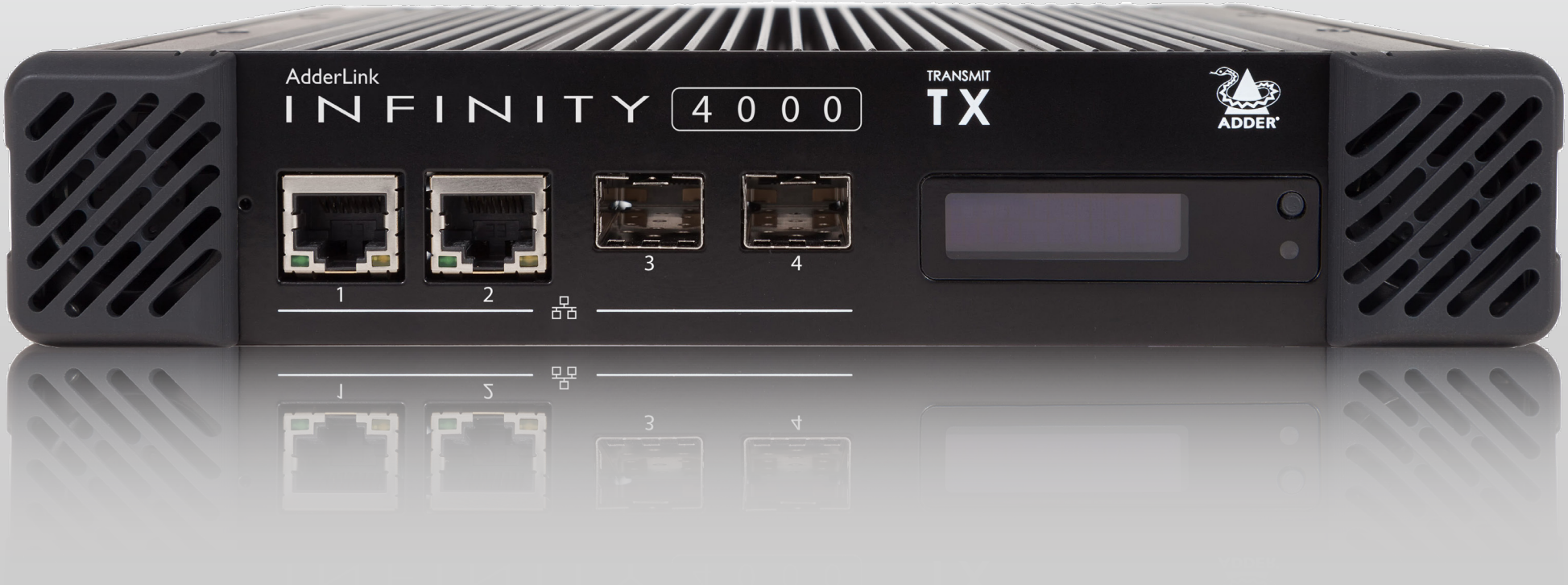
ADDER®
THE IP KVM PEOPLE

ADDERLink™ INFINITY 4000

User Guide



Experts in Connectivity Solutions

KVM Extension Solutions

Contents

Introduction

WELCOME

Thank you for choosing the ADDERLink™ INFINITY 4000 (aka ALIF4000) high performance extenders. The ALIF4000 range offers dual-head 4K, audio and USB delivered over a single fiber connection. Pixel-perfect color, accurate picture quality and USB2.0 with fast switching.

