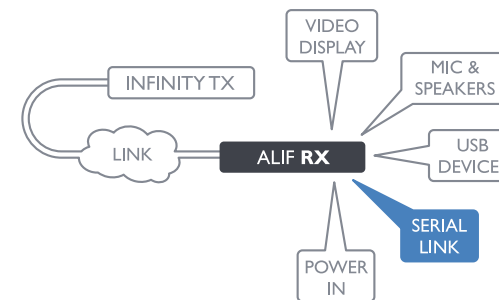
Supported USB Devices

The transmitter unit use True Emulation technology to emulate the signals of certain USB peripherals to the computer. This means that those peripherals appear to the computer to be permanently connected, even when the receivers are switched elsewhere. This enables faster keyboard and mouse switching and allows for more than 13 identical USB devices. If the keyboards and mice are identical across the connected receivers, they are only enumerated once by the host. The following limitations apply:

- Keyboards, mice and other HID devices are supported.
- Storage devices (i.e. flash drives, USB hard disks, CD-ROM drives) are supported, but they may operate more slowly than with a direct connection.
- Isochronous devices (including microphones, speakers, webcams and TV receivers) are not currently supported.
- Many other devices (such as printers, scanners, serial adapters and specialist USB devices) will work, but due to the huge variety of devices available, successful operation cannot be guaranteed.
- If a device cannot be made to work, please contact Adder technical support as a special entry within the advanced configuration may solve it.

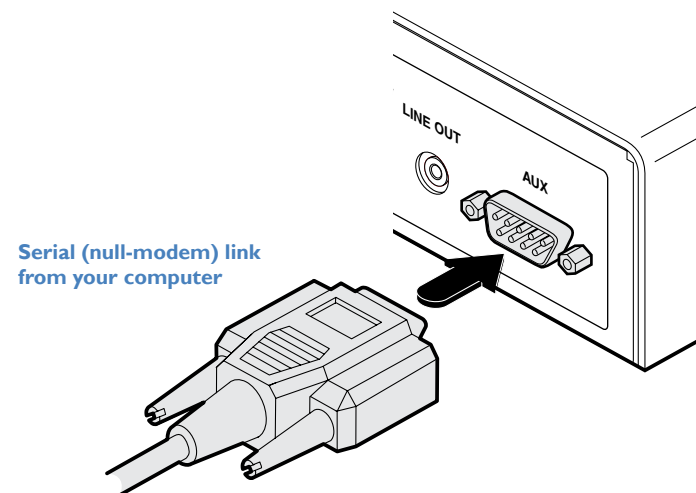
RX AUX port

The AUX port is an RS232 serial port that allows extension of RS232 signals up to a baud rate of 115200. The port has software flow control, but no hardware flow control.



To connect the AUX port

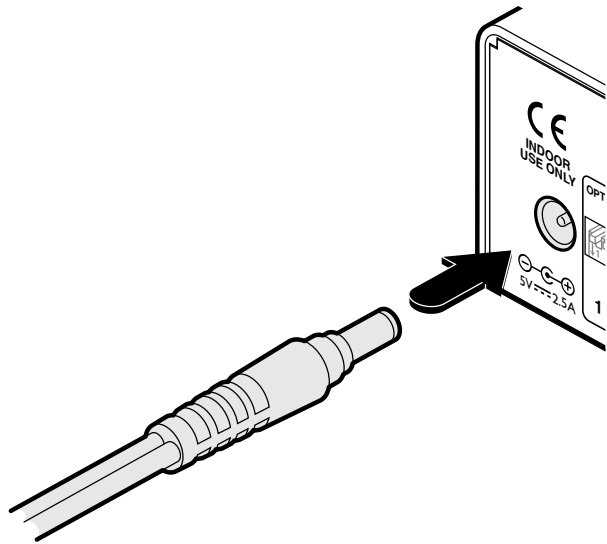
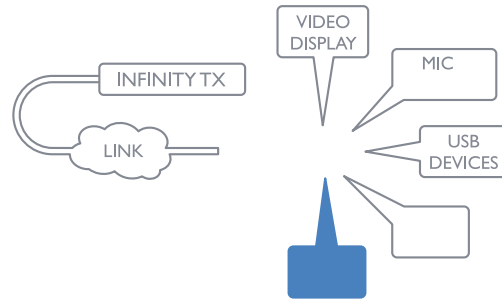
- 1 Ensure that power is removed from the ALIF unit.
- 2 Connect a suitable serial 'null-modem' cable (see [Appendix F](#) for pin-out) between the AUX port on the right hand side of the ALIF rear panel and your remote serial device.



Serial (null-modem) link from your computer

RX power in

Each ALIF unit is supplied with an appropriate power adapter. When all other connections have been made, connect and switch on the power adapter unit.



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

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

INITIAL CONFIGURATION

ALIF units are designed to be as flexible as possible and this principle extends also to their configuration.

Direct linking

Where an ALIF TX and an ALIF RX are directly linked to each other, no configuration action is required, provided that they have their factory default settings in place. If the standard settings have been changed in a previous installation, you merely need to perform a factory reset on each unit.

Networked linking

Where ALIF units are connected via networked links, you can either configure them individually, or configure them collectively using an A.I.M. server:

- **Configuring networked ALIF units individually** - You need to specify the network addresses of the ALIF units so that they can locate each other. This is done by running the [AdderLink Infinity browser-based configuration utility](#) on a computer system linked to the same network as the ALIF units.
- **Configuring ALIF units collectively** - The AdderLink Infinity Management (A.I.M.) server allows you to configure, control and coordinate any number of ALIF transmitters and receivers from a single application.

IMPORTANT: When using A.I.M. to configure ALIF units, it is vital that all ALIF units that you wish to locate and control are set to their factory default settings. Otherwise they will not be located by the A.I.M. server. If necessary, perform a factory reset on each ALIF unit.

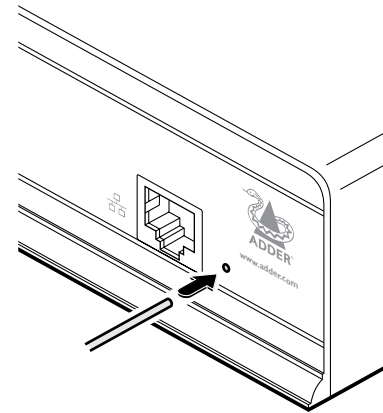
Please also see [Appendix C - Tips for success when networking ALIF units](#)

Manual factory reset

A factory reset returns an ALIF TX or RX unit to its default configuration. You can perform factory resets using the [AdderLink Infinity browser-based configuration utility](#) or by using this direct manual method.

To perform a manual factory reset

- 1 Remove power from the ALIF unit.
- 2 Use a narrow implement (e.g. a straightened-out paper clip) to press-and-hold the recessed reset button on the front panel. With the reset button still pressed, re-apply power to the unit and then release the reset button.



Use a straightened-out paper clip to press the reset button while powering on the unit

After roughly eight seconds, when the factory reset has completed, five of the front panel indicators will flash for a period of three seconds to indicate a successful reset operation.

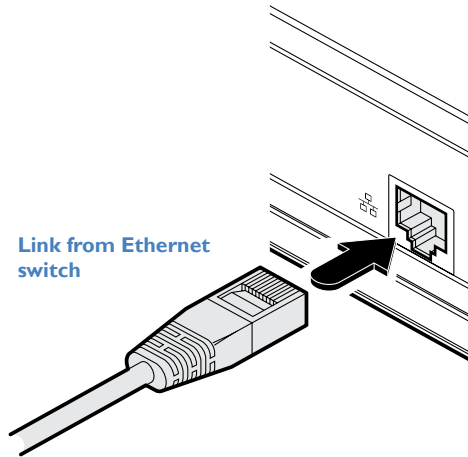
AdderLink Infinity browser-based configuration utility

The browser-based configuration utility within all TX and RX units requires a network connection between the ALIF unit and a computer on the same network. The configuration utility allows you to perform all of the following functions:

- View/edit the IP network address and netmask,
- Configure separate IP network addresses for video, audio and USB,
- Configure multicast settings (on RX units),
- Configure video bandwidth settings (on TX units),
- View the current video output (on TX units),
- Perform a firmware upgrade,
- Perform a factory reset.

To connect a computer system for browser-based configuration

1 Connect a suitable network cable to the Ethernet port on the front panel of the ALIF unit.



- 2 Connect the other end of the link cable to your network.
- 3 Similarly, link your computer to the same network. *Note: A Gigabit connection is not essential for configuration purposes.*
- 4 If not already switched on, power up your computer and the ALIF unit. You are now ready to use the browser-based configuration utility.