Product in brief

- Support for dual link speeds up to 10GbE using either CATx and/or fiber. Two model variants available:
  - **ALIF4001** models* have two SFP sockets for CATx or fiber modules (up to 10GbE).
  - **ALIF4021** models have two fixed 1GbE CATx ports as well as two SFP sockets for additional CATx or fiber modules (up to 10GbE).
- Dual-head 5K, video, audio and USB over a single fiber connection,
- Pixel-perfect, color accuracy at 4K60,
- Support for 5K resolution: 5120 pixels by 2880*, 2160 or 1440 *(* at 30Hz refresh)*
- Support for 240Hz frame rate at HD resolutions,
- Support for three dynamic color ranges: SDR8, SDR10 and HDR10 (see page 4),
- Bi-directional analog audio,
- DisplayPort™ audio with 2, 4, 6 or 8 channels on both video heads *(supports 5.1 and 7.1),*
- Adder's USB True Emulation for fast switching,
- Support for local feed through, using an additional ALIF transmitter to allow a local host PC to be connected directly to an ALIF4000 RX in addition to its network links (see page 3),
- Support for advanced diagnostic and troubleshooting tools,
- Backwards compatibility with existing ALIF range,
- Plug and play.

** ALIF4001 models are only supported by software version v5.05 or later.*

Safety

Please refer to the safety booklet provided in the box before use of this product.

Linking

ALIF4000 units can be linked in two mains ways: Direct or Networked.

Direct linking

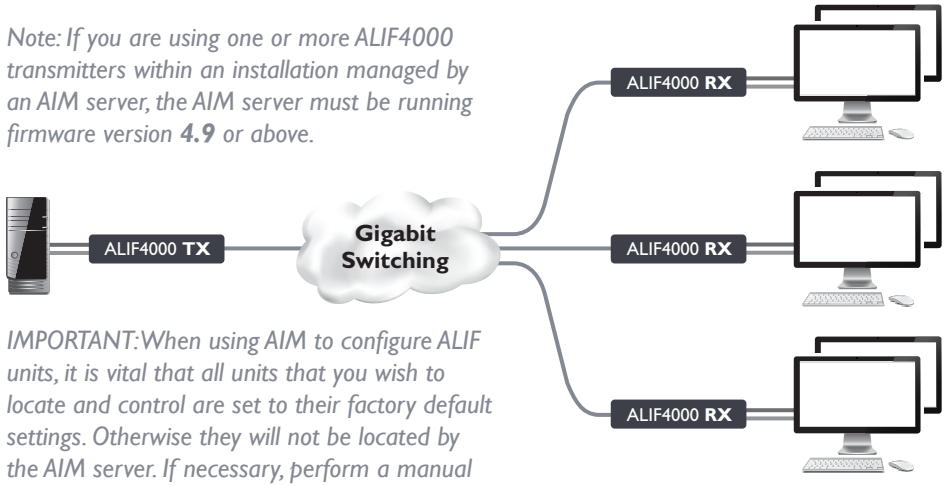
Where ALIF4000 transmitters and receivers are directly linked to each other, very little configuration action is required, provided that they both have their factory default settings in place - just link them together. If the standard settings have been changed in a previous installation, you merely need to perform a manual factory reset on each unit.

Networked linking

Where ALIF4000 units are connected via networked links, you can either configure them individually, or configure them collectively using an AIM server:

- **Configuring networked ALIF units individually** - In the absence of an AIM server, unallocated ALIF4000 units have the ability to locate each other. You can alter settings via the OSD on the console connected to the RX unit by pressing **CTRL** + **ALT** + **C**.
- **Configuring networked ALIF units collectively** - The ADDERLink™ INFINITY Management (AIM) server allows you to configure, control and coordinate any number of ALIF transmitters and receivers from a single application.

*Note: If you are using one or more ALIF4000 transmitters within an installation managed by an AIM server, the AIM server must be running firmware version **4.9** or above.*



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

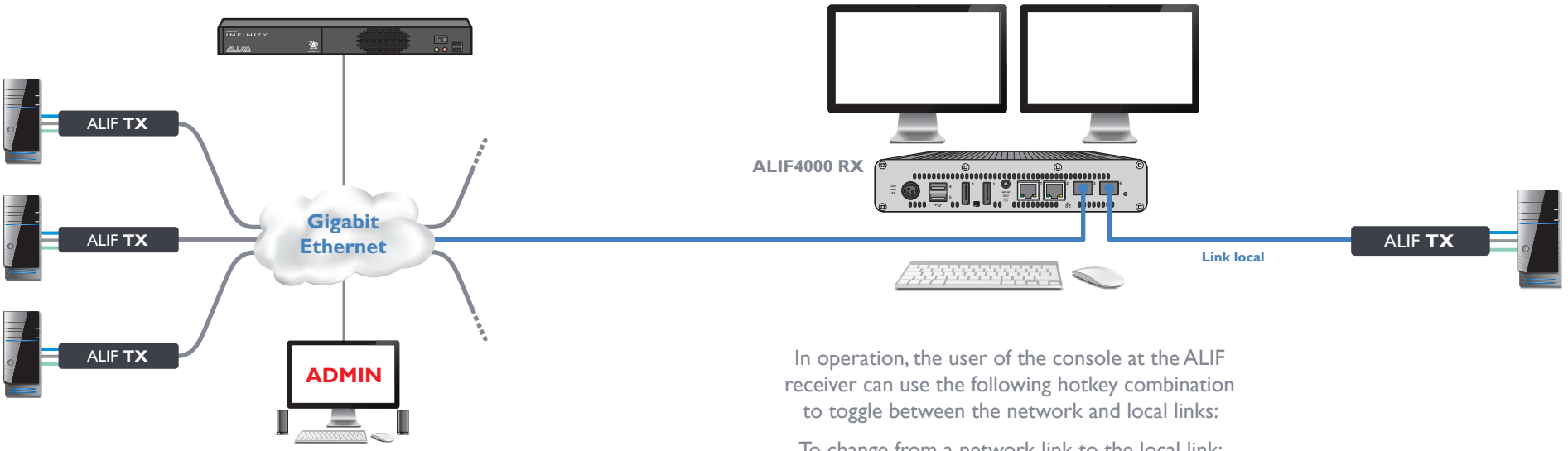
See Start of Life: AIM or Point to Point configuration

LOCAL FEED THROUGH

ALIF receiver units can be configured to support a local link to a separate host PC, via a dedicated ALIF transmitter, in addition to the main link to the network. The locally linked PC remains completely isolated from the main network.

To configure this arrangement, ensure that the receiver is using its default IP address and is directly connected to the transmitter. The transmitter must use its primary network port, which is the interface using 169.254.1.33 as its default address, and be configured to either "Auto" or "Allow" for insecure connections (see "Insecure connections" on page 40). The easiest way to do this is to use a factory new or factory reset transmitter, you can then change any additional settings after connecting it to the receiver.

Notes: For the local feed through feature to operate, the AIM server must be at version 4.8 or greater while the endpoints must be at version 4.0 or greater. The TX must use its primary network port and be in it's default configuration, which can be achieved via a new unit or a factory refresh, when connected to the RX.



In operation, the user of the console at the ALIF receiver can use the following hotkey combination to toggle between the network and local links:

To change from a network link to the local link: enter CTRL+ALT+L

To change from the local link to a network link: enter CTRL+ALT +C to display the OSD and choose the required connection.

Note: The L and C default hotkeys can be changed within the AIM control panel.

SUPPORT FOR STANDARD AND HIGH DYNAMIC RANGES (SDR8/SDR10/HDR10)

With the introduction of firmware versions 4.00 (and above), ALIF4000 models now support video signals with color formats that use 30-bpp (bits per pixel) as well as the standard 24-bpp. The supported dynamic ranges are:

- **SDR8** - Uses 24-bpp (ie. 8-bits per color), as supported across the ALIF range.
- **SDR10** - Uses 30-bpp (10-bits per color) in order to define a wider color gamut.
- **HDR10** - Uses 30-bpp to define a wider color gamut and also benefits from support for ST2084 dynamic range mastering and BT.2020 colorimetry.

All ALIF devices use the AFZ24 codec to support SDR8 signals; ALIF4000 devices (with firmware v4.xx) also use the newer AFZ30 to support SDR10 and HDR10 modes.