To access the browser-based configuration utility

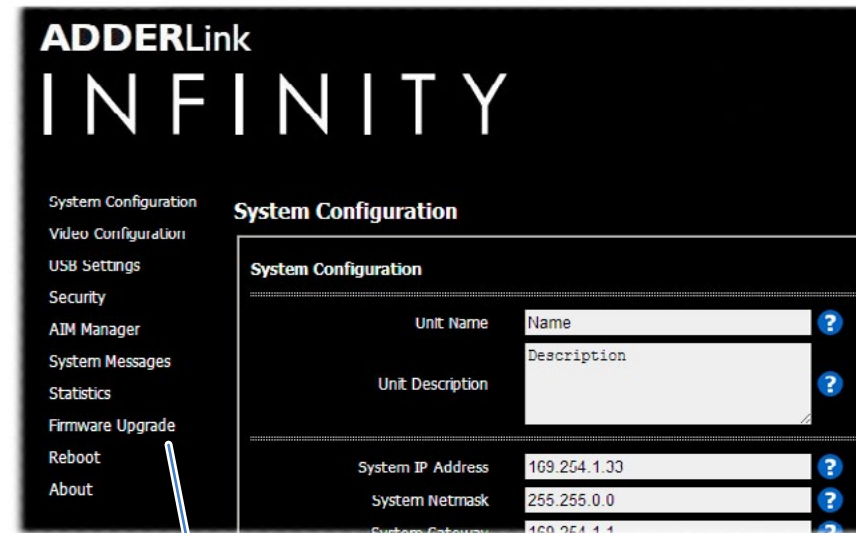
- 1 Temporarily connect the ALIF unit and a computer via a network, as discussed opposite.
- 2 Run a web browser on your computer and enter the IP address of the ALIF unit, e.g. <http://169.254.1.33>

The default settings are as follows:

- **TX units** - IP address: **169.254.1.33**
- **RX units** - IP address: **169.254.1.32**

Where the address of a unit is not known perform a [manual factory reset](#) to restore the default address.

The opening page of the ALIF configuration utility should be displayed:



Use the menu options to choose the required configuration page

You can find further information about the configuration pages for the TX and RX units within separate appendices later in this guide:

- [Appendix A - Transmitter \(TX\) unit configuration pages](#)
- [Appendix B - Receiver \(RX\) unit configuration pages](#)

A rough guide to configuring TX and RX units

TX (transmitter) unit configuration

In the ALIF system, the majority of configuration settings are dictated by the [RX units](#). Therefore, the local TX unit setup (using its browser-based configuration utility) is usually concerned only with three main factors: Its IP address details, the data streams to enable/disable and video signal optimization. Other TX unit pages, such as [USB Settings](#), [System Messages](#), [Firmware Upgrades](#) and [Reboot](#) are generally not used or altered during the majority of installations and are discussed elsewhere in this guide. See [Appendix A](#) for explanations of all TX configuration page options.

Setting the TX address and output signal details

- 1 Display the TX unit [System Configuration](#) page.
- 2 Ensure that the IP address and netmask for the TX unit are correct. The default settings are 169.254.1.33 and 255.255.0.0 respectively. Where changes are necessary, enter the new values and click the Update Now button. You will need to declare the System IP mmmvhat 5 th dhe
Eyscaes Eyscaes pnd r Esnfiguration paaes. M 5 trri tfe qu i exer Eeb pd rm
? Ehere ch5 r5 tq)tex R e r
H R E g e r

RX (receiver) unit configuration

In the ALIF system, it is the RX unit (receiver) that determines where and how data signals are sent (and received) by the [TX unit](#). Although numerous topologies (one-to-one, one-to-many, many-to-one, etc.) are made possible by the ALIF system, they are all dependent on two underlying modes of operation: either *Unicast* or *Multicast* transmission. Where multicast transmission is not invoked for video and/or audio data, operation will be automatically served by unicast network transmission technologies.

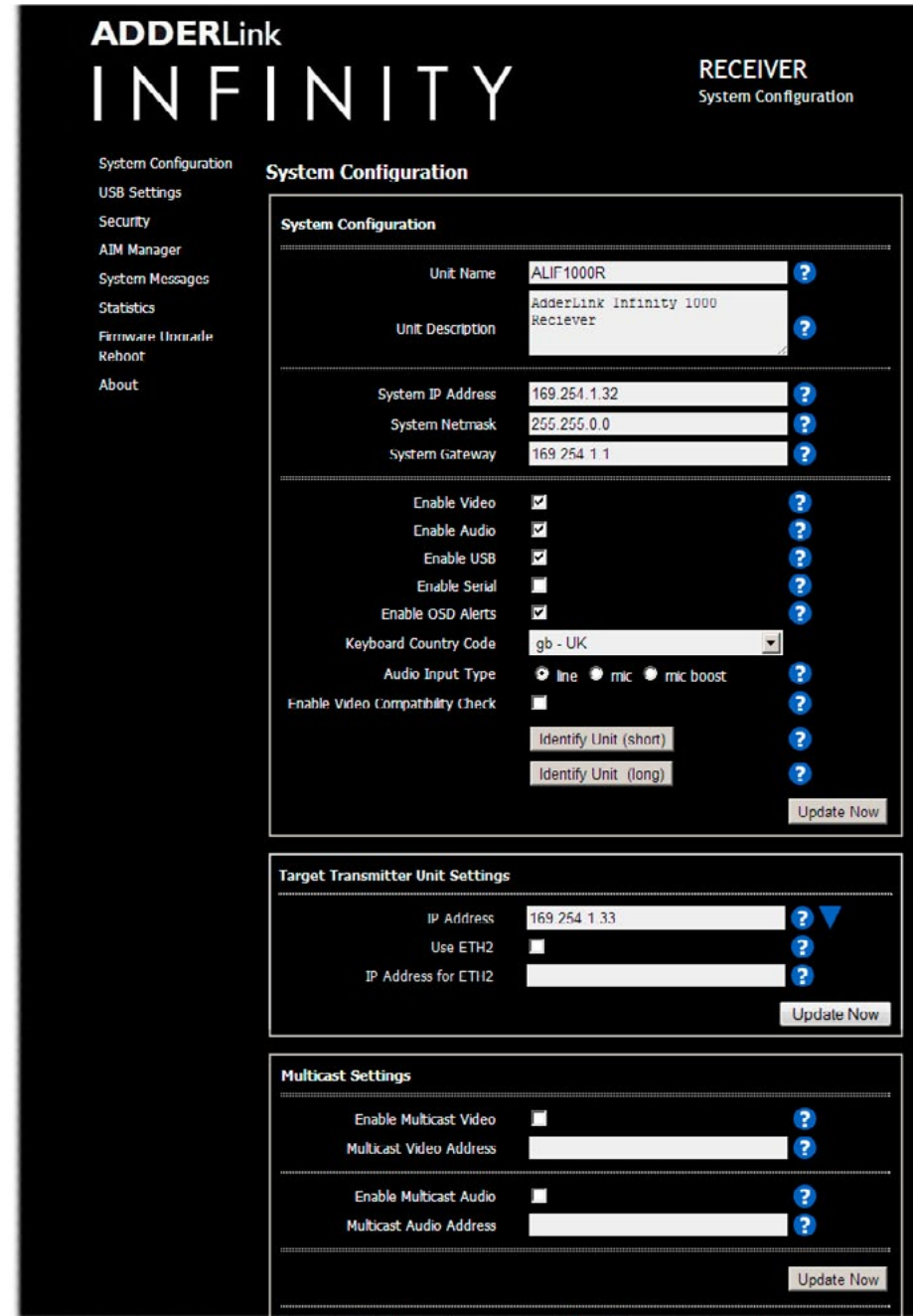
The RX unit setup (using the System Configuration page of its browser-based configuration utility) is concerned with four main factors: its own IP address details, the data streams to enable/disable, the IP address of the TX unit and multicast transmission details. Other pages, such as [USB Settings](#), [System Messages](#), [Firmware Upgrades](#) and [Reboot](#) are generally not used or altered during the majority of installations and are discussed elsewhere in this guide.

Configuring the RX unit

- 1 Display the RX unit [System Configuration](#) page.
- 2 In the System Configuration section, ensure that the System IP address and System Netmask for this RX unit are correct. Their default settings are 169.254.1.32 and 255.255.0.0 respectively. Where changes are necessary, enter the new values and click the **Update Now** button. The System IP Address that is set here will be sent to the TX unit as the destination for transmitted data (when operating in unicast mode). The Gateway entry is only necessary when the TX unit is located on a separate network to the RX unit.
- 3 Check that the data streams (Enable Video, Enable Audio and Enable USB - plus Enable Serial, if used) are enabled (ticked) or disabled (unticked) as appropriate. There are similar options within the TX unit configuration; if one of these options is ticked in one unit but unticked in the other, then that data stream will remain disabled. If you make a change, click the Update Now button.
- 4 If necessary, alter the Audio Input Type to match your audio input. The *line* option is for a stereo line input, *mic* and *mic boost* are for mono microphones, the latter benefiting from a +20dB gain boost.
- 5 In the Target Transmitter Unit Settings section, enter the IP address for the TX unit that will be supplying the video, audio, USB and serial data streams. (See also step 7 overleaf).
- 6 The *Use ETH2* setting controls an optional feature that can be used when the ALIF 1000 receiver is linked to an ALIF dual (2002 or 2112T) transmitter. This takes advantage of the extra Teaming port of those transmitters to provide a secondary (redundant) data feed. Once enabled, if the primary link fails for any reason, there will be a short delay for a few video frames (and possibly some on-screen corruption) as all the data packets are rearranged to be sent down the secondary link.

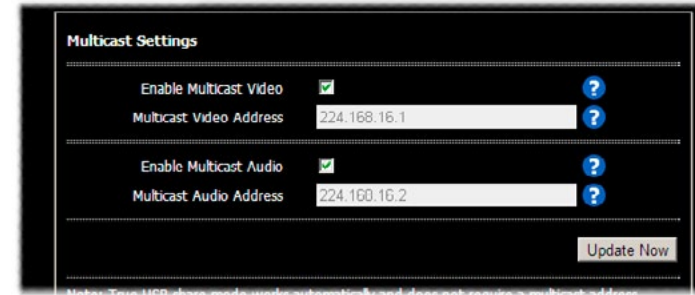
If required, tick the *Use ETH2* option to enable the feature and enter the IP address of the Teaming port (ETH2) of the transmitter whose primary IP address is declared in the field above. It is important that the primary and secondary ports are both derived from the same ALIF dual transmitter otherwise both links will fail. (See also step 8 overleaf).

continued



See [Appendix B](#) for individual explanations of the controls.