The ability to successfully deliver full SDR10 or HDR10 video signals from a host PC to any particular remote video display relies upon a series of factors:

- The host PC must produce video signals with SDR10 or HDR10 content.
- The ALIF4000 TX must have firmware v4.00 or greater.
- The receiving ALIF4000 RX units must have firmware v4.00 or greater.
- The video display(s) connected to a receiver must support SDR10 or HDR10.

Where possible, you are recommended to upgrade all ALIF4000 devices to 4.xx firmware. Where a mix of ALIF4000 and non-ALIF4000 receivers exist, an ALIF4000 TX will respond in manner discussed on the right to negotiate access.

To lock an ALIF4000 TX into SDR8 mode

If a mixture of new and legacy devices is unavoidable **and** it is vital that no legacy receiver is ever locked out from a particular ALIF4000 TX, then set the ALIF4000 TX to use a maximum of 24-bpp (regardless of the input signal):

If the unit IS under AIM control

1. Login to the AIM suite.
2. Click the Transmitters tab and locate the ALIF4000 TX within the list of devices.
3. Click the icon for the ALIF4000 TX.
4. For video port 1, set the Maximum Bits Per option to '24bpp'.
5. Repeat step 4 for video port 2, if necessary.
6. Click the Save button.

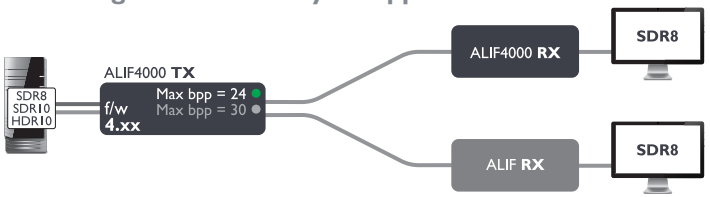
If the unit is NOT under AIM control

1. On the console keyboard attached to an RX unit, access the OSD by pressing: **CTRL + ALT + C**.
2. Click on the **Transmitters** option and click the icon for the required TX.
3. Click the **Ports** link and ensure that the page is selected.
4. For video port 1, set the Max Bits per Pixel option to '24'.
5. Repeat step 4 for video port 2, if necessary.
6. Click the Apply button.

Mixing devices

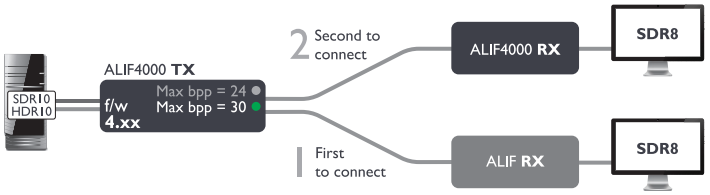
Care should be taken when using a mixture of ALIF4000 (v4.00 and greater) and non-ALIF4000 devices. It is not possible for an ALIF 4000 TX to deliver SDR10/HDR10 to multiple RX units if one or more of them are only able to process SDR8. When a mixture of RX devices make connection, the TX will employ the following methods to negotiate access - on a first-come, first-served basis:

TX configured to use only 24-bpp



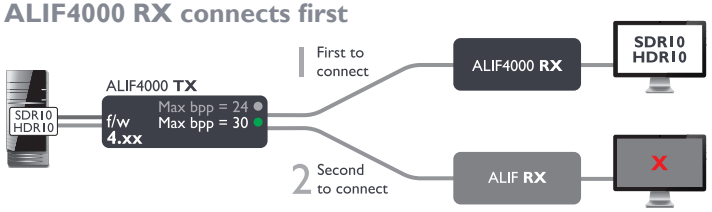
Max Bits per Pixel is set to '24' on the ALIF4000 TX. This means that regardless of the signal type received from the host (SDR8, SDR10 or HDR10), the TX will only send out SDR8. Consequently, all types of ALIF RX units are fully supported, albeit at the lower dynamic range and color depth (see lower left).

Non-ALIF4000 RX connects first



Max Bits per Pixel is set to '30' on the ALIF4000 TX. However, the first RX to connect with the TX is a non-ALIF4000 type, which means that the TX scales back the video output to SDR8 for this and all subsequent RX units.

ALIF4000 RX connects first



The ALIF4000 TX has been set to either SDR10 or HDR10. The first to connect with the TX is an ALIF4000 RX and subsequently receives SDR10/HDR10 output. The next to join is a non-ALIF4000 RX and is rejected from connecting. It will continue to attempt a connection.

After either of the last two scenarios have occurred; once all RX units have disconnected, the ALIF4000 TX will revert to SDR8, SDR10 or HDR10 (as determined by the host signal and the ALIF4000 TX settings) and be ready to respond accordingly to connecting RX units.

TECHNICAL SPECIFICATIONS

Operating/storage conditions

Operating temperature:	0 to 50°C / 32 to 122°F
Storage temperature:	0 to 50°C / 32 to 122°F
Storage and operating relative humidity:	10 to 90% non-condensing
Altitude:	< 2000m

Power

External power:	12VDC, 5A
Typical power consumption:	20W

Physical

Dimensions	(L)210mm /8.3" x (W)215mm/8.5" x (D)40mm/1.6"
Weight:	1.8kg / 4 lbs

Materials

Aluminium and steel construction

Connectors

Local Unit - Transmitter (TX)

Computer: 2x DisplayPort™, 2x USB type B, 2x 3.5mm audio jack sockets, 1x DB9 socket. 3-pin Kycon power socket.

ALIF4001 model: 2x SFP sockets for up to 10GbE fiber/CATx network connections.

ALIF4021 model: 2x 8p8c RJ45 CATx ports for 1GbE (no 10/100 support) plus 2x SFP sockets for up to 10GbE fiber or CATx network connections.

Remote Unit - Receiver (RX)

Desk: 2x DisplayPort, 5x USB type A, 2x 3.5mm audio jack sockets, 1x 3.5mm SPDIF socket. 3-pin Kycon power socket.

ALIF4001 model: 2x SFP sockets for up to 10GbE fiber/CATx network connections.

ALIF4021 model: 2x 8p8c RJ45 CATx ports for 1GbE (no 10/100 support) plus 2x SFP sockets for up to 10GbE fiber or CATx network connections.

USB

4 ports of USB2.0 with USB True Emulation to support keyboard, mouse and touch.

1 additional port provides transparent high speed USB2.0, best suited to mass storage, web cams, headsets and microphones.

USB device seen as: 7 or 13 port hub

Max video resolution

Supports 4K UHD or DCI and refresh rates to 60Hz

Supports 5K at 60, 50 or 30Hz refresh rates (dependent on vertical resolution)

Supports 8- and 10-bit color depth

Audio

Analog Line in/out 2 channel 16bit 48KHz 1V RMS in / 1V RMS out

DisplayPort digital audio (LPCM), up to 8 channels, 16, 20 or 24bit, 32, 44.1, 48, 88.2, 96, 176.4 or 192KHz

Ethernet

ALIF4001 model* features 2x SFP ports: CATx support for 10,5,2.5 and 1GbE. Fiber support for 10GbE (no 10/100/1000 support).

ALIF4021 model* features 2x SFP ports: CATx support for 10,5,2.5 and 1GbE. Fiber support for 10GbE (no 10/100/1000 support).

Plus 2x 8p8c RJ45 CATx ports: Support for 1GbE (no 10/100 support).

Packing Box

Dimensions:	(L) 285mm /11.2" x (W) 245mm/9.6" x (D)145mm/5.7"
Weight:	2.5kg / 5.5lb

Approvals / Compliance

CE and FCC: See the compliance web page for the full list

Product information labels

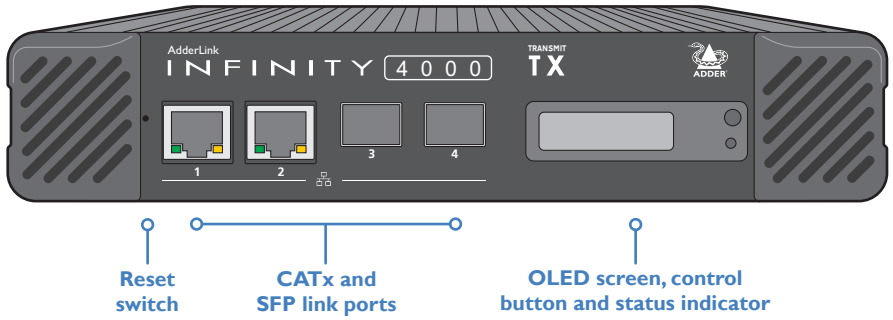
The product information labels are located on the base of each unit.