- 9 For installations that require multiple RX units to receive the same feeds, for either video or audio or both, then you need to configure the *Multicast Settings* section.



The Video and Audio sub-sections are configured in exactly the same way:

- First, tick the Enable Multicast Video / Enable Multicast Audio check box.
- Next, enter appropriate Multicast Addresses for the Video/Audio data stream(s). The set of IP addresses between 224.0.0.0 and 239.255.255.255 are specifically reserved for multicast operations. Within a private enterprise network, you merely need to choose a location that is currently unused. However, if your link will pass through public networks, then attention must be given to finding an address within these limits that is not already reserved for special use. The IANA (Internet Assigned Numbers Authority) website: iana.org provides a list of publicly reserved addresses.



PERFORMING AN UPGRADE

ALIF units are flash upgradeable using the method outlined here. However, for larger installations we recommend that you use the AdderLink Infinity Manager (A.I.M.) to upgrade multiple ALIF units. When using the method below, the ALIF unit will be upgraded in sequence.

WARNING: During the upgrade process, ensure that power is not interrupted as this may leave the unit in an inoperable state.

To upgrade a single unit via network link

- 1 Download the latest upgrade file from the Adder Technology website.
Note: There are separate upgrade files for TX and RX units.
- 2 Temporarily connect the ALIF unit and a computer via a network (see [AdderLink Infinity browser-based configuration utility](#) section for details).
- 3 Run a web browser on your computer and enter the IP address of the ALIF unit to be upgraded.
- 4 Click the Firmware Upgrade link. Within the Firmware Upgrade page, click the Choose File button. In the subsequent file dialog, locate the downloaded upgrade file - check that the file is correct for the unit being upgraded.
- 5 Click the Upgrade Now button. A progress bar will be displayed (however, if your screen is connected to the unit being upgraded then video may be interrupted) and the indicators on the front panel will flash while the upgrade is in progress.
- 6 The indicators should stop flashing in less than one minute, after which the unit will automatically reboot itself. The upgrade process is complete.

Finding the latest upgrade files

Firmware files for the ALIF units are available from the *Technical Support > Updates* section of the Adder Technology website (www.adder.com).

OPTIONS SWITCHES

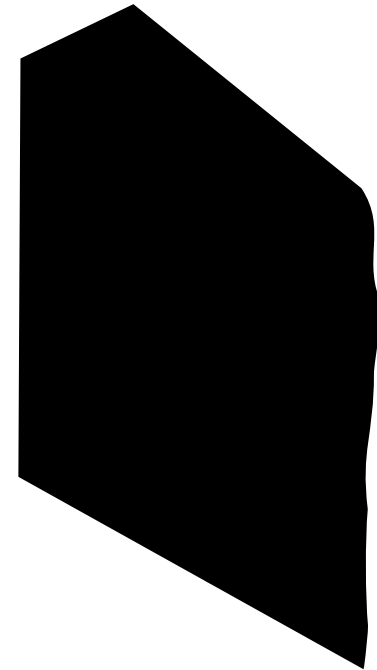
A pair of Options switches are located on the rear panel of every ALIF unit.

Switch 1 - firmware image select

Each ALIF unit retains a backup firmware image which can be used in situations where the primary firmware becomes corrupted (most often through failed upgrade operations). Using the backup firmware will allow you to regain operation of the unit.

Option switch 1	OFF	Normal operation using the main firmware
	ON	Operate using the backup firmware image

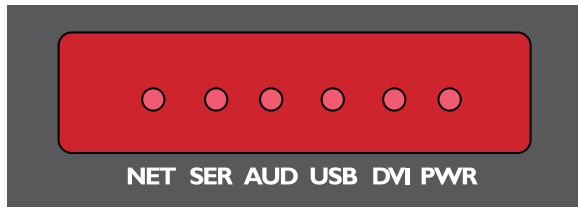
Option switch 2 is reserved and must remain in the OFF (up) position for normal operation.



In operation, many ALIF installations require no intervention once configured. The TX and RX units take care of all connection control behind the scenes so that you can continue to work unhindered.

FRONT PANEL INDICATORS

The six front panel indicators on each unit provide a useful guide to operation:



Indicators

These six indicators clearly show the key aspects of operation:

- **NET** On when valid network link is present. Flashes when the unit is in error.
- **SER** On when the AUX (serial) port is enabled and active.
- **AUD** On when audio is enabled and active.
- **USB** On when USB is enabled and active.
- **DVI** On when the DVI Video channel is enabled.
- **PWR** Power indicator.

This chapter contains a variety of information, including the following:

- Getting assistance - see right
- [Appendix A](#) - Transmitter (TX) unit configuration pages
- [Appendix B](#) - Receiver (TX) unit configuration pages
- [Appendix C](#) - Tips for success when networking ALIF units
- [Appendix D](#) - Troubleshooting
- [Appendix E](#) - Glossary
- [Appendix F](#) - RS232 'null-modem' cable, General specifications.
- [Safety information](#)
- [Warranty](#)
- [Radio frequency energy statements](#)

GETTING ASSISTANCE

If you are still experiencing problems after checking the information contained within this guide, then we provide a number of other solutions:

- **Online solutions and updates** – www.adder.com/support
Check the Support section of the adder.com website for the latest solutions and firmware updates.
- **Adder Forum** – forum.adder.com
Use our forum to access FAQs and discussions.
- **Technical support** – www.adder.com/contact-support-form
For technical support, use the contact form in the Support section of the adder.com website - your regional office will then get in contact with you.

APPENDIX A - Transmitter (TX) unit configuration pages

This section covers the browser-based configuration utility for the AdderF

T

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

INSTALLATION

CONFIGURATION

OPERATION

**FURTHER
INFORMATION**

INDEX



Unit Name

Name details that you can alter to distinguish this unit from all others. The name entered here will be read by A.I.M. units (if used) for administration purposes.

Unit Description

Allows you to optionally add a description of the unit, such as its location. Useful when many ALIF units are being used.

System IP Address

Enter the address that you wish to use for this transmitter. The default is 169.254.1.33 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx

System Netmask

Enter the netmask that you wish to use for this transmitter. The default is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0

System Gateway

Necessary when receiver units may be placed on a different network.

Enable options

These checkboxes allow you to determine which peripheral options will be used: Video, audio, USB and serial.

Serial port options

These allow you to match the serial configuration being used by the attached PC host.

Identify unit

When clicked, these buttons cause the front panel indicators to flash to assist with identifying the ALIF unit within a rack.

- The Identify Unit (short) button flashes the indicators for five seconds.
- The Identify Unit (long) button flashes the indicators for one hour but can be overridden by clicking the Identify Unit (short) button.

Thumbnail

The Thumbnail shows a snap shot of the video that is connected and reports the video resolution/color depth that has been detected. Click the Refresh Thumbnail button to update.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: <http://169.254.1.33>
If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the [System Configuration](#) link.

ADDERLink
TRANSMIT
Video Configuration

- System Configuration
- Video Configuration**
- USB Settings
- Security
- AIM Manager
- System Messages
- Statistics
- Firmware Upgrade
- Reboot
- About

Video Configuration

Bandwidth Control

Peak bandwidth limiter percentage: 95

1 95 ?

Video Control

Background Refresh: every 32 frames ?

Colour Depth: 24 bit ?

Use Default DDC: ?

Choose Default DDC: GENERIC 4:3 ?

Enable Hot Plug Detect on change of display: ?

Period of Hot Plug Detect signal: Default - 25ms ?

Frame skipping percentage: 0

0 99 ?

[Update Now](#)

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Peak bandwidth limiter percentage

The TX unit will employ a 'best effort' strategy in sending video and other data over the IP network. This means it will use as much of the available network bandwidth as necessary to achieve optimal data quality, although typically the TX unit will use considerably less than the maximum available. In order to prevent the TX unit from 'hogging' too much of the network capacity, you can reduce this setting to place a tighter limit on the maximum bandwidth permissible to the TX unit. Range: 0 to 95%.

Background Refresh

The TX unit sends portions of the video image only when they change. In order to give the best user experience, the TX unit also sends the whole video image, at a lower frame rate, in the background. The Background Refresh parameter controls the rate at which this background image is sent. The default value is 'every 32 frames', meaning that a full frame is sent in the background every 32 frames. Reducing this to 'every 64 frames' or more will reduce the amount of bandwidth that the TX unit consumes. On a high-traffic network this parameter should be reduced in this way to improve overall system performance. Options: every 32 frames, every 64 frames, every 128 frames, every 256 frames or disabled.

Colour Depth

This parameter determines the number of bits required to define the color of every pixel. The maximum (and default) value is '24 bit'. By reducing the value you can significantly reduce bandwidth consumption, at the cost of video color reproduction. Options: 24 bit, 16 bit or 8 bit.

Use Default DDC and Choose Default DDC

When the *Use Default DDC* option is unticked, AdderLink Infinity will use the EDID that is reported by the monitor connected to the receiver unit. However, if you tick the *Use Default DDC* option, you can then select from a range of preset video resolutions from the *Choose Default DDC* drop down box. Once selected, the TX will report itself capable of only supporting this one video resolution. Please note that all of the listed video resolutions are single link DVI with a maximum pixel clock of 165MHz and a 60Hz refresh rate.

Enable Hot Plug Detect...

When this option is ticked, every time the monitor is changed at the receiver unit, a hot plug detect message will be sent to the graphics card of the PC attached to the TX unit.

Period of Hot Plug Detect signal

This is the length of time that a hot-plug detect signal is applied. The default of 25mS is sufficient for the majority of graphics cards, however, a small minority may need to be given a longer a period.

Frame skipping percentage

Frame Skipping involves 'missing out' video frames between those captured by the TX unit. For video sources that update only infrequently or for those that update very frequently but where high fidelity is not required, frame skipping is a good strategy for reducing the overall bandwidth consumed by the system. Range: 0 to 100%.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: <http://169.254.1.33>
If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the **Video Configuration** link.

TX USB Settings



Enable Dummy Boot Keyboard

When ticked, the TX unit reports a virtual dummy boot keyboard to the attached PC to ensure that a keyboard is always reported when the PC boots up. The dummy boot keyboard uses one of the 13 USB endpoints, therefore if all 13 endpoints are required elsewhere for USB devices (or a KVM switch only supports two HID devices) then it can be disabled by deselecting this option. See also [Reserved Port Range](#) below.

Disable Hi-Speed

This option allows you to force the system to run at the low/full USB speed of 12Mb/s, thus forcing USB 2.0 Hi-Speed devices to adapt to the lower rate.

Hub Size

Using this option you can select whether the transmitter should report itself as a 13 or a 7 port USB hub. Some USB hosts are only able to support 7 port USB hubs. If this option is set to 7, then only 7 USB devices are supported by the PC.

Reserved Port Range

For some devices, e.g. touch screens, you may wish to ensure that they are always reported to the same USB port number so that the USB driver will always find the device. This option allows you reserve up to 8 ports for certain devices. At the RX unit, the devices are assigned to the reserved ports. If a port reservation is to be applied, then the dummy boot keyboard should be disabled. The default value for this option is '0', i.e. *disabled*. See [Port Reservation](#) on RX unit for further details.

TX Security



Encryption

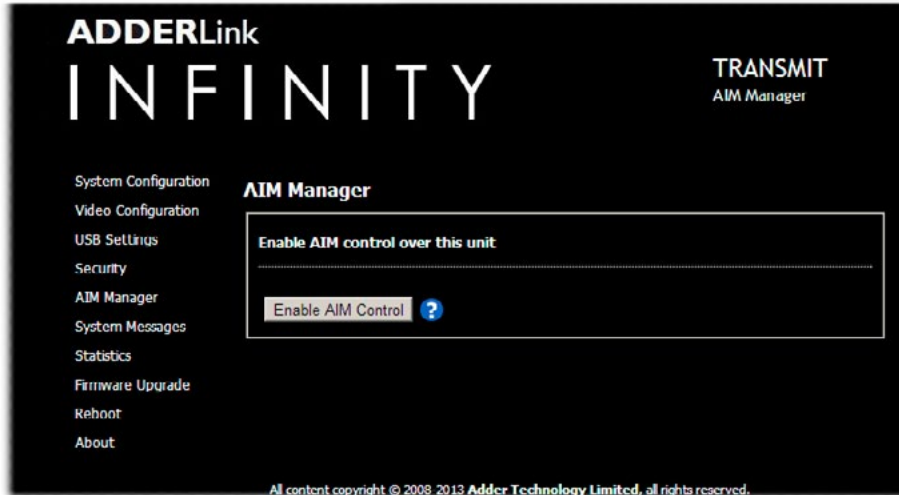
This setting allows you to apply encryption to the USB and control data passed across the link. Note that video data is never encrypted.

Secure Web pages with password

When ticked, this option enables https security so that the configuration pages are only accessible to the admin user with a password.

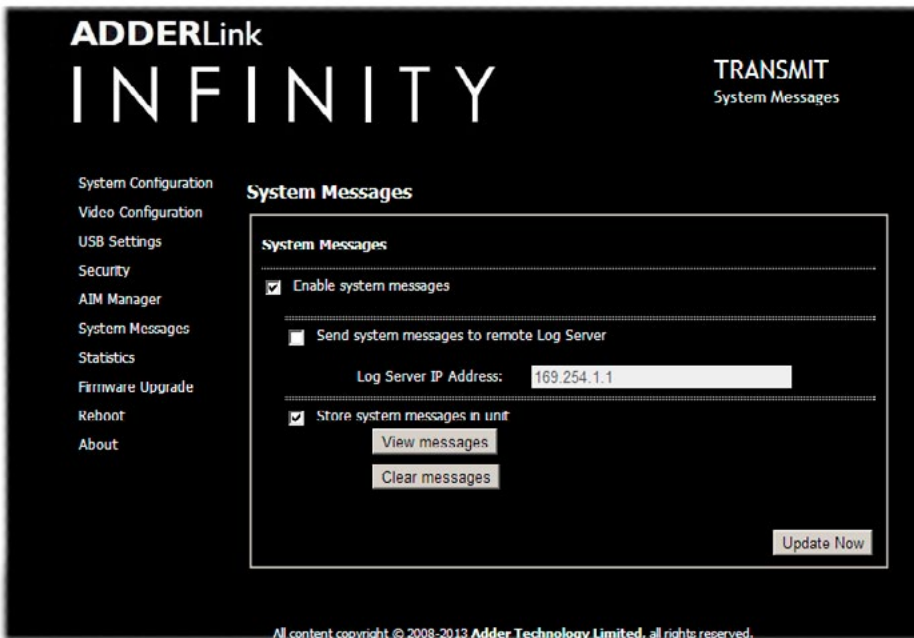
To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: **http://169.254.1.33**
If the address is unknown, perform a [manual factory reset](#).
- 3 Click either the **USB Settings** or **Security** links, as appropriate.



Enable AIM Control

Click this button to allow an A.I.M. (Adder Infinity Manager) box to take control of this TX. When the button is clicked, the TX unit will be rebooted to allow the A.I.M. box to discover and control it.



Enable system messages

Tick to allow the creation of status and error messages by the unit.

Send system messages to remote Log Server

Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

Store system messages in unit

When ticked, this option will store system messages within the memory of the unit. Click the *View messages* button to view the list or the *Clear messages* button to delete the list.

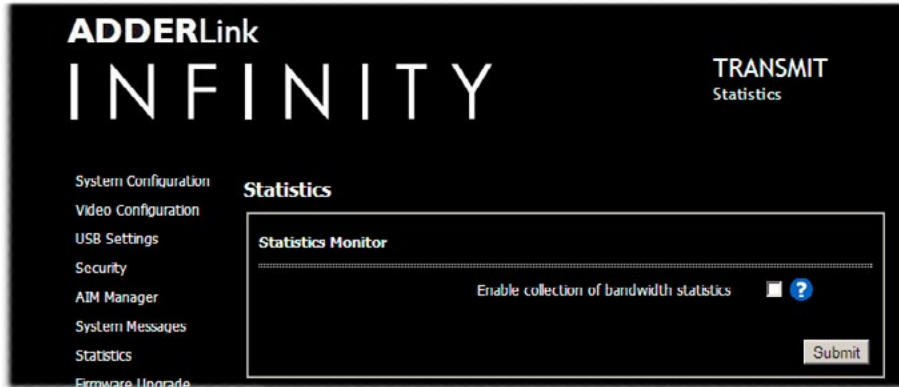
Update Now

Click to save and implement any changes that you make.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: <http://169.254.1.33>
If the address is unknown, perform a [manual factory reset](#).
- 3 Click either the **AIM Manager** or **System Messages** links, as appropriate.

TX Statistics



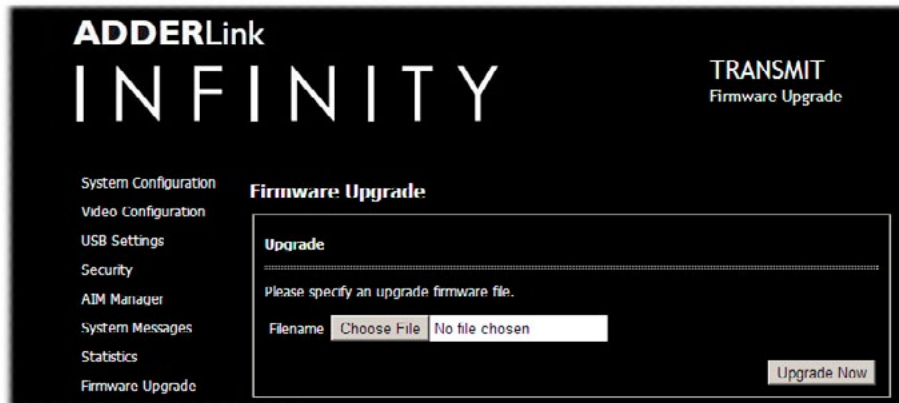
Enable collection of bandwidth statistics

The ALIF unit can record data transfer statistics and plot them on a graph for troubleshooting and optimization purposes. When you enable this option, you will first be presented with a pop up from which you can choose which aspects you would like to graph: Data throughput, various packet rates and/or frame rates.

Submit

Click this button after ticking the above checkbox to plot the chosen statistics on a pop up graph.