** Software version v5.05 or later required.*

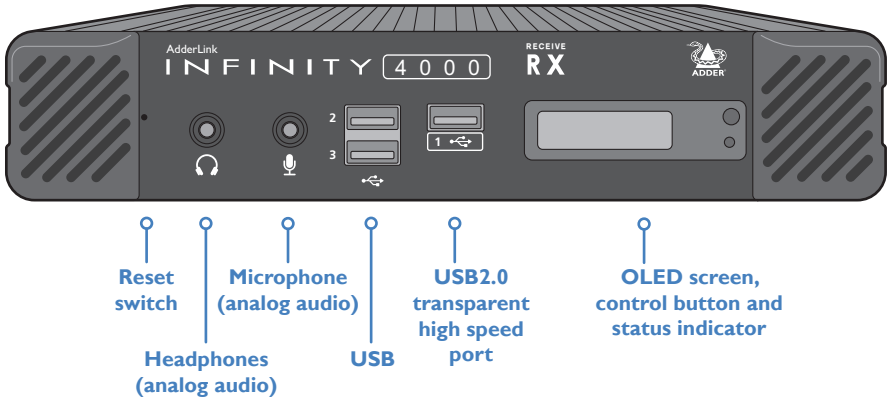
ALIF4000 UNIT FEATURES

The transmitter and receiver modules are housed within durable, vented enclosures with connectors situated on the front and rear panels. The ALIF4001 model variants have two SFP sockets rather than SFP sockets plus CATx, but are otherwise identical.

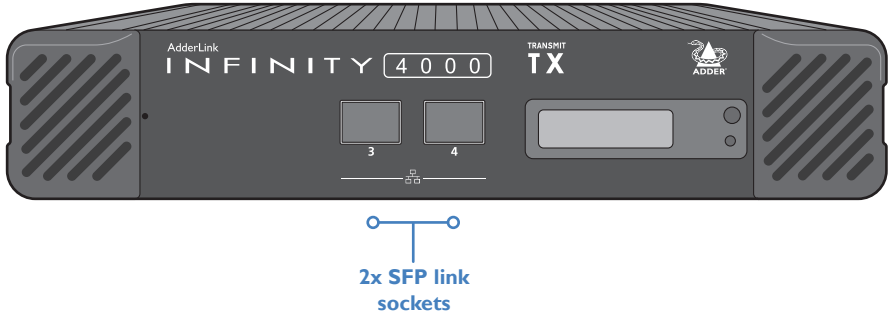
Transmitter - front (ALIF4021 model)