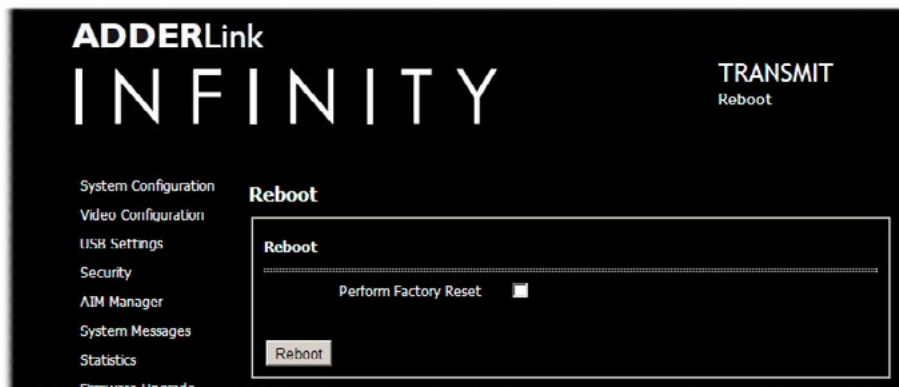
TX Firmware Upgrade



Upgrade

Use this page to upgrade the main or backup firmware image on the unit. Please see the section [Performing an upgrade](#) for details.

TX Reboot



Reboot

Use this page to perform a reboot or a factory reset. Please see the section [Manual factory reset](#) for details.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: <http://169.254.1.33>
If the address is unknown, perform a [manual factory reset](#).
- 3 Click either the **Statistics**, **Firmware Upgrade** or **Reboot** links, as appropriate.

ADDERLink

TRANSMIT

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System Configuration

Video Configuration

USB Settings

Security

AIM Manager

System Messages

Statistics

Firmware Upgrade

Reboot

About

About

System Information

MAC Address
Unit MAC address 00:0F:58:01:6D:E1

Main System
Build number 3.0.24059

Backup System
Build number 3.0.24059

Boot System
Build number 3.0.24059

Option Switches
Option Switch 1 was up at boot time
Option Switch 2 was up at boot time

Board Revision
Board Revision is 1

System Type
System Type is TX

Getting Help

Contact support@adder.com or visit <http://www.adder.com> for help

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About

This page displays key information about the TX unit that may be requested by Adder Technical Support.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the TX unit. Default: **http://169.254.1.33**
If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the **About** link.

APPENDIX B - Receiver (RX) unit configuration pages

This section covers the browser-based configuration utility for the AdderLink Infinity RX (receiver) unit. The RX utility has nine pages, titled as follows:

- [System Configuration](#)
- [USB Settings](#)
- [Security](#)
- [AIM Manager](#)
- [System Messages](#)
- [Statistics](#)
- [Firmware Upgrade](#)
- [Reboot](#)
- [About](#)

ADDERLink
RECEIVER
System Configuration

- System Configuration
- USB Settings
- Security
- AIM Manager
- System Messages
- Statistics
- Firmware Upgrade
- Reboot
- About

System Configuration

System Configuration

Unit Name	<input type="text" value="ALIF1000R"/>	?
Unit Description	<input type="text" value="AdderLink Infinity 1000 Receiver"/>	?
System IP Address	<input type="text" value="169.254.1.32"/>	?
System Netmask	<input type="text" value="255.255.0.0"/>	?
System Gateway	<input type="text" value="169.254.1.1"/>	?

Enable Video	<input checked="" type="checkbox"/>	?
Enable Audio	<input checked="" type="checkbox"/>	?
Enable USB	<input checked="" type="checkbox"/>	?
Enable Serial	<input type="checkbox"/>	?
Enable OSD Alerts	<input checked="" type="checkbox"/>	?
Keyboard Country Code	<input type="text" value="gb - UK"/>	?
Audio Input Type	<input checked="" type="radio"/> line <input type="radio"/> mic <input type="radio"/> mic boost	?
Enable Video Compatibility Check	<input type="checkbox"/>	?

Target Transmitter Unit Settings

IP Address	<input type="text" value="169.254.1.33"/>	? ▼
Use ETH2	<input type="checkbox"/>	?
IP Address for ETH2	<input type="text"/>	?

Multicast Settings

Enable Multicast Video	<input type="checkbox"/>	?
Multicast Video Address	<input type="text"/>	?
Enable Multicast Audio	<input type="checkbox"/>	?
Multicast Audio Address	<input type="text"/>	?

Notes: True USB share mode works automatically and does not require a multicast address.

Unit Name

Name details that you can alter to distinguish this unit from all others. The name entered here will be read by A.I.M. units (if used) for administration purposes.

Unit Description

Allows you to add a description of the unit, such as its location. Useful when many ALIF units are being used.

System IP Address

Enter the address that you wish to use for this receiver. The default is 169.254.1.32 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx

System Netmask

Enter the netmask that you wish to use for this receiver. The default is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0

System Gateway

Necessary when transmitter units may be placed on a different network.

Enable options

These checkboxes allow you to determine which peripheral options will be used: Video, audio, USB and serial.

Audio Input Type

Choose 'line' for stereo line input, 'mic' for mono microphone or 'mic boost' for a mono microphone that requires extra gain (+20dB).

Enable Video Compatibility Check

If enabled, this option compares the EDID reported by the PC graphics card and determines whether the display connected to the RX is capable of displaying the chosen video resolution. If not, an error message is generated and the connection is not made.

Identify unit

When clicked, these buttons cause the front panel indicators to flash to assist with identifying the ALIF unit within a rack.

- The Identify Unit (short) button flashes the indicators for five seconds.
- The Identify Unit (long) button flashes the indicators for one hour. Clicking the (short) button to override.

Target Transmitter Unit Settings

IP address: Enter the address of the TX unit that you need to connect with.

Use ETH2: Controls an optional feature that can be used when the ALIF 1000 receiver is linked to an ALIF dual (2002 or 2112T) transmitter. This allows the extra Teaming port of those transmitters to provide a secondary (redundant) data feed (using the *IP Address for ETH2* entry) that can be automatically substituted if the primary link fails.

This section also contains separate options for video, audio, USB and serial, which are accessible by clicking the blue arrow. See [A rough guide to configuring TX and RX units](#) for details.

Multicast Settings

The items within this section are required if the RX will join a multicast group i.e. many receivers connected to the one transmitter. You need to enter the multicast IP addresses of the Video and Audio that the TX unit has generated.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the **System Configuration** link.

INSTALLATION

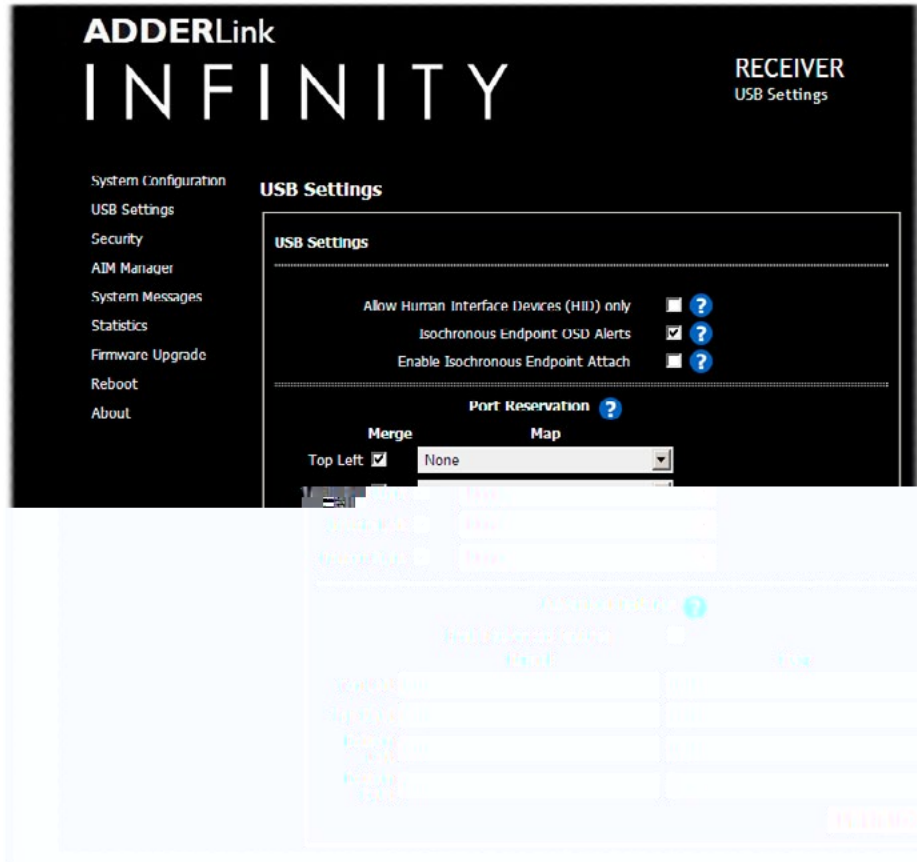
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Allow Human Interface Devices (HID) only

When enabled, this option restricts supported USB devices to keyboards and mice only. The use of memory sticks and other devices is disabled.

Isochronous Endpoint OSD Alerts

The AdderLink Infinity USB system does not support Isochronous USB. When enabled, this option will alert the user when an Isochronous USB device is connected.

Enable Isochronous Endpoint Attach

When enabled, this option will allow for an exchange of control information with an Isochronous device. Some devices have multiple endpoints e.g. a keyboard with an audio controller. By enabling this option, the keyboard functionality will work even though the isochronous audio functionality will not. Without this setting, the entire keyboard would be rejected as it would be detected as being solely an isochronous device.

Port Reservation

This section allows you to map the four USB connectors on the receiver to a specific USB port that has been reserved on the transmitter. It is useful if you have a specific device e.g. a touch screen that must be reported to a specific USB port on the USB host device. See [Reserved Port Range](#) on the TX unit for further details.

Advanced features

This section is used for special configuration and is disabled by default. If a USB device fails to operate as expected, this section allows special codes to be inserted to attempt to solve the issue.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the **USB Settings** link.