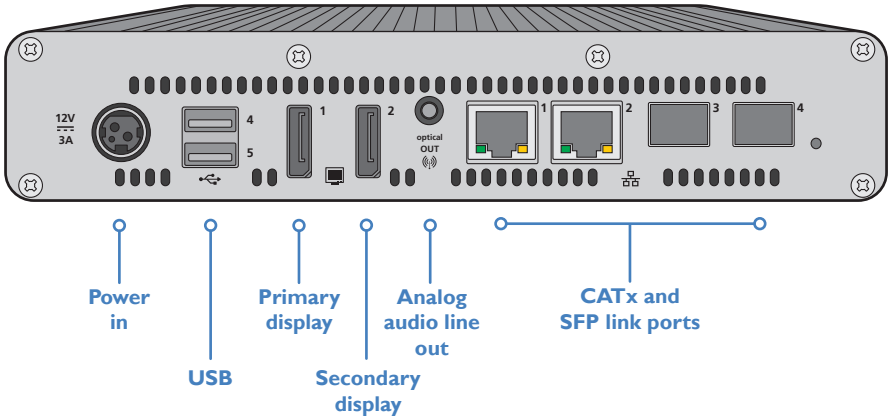
Receiver - front



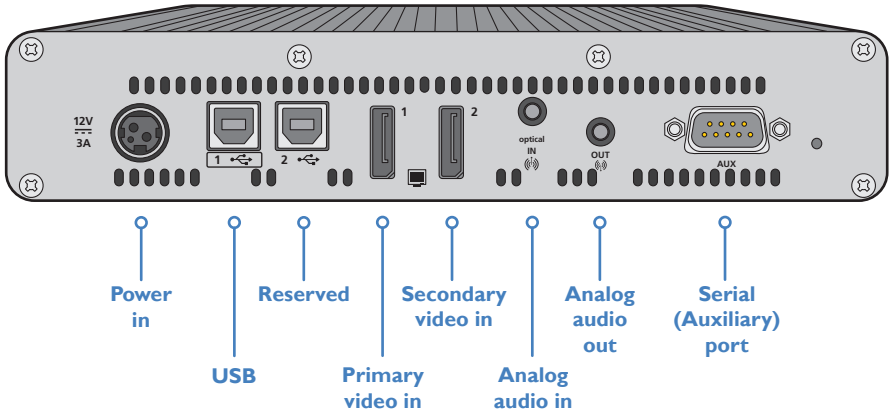
Transmitter - front (ALIF4001 model)



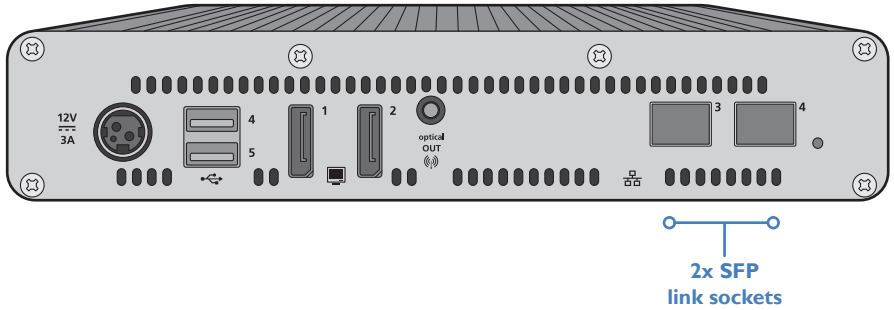
Receiver - rear (ALIF4021 model)



Transmitter - rear

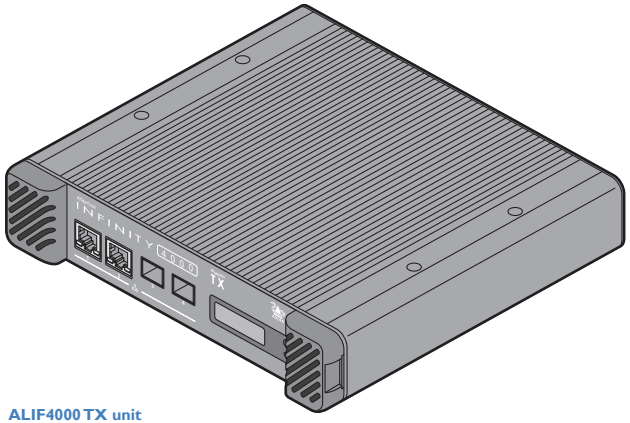


Receiver - rear (ALIF4001 model)