Encryption

This setting allows you to apply encryption to the USB and control data passed across the link. Note that video data is never encrypted.

Secure Web pages with password

When ticked, this option enables https security so that the configuration pages are only accessible to the admin user with a password.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
If the address is unknown, perform a [manual factory reset](#).
- 3 Click the **Security** link.



Enable AIM Control

Click this button to allow an A.I.M. (Adder Infinity Manager) box to take control of this RX. When the button is clicked, the RX unit will be rebooted to allow the A.I.M. box to discover and control it.

RX System Messages



Enable system messages

Tick to allow the creation of status and error messages by the unit.

Send system messages to remote Log Server

Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

Store system messages in unit

When ticked, this option will store system messages within the memory of the unit. Click the *View messages* button to view the list or the *Clear messages* button to delete the list.

Update Now

Click to save and implement any changes that you make.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
If the address is unknown, perform a [manual factory reset](#).
- 3 Click either the **AIM Manager** or **System Messages** links, as appropriate.

RX Statistics



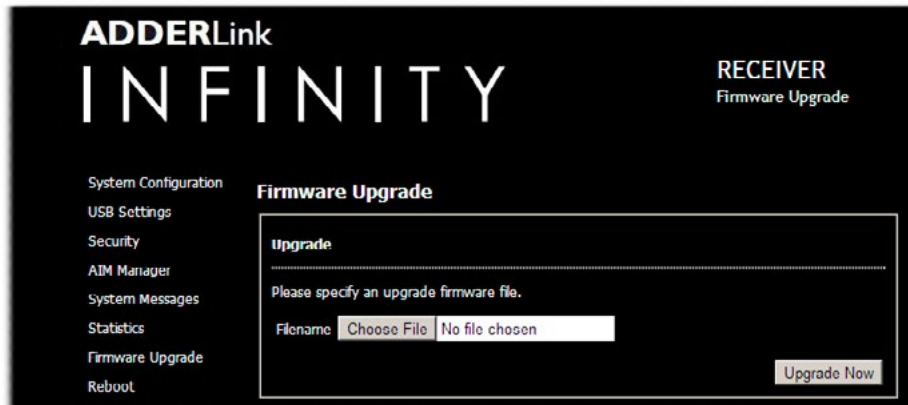
Enable collection of bandwidth statistics

The ALIF unit can record data transfer statistics and plot them on a graph for troubleshooting and optimization purposes. When you enable this option, you will first be presented with a pop up from which you can choose which aspects you would like to graph: Data throughput, various packet rates and/or frame rates.

Submit

Click this button after ticking the above checkbox to plot the chosen statistics on a pop up graph.

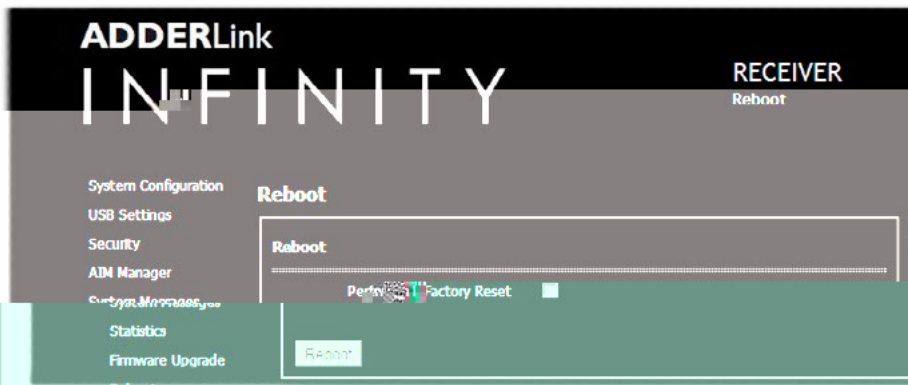
RX Firmware Upgrade



Upgrade

Use this page to upgrade the main or backup firmware image on the unit. Please see the section [Performing an upgrade](#) for details.

RX Reboot



Reboot

Use this page to perform a reboot or a factory reset. Please see the section [Manual factory reset](#) for details.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
If the address is unknown, perform a [manual factory reset](#).
- 3 Click either the **Statistics**, **Firmware Upgrade** or **Reboot** links, as appropriate.

ADDERLink

RECEIVER

About

System Configuration

USB Settings

Security

AIM Manager

System Messages

Statistics

Firmware Upgrade

Reboot

About

About

System Information

MAC Address

Unit MAC address 00:0F:58:01:46:78

Main System

Build number 3.0.24059

Backup System

Build number 3.0.24059

Boot System

Build number 3.0.24059

Option Switches

Option Switch 1 was up at boot time

Option Switch 2 was up at boot time

Board Revision

Board Revision is 1

System Type

System Type is RX

Getting Help

Contact support@adder.com or visit <http://www.adder.com> for help

About

This page displays key information about the RX unit that may be requested by Adder Technical Support.

To get here

- 1 If not already connected, temporarily [connect the AdderLink Infinity unit and a PC via a network](#).
- 2 Run a web browser and enter the IP address of the RX unit. Default: <http://169.254.1.32>
- If the address is unknown, perform a [manual factory reset](#).
- 3 If necessary, click the **About** link.

APPENDIX C - Tips for success when networking ALIF units

ALIF units use multiple strategies to minimize the amount of data that they send across networks. However, data overheads can be quite high, particularly when very high resolution video is being transferred, so it is important to take steps to maximize network efficiency and help minimize data output. The tips given in this section have been proven to produce very beneficial results.

Summary of steps

- Choose the right kind of switch.
- Create an efficient network layout.
- Configure the switches and devices correctly.

Choosing the right switch

[Layer 2](#) switches are what bind all of the hosts together in the subnet. However, they are all not created equally, so choose carefully. In particular look for the following:

- Gigabit (1000Mbps) or faster Ethernet ports,
- Support for [IGMP v2](#) (or v3) snooping,
- Support for [Jumbo frames](#) up to 9216-byte size,
- High bandwidth connections between switches, preferably Fiber Channel.
- Look for switches that perform their most onerous tasks (e.g. [IGMP snooping](#)) using multiple dedicated processors (ASICs).
- Ensure the maximum number of concurrent ‘snoopable groups’ the switch can handle meets or exceeds the number of ALIF transmitters that will be used to create multicast groups.
- Check the throughput of the switch: Full duplex, 1Gbps up- and down- stream speeds per port.
- Use the same switch make and model throughout a single subnet.
- You also need a [Layer 3](#) switch. Ensure that it can operate efficiently as an [IGMP Querier](#).

Layer 2 (and Layer 3) switches known to work

- Cisco 2960
- Extreme Networks X480
- Cisco 3750
- HP Procurve 2810
- Cisco 4500
- HP Procurve 2910
- Cisco 6500



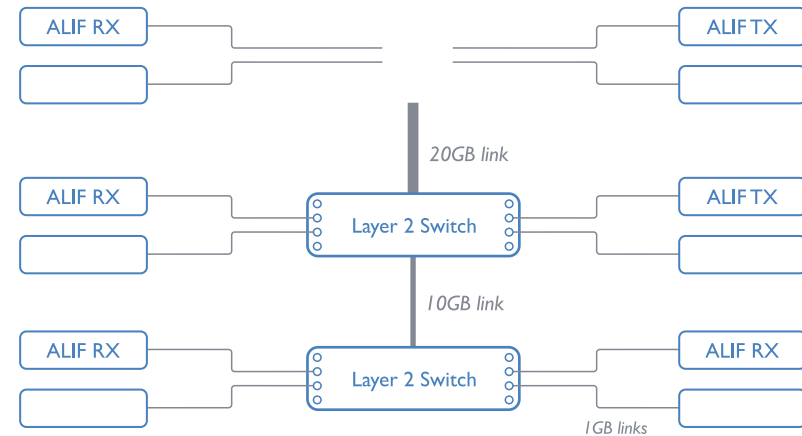
Creating an efficient network layout

Network layout is vital. The use of [IGMP snooping](#) also introduces certain constraints, so take heed:

- Keep it flat. Use a basic line-cascade structure rather than a pyramid or tree arrangement.
- Keep the distances between the switches as short as possible.
- Ensure sufficient bandwidth between switches to eliminate bottlenecks.
- Where the A.I.M. server is used to administer multiple ALIF transceivers, ensure the A.I.M. server and all ALIF units reside in the same subnet.
- Do not use VGA to DVI converters, instead replace VGA video cards in older systems with suitable DVI replacements. Converters cause ALIF TX units to massively increase data output.
- Wherever possible, create a private network.

The recommended layout

The layout shown below has been found to provide the most efficient network layout for rapid throughput when using IGMP snooping:



- Use no more than two cascade levels.
- Ensure high bandwidth between the two L2 switches and very high bandwidth between the top L2 and the L3. Typically 10GB and 20GB, respectively for 48 port L2 switches.

continued

Configuring the switches and devices

The layout is vital but so too is the configuration:

- Enable [IGMP Snooping](#) on all L2 switches.
- Ensure that [IGMP Fast-Leave](#) is enabled on all switches with ALIF units connected directly to them.
- Enable the L3 switch as an [IGMP Querier](#).
- Enable [Spanning Tree Protocol \(STP\)](#) on all switches and importantly also enable portfast (only) on all switch ports that have ALIF units connected.
- If any hosts will use any video resolutions using 2048 horizontal pixels (e.g. 2048 x 1152), ensure that [Jumbo Frames](#) are enabled on all switches.
- Choose an appropriate forwarding mode on all switches. Use [Cut-through](#) if available, otherwise [Store and forward](#).
- Optimize the settings on the ALIF transmitters:
 - If color quality is important, then leave Colour Depth at 24 bits and adjust other controls,
 - If moving video images are being shown frequently, then leave Frame Skipping at a low percentage and instead reduce the Peak bandwidth limiter and Colour Depth.
 - Where screens are quite static, try increasing the Background Refresh interval and/or increasing the Frame skipping percentage setting.

Make changes to the ALIF transmitters one at a time, in small steps, and view typical video images so that you can attribute positive or negative results to the appropriate control.

- Ensure that all ALIF units are fully updated to the latest firmware version (at least v2.1).

APPENDIX D - Troubleshooting

Problem: The video image of the ALIF receiver shows horizontal lines across the screen.

This issue is known as *Blinding* because the resulting video image looks as though you're viewing it through a venetian blind.

When video is transmitted by ALIF units, the various lines of each screen are divided up and transmitted as separate data packets. If the reception of those packets is disturbed, then blinding is caused. The lines are displayed in place of the missing video data packets.

There are several possible causes for the loss of data packets:

- Incorrect switch configuration. The problem could be caused by multicast flooding, which causes unnecessary network traffic. This is what IGMP snooping is designed to combat, however, there can be numerous causes of the flooding.
- Speed/memory bandwidth issues within one or more switches. The speed and capabilities of different switch models varies greatly. If a switch cannot maintain pace with the quantity of data being sent through it, then it will inevitably start dropping packets.
- One or more ALIF units may be outputting Jumbo frames due to the video resolution (2048 horizontal pixels) being used. If jumbo frames are output by an ALIF unit, but the network switches have not been configured to use jumbo frames, the switches will attempt to break the large packets down into standard packets. This process introduces a certain latency and could be a cause for dropped packets.
- One or more ALIF units may be using an old firmware version. Firmware versions prior to v2.1 exhibited an issue with the timing of IGMP join and leave commands that caused multicast flooding in certain configurations.

Remedies:

- Ensure that [IGMP snooping](#) is enabled on all switches within the subnet.
- Where each ALIF unit is connected as the sole device on a port connection to a switch, enable [IGMP Fast-Leave \(aka Immediate Leave\)](#) to reduce unnecessary processing on each switch.
- Check the video resolution(s) being fed into the ALIF transmitters. If resolutions using 2048 horizontal pixels are unavoidable then ensure that [Jumbo frames](#) are enabled on all switches.
- Check the [forwarding mode](#) on the switches. If *Store and forward* is being used, try selecting *Cut-through* as this mode causes reduced latency on lesser switch designs.
- Ensure that one device within the subnet is correctly configured as an [IGMP Querier](#), usually a layer 3 switch or multicast router.
- Ensure that the firmware in every ALIF unit is version 2.1 or greater.
- Try adjusting the transmitter settings on each ALIF to make the output data stream as efficient as possible. See [ALIF transmitter video settings](#) for details.

continued

Problem:The mouse pointer of the ALIF receiver is slow or sluggish when moved across the screen.

This issue is often related to either using dithering on the video output of one or more transmitting computers or using VGA-to-DVI video converters.

Dithering is used to improve the perceived quality and color depth of images by diffusing or altering the color of pixels between video frames. This practice is commonly used on Apple Mac computers using ATI or Nvidia graphics cards. VGAto-DVI converters unwittingly produce a similar issue by creating high levels of pixel background noise.

ALIF units attempt to considerably reduce network traffic by transmitting only the pixels that change between successive video frames. When dithering is enabled and/or VGA-to-DVI converters are used, this can have the effect of changing almost every pixel between each frame, thus forcing the ALIF transmitter to send the whole of every frame: resulting in greatly increased network traffic and what's perceived as sluggish performance.

Remedies:

- Linux PCs
Check the video settings on the PC. If the Dither video box option is enabled, disable it.
- Apple Mac with Nvidia graphics
Use the Adder utility for Mac's – Contact technical support.
- Apple Mac with ATI graphics
Use the ALIF 2000 series unit with Magic Eye dither removal feature.
- Windows PCs
If you suspect these issues with PC's, contact technical support for assistance.
- Replace old VGA adapters on host computers with DVI video cards.

Problem:The audio output of the ALIF receiver sounds like a scratched record.

This issue is called Audio crackle and is a symptom of the same problem that produces blinding (see previous page). The issue is related to missing data packets.

Remedies:

As per blinding discussed previously.

Problem:A.I.M. cannot locate working ALIF units.

There are a few possible causes:

- The ALIF units must be reset back to their zero config IP addresses for A.I.M. discovery. If you have a working network of ALIF's without A.I.M. and then add A.I.M. to the network A.I.M. will not discover the ALIFs until they are reset to the zero config IP addresses.
- This could be caused by Layer 2 Cisco switches that have [Spanning Tree Protocol \(STP\)](#) enabled but do not also have *portfast* enabled on the ports to which ALIF units are connected. Without portfast enabled, ALIF units will all be assigned the same zero config IP address at reboot and A.I.M. will only acquire them one at a time on a random basis.

You can easily tell whether portfast is enabled on a switch that is running STP: When you plug the link cable from a working ALIF unit into the switch port, check how long it takes for the port indicator to change from orange to green. If it takes roughly one second, portfast is on; if it takes roughly thirty seconds then portfast is disabled.

Remedies:

- Ensure that the ALIF units and the A.I.M. server are located within the same subnet. A.I.M. cannot cross subnet boundaries.
- [Manually reset](#) the ALIF units to their zero config IP addresses.
- Enable portfast on all switch ports that have ALIF units attached to them or try temporarily disabling STP on the switches while A.I.M. is attempting to locate ALIF units.

APPENDIX E - Glossary

Internet Group Management Protocol

Where an ALIF transmitter is required to stream video to two or more receivers, multicasting is the method used.

Multicasting involves the delivery of identical data to multiple receivers simultaneously without the need to maintain individual links. When multicast data packets enter a subnet, the natural reaction of the switches that bind all the hosts together within the subnet, is to spread the multicast data to all of their ports. This is referred to as Multicast flooding and means that the hosts (or at least their network interfaces) are required to process plenty of data that they didn't request. IGMP offers a partial solution.

The Internet Group Management Protocol (IGMP) is designed to prevent multicast flooding by allowing [Layer 3](#) switches to check whether host computers within their care are interested in receiving particular multicast transmissions. They can then direct multicast data only to those points that require it and can shut off a multicast stream if the subnet has no recipients.

There are currently three IGMP versions: 1, 2 and 3, with each version building upon the capabilities of the previous one:

- IGMPv1 allows host computers to opt into a multicast transmission using a Join Group message, it is then incumbent on the router to discover when they no longer wish to receive; this is achieved by polling them (see IGMP Querier below) until they no longer respond.
- IGMPv2 includes the means for hosts to opt out as well as in, using a Leave Group message.
- IGMPv3 encompasses the abilities of versions 1 and 2 but also adds the ability for hosts to specify particular sources of multicast data.

AdderLink Infinity units make use of IGMPv2 when performing multicasts to ensure that no unnecessary congestion is caused.

IGMP Snooping

The IGMP messages are effective but only operate at [layer 2](#) - intended for routers to determine whether multicast data should enter a subnet. A relatively recent development has taken place within the switches that glue together all of the hosts within each subnet: IGMP Snooping. IGMP snooping means these layer 2 devices now have the ability to take a peek at the IGMP messages. As a result, the switches can then determine exactly which of their own hosts have requested to receive a multicast – and only pass on multicast data to those hosts.

IGMP Querier

When IGMP is used, each subnet requires one [Layer 3](#) switch to act as a Querier. In this lead role, the switch periodically sends out IGMP Query messages and in response all hosts report which multicast streams they wish to receive. The Querier device and all snooping Layer 2 switches, then update their lists accordingly (the lists are also updated when Join Group and Leave Group (IGMPv2) messages are received).

IGMP Fast-Leave (aka Immediate Leave)

When a device/host no longer wishes to receive a multicast transmission, it can issue an IGMP Leave Group message as mentioned above. This causes the switch to issue an IGMP Group-Specific Query message on the port (that the Leave Group was received on) to check no other receivers exist on that connection that wish to remain a part of the multicast. This process has a cost in terms of switch processor activity and time.

Where ALIF units are connected directly to the switch (with no other devices on the same port) then enabling IGMP Fast-Leave mode means that switches can immediately remove receivers without going through a full checking procedure. Where multiple units are regularly joining and leaving multicasts, this can speed up performance considerably.

Jumbo frames (Jumbo packets)

Since its commercial introduction in 1980, the Ethernet standard has been successfully extended and adapted to keep pace with the ever improving capabilities of computer systems. The achievable data rates, for instance, have risen in ten-fold leaps from the original 10Mbit/s to a current maximum of 100Gbit/s.

While data speeds have increased massively, the standard defining the number of bytes (known as the Payload) placed into each data packet has remained resolutely stuck at its original level of 1500 bytes. This standard was set during the original speed era (10Mbits/s) and offered the best compromise at that speed between the time taken to process each packet and the time required to resend faulty packets due to transmission errors.

But now networks are much faster and files/data streams are much larger; so time for a change? Unfortunately, a wholesale change to the packet size is not straightforward as it is a fundamental standard and changing it would mean a loss of backward compatibility with older systems.

Larger payload options have been around for a while, however, they have often been vendor specific and at present they remain outside the official standard. There is, however, increased consensus on an optional 'Jumbo' payload size of 9000 bytes and this is fully supported by the AdderLink Infinity (ALIF) units.

Jumbo frames (or Jumbo packets) offer advantages for ALIF units when transmitting certain high resolution video signals across a network. This is because the increased data in each packet reduces the number of packets that need to be transferred and dealt with - thus reducing latency times.

The main problem is that for jumbo frames to be possible on a network, all of the devices on the network must support them.

Spanning Tree Protocol (STP)

In order to build a robust network, it is necessary to include certain levels of redundancy within the interconnections between switches. This will help to ensure that a failure of one link does not lead to a complete failure of the whole network.

The danger of multiple links is that data packets, especially multicast packets, become involved in continual loops as neighbouring switches use the duplicated links to send and resend them to each other.

To prevent such bridging loops from occurring, the Spanning Tree Protocol (STP), operating at [layer 2](#), is used within each switch. STP encourages all switches to communicate and learn about each other. It prevents bridging loops by blocking newly discovered links until it can discover the nature of the link: is it a new host or a new switch?

The problem with this is that the discovery process can take up to 50 seconds before the block is lifted, causing problematic timeouts.

The answer to this issue is to enable the portfast variable for all host links on a switch. This will cause any new connection to go immediately into forwarding mode. However, take particular care not to enable portfast on any switch to switch connections as this will result in bridging loops.

ALIF transmitter video settings

Each ALIF transmitter includes controls to help you customize how video data is transmitted. When configured correctly for the application, these can help to increase data efficiency.

Background Refresh

The transmitter sends portions of the video image only when they change. In order to give the best user experience, the transmitter also sends the whole video image, at a lower frame rate, in the background. The Background Refresh parameter controls the rate at which this background image is sent. The default value is 'every 32 frames', meaning that a full frame is sent in the background every 32 frames. Reducing this to 'every 64 frames' or more will reduce the amount of bandwidth that the transmitter consumes. On a high-traffic network this parameter should be reduced in this way to improve overall system performance.

Colour Depth

This parameter determines the number of bits required to define the color of every pixel. The maximum (and default) value is '24 bit'. By reducing the value you can significantly reduce bandwidth consumption, at the cost of video color reproduction.

Peak Bandwidth Limiter

The transmitter will employ a 'best effort' strategy in sending video and other data over the IP network. This means it will use as much of the available network bandwidth as necessary to achieve optimal data quality, although typically the transmitter will use considerably less than the maximum available.

In order to prevent the transmitter from 'hogging' too much of the network capacity, you can reduce this setting to place a tighter limit on the maximum bandwidth permissible to the transmitter.

Frame Skipping

Frame Skipping involves 'missing out' video frames between those captured by the transmitter. For video sources that update only infrequently or for those that update very frequently but where high fidelity is not required, frame skipping is a good strategy for reducing the overall bandwidth consumed by the system.

Forwarding modes

In essence, the job of a layer 2 switch is to transfer as fast as possible, data packets arriving at one port out to another port as determined by the destination address. This is known as data forwarding and most switches offer a choice of methods to achieve this. Choosing the most appropriate forwarding method can often have a sizeable impact on the overall speed of switching:

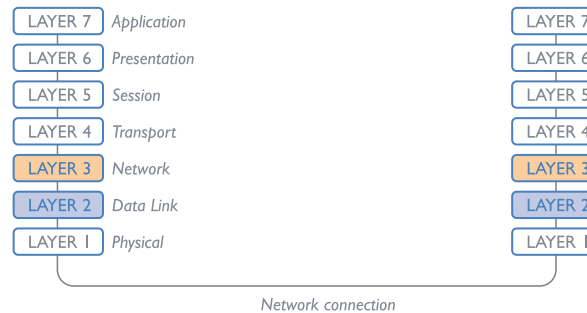
- **Store and forward** is the original method and requires the switch to save each entire data packet to buffer memory, run an error check and then forward if no error is found (or otherwise discard it).
- **Cut-through** was developed to address the latency issues suffered by some store and forward switches. The switch begins interpreting each data packet as it arrives. Once the initial addressing information has been read, the switch immediately begins forwarding the data packet while the remainder is still arriving. Once all of the packet has been received, an error check is performed and, if necessary, the packet is tagged as being in error. This checking ‘on-the-fly’ means that cut-through switches cannot discard faulty packets themselves. However, on receipt of the marked packet, a host will carry out the discard process.
- **Fragment-free** is a hybrid of the above two methods. It waits until the first 64 bits have been received before beginning to forward each data packet. This way the switch is more likely to locate and discard faulty packets that are fragmented due to collisions with other data packets.
- **Adaptive** switches automatically choose between the above methods. Usually they start out as a cut-through switches and change to store and forward or fragment-free methods if large number of errors or collisions are detected.

So which one to choose? The *Cut-through* method has the least latency so is usually the best to use with AdderLink Infinity units. However, if the network components and/or cabling generate a lot of errors, the *Store and forward* method should probably be used. On higher end store and forward switches, latency is rarely an issue.

Layer 2 and Layer 3: The OSI model

When discussing network switches, the terms Layer 2 and Layer 3 are very often used. These refer to parts of the Open System Interconnection (OSI) model, a standardized way to categorize the necessary functions of any standard network.

There are seven layers in the OSI model and these define the steps needed to get the data created by you (imagine that you are Layer 8) reliably down onto the transmission medium (the cable, optical fiber, radio wave, etc.) that



carries the data to another user; to complete the picture, consider the transmission medium is Layer 0. In general, think of the functions carried out by the layers at the top as being complex, becoming less complex as you go lower down.

As your data travel down from you towards the transmission medium (the cable), they are successively encapsulated at each layer within a new wrapper (along with a few instructions), ready for transport. Once transmission has been made to the intended destination, the reverse occurs: Each wrapper is stripped away and the instructions examined until finally only the original data are left.

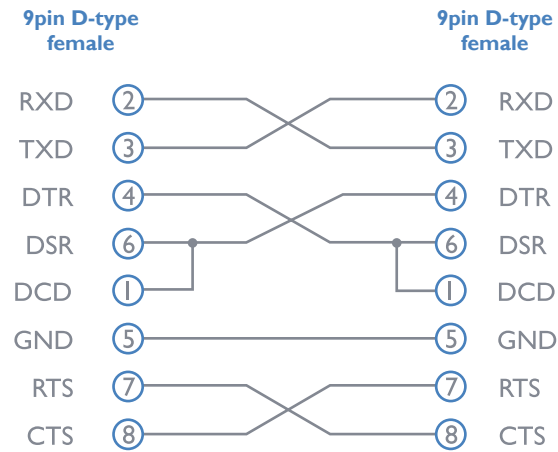
So why are Layer 2 and Layer 3 of particular importance when discussing AdderLink Infinity? Because the successful transmission of data relies upon fast and reliable passage through network switches – and most of these operate at either Layer 2 or Layer 3.

The job of any network switch is to receive each incoming network packet, strip away only the first few wrappers to discover the intended destination then rewrap the packet and send it in the correct direction.

In simplified terms, the wrapper that is added at Layer 2 (by the sending system) includes the physical address of the intended recipient system, i.e. the unique MAC address (for example, 09:f8:33:d7:66:12) that is assigned to every networking device at manufacture. Deciphering recipients at this level is more straightforward than at Layer 3, where the address of the recipient is represented by a logical IP address (e.g. 192.168.0.10) and requires greater knowledge of the surrounding network structure. Due to their more complex circuitry, Layer 3 switches are more expensive than Layer 2 switches of a similar build quality and are used more sparingly within installations.

APPENDIX F - Cable pinouts, video modes and general specifications

RS232 ‘null-modem’ cable pin-out



Supported video modes

ALIF units support all VESA and CEA video modes.

General specifications

Casing (w x h x d): 198mm (7.92") x 44mm (1.76") x 120mm (4.8")

Construction: 1U compact case, robust metal design

Weight: 0.75kg (1.65lbs)

Mount kits: Rack mount - single or dual units per 1U slot.
VESA monitor / wall mount chassis.

Power to adapter: 100-240VAC 50/60Hz, 0.5A,

Power to unit: 5VDC 12.5W

Operating temp: 0°C to 40°C (32°F to 104°F)

Approvals: CE, FCC

SAFETY INFORMATION

- For use in dry, oil free indoor environments only.
- Warning - live parts contained within power adapter.
- No user serviceable parts within power adapter - do not dismantle.
- Plug the power adapter into a socket outlet close to the module that it is powering.
- Replace the power adapter with a manufacturer approved type only.
- Do not use the power adapter if the power adapter case becomes damaged, cracked or broken or if you suspect that it is not operating properly.
- If you use a power extension cord with the units, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating. Also, make sure that the total ampere rating of all the devices plugged into the wall outlet does not exceed the wall outlet's ampere rating.
- Do not attempt to service the units yourself.

WARRANTY

Adder Technology Ltd warrants that this product shall be free from defects in workmanship and materials for a period of two years from the date of original purchase. If the product should fail to operate correctly in normal use during the warranty period, Adder will replace or repair it free of charge. No liability can be accepted for damage due to misuse or circumstances outside Adder's control. Also Adder will not be responsible for any loss, damage or injury arising directly or indirectly from the use of this product. Adder's total liability under the terms of this warranty shall in all circumstances be limited to the replacement value of this product.

If any difficulty is experienced in the installation or use of this product that you are unable to resolve, please contact your supplier.



RADIO FREQUENCY ENERGY

A Category 5 (or better) twisted pair cable must be used to connect the units 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 2004/108/EC

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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Support: forum.adder.com

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