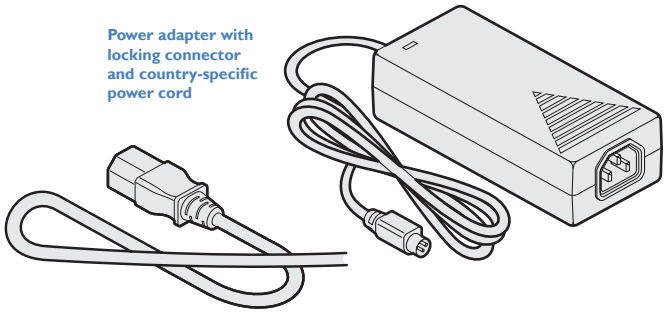


SUPPLIED ITEMS

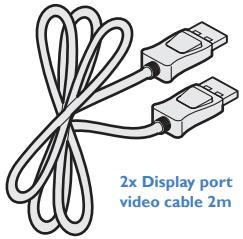
ALIF4000 TX package



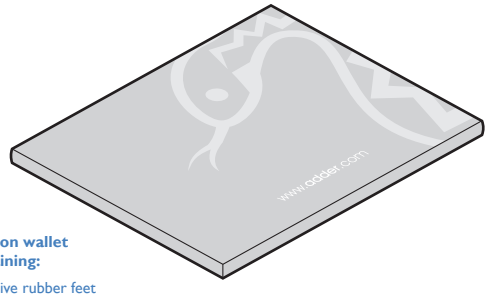
ALIF4000 TX unit



Power adapter with locking connector and country-specific power cord

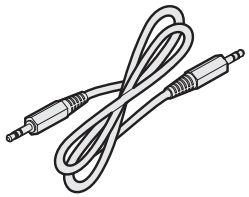


2x Display port video cable 2m

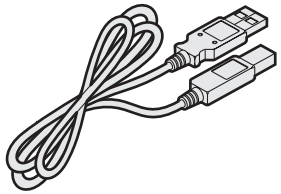


Information wallet containing:

Four self-adhesive rubber feet
Quick start guide
Safety document

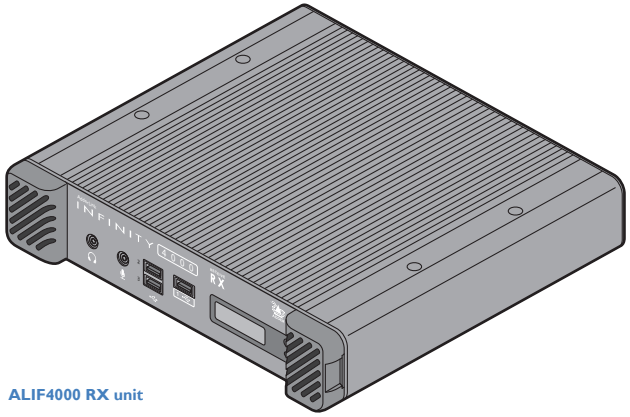


2x Audio cable 2m (3.5mm stereo jacks)

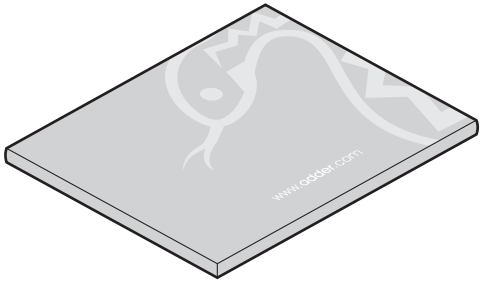


2x USB cable 2m (type A to B)
Part number: VSC24

ALIF4000 RX package

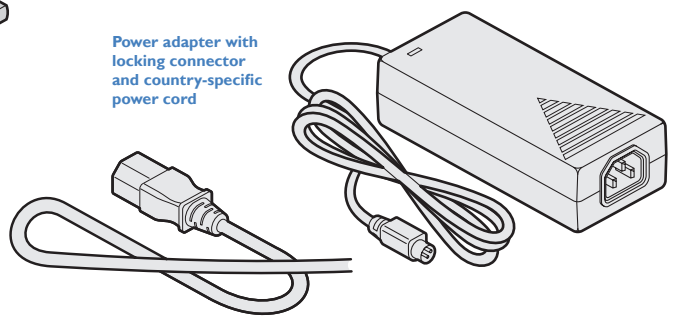


ALIF4000 RX unit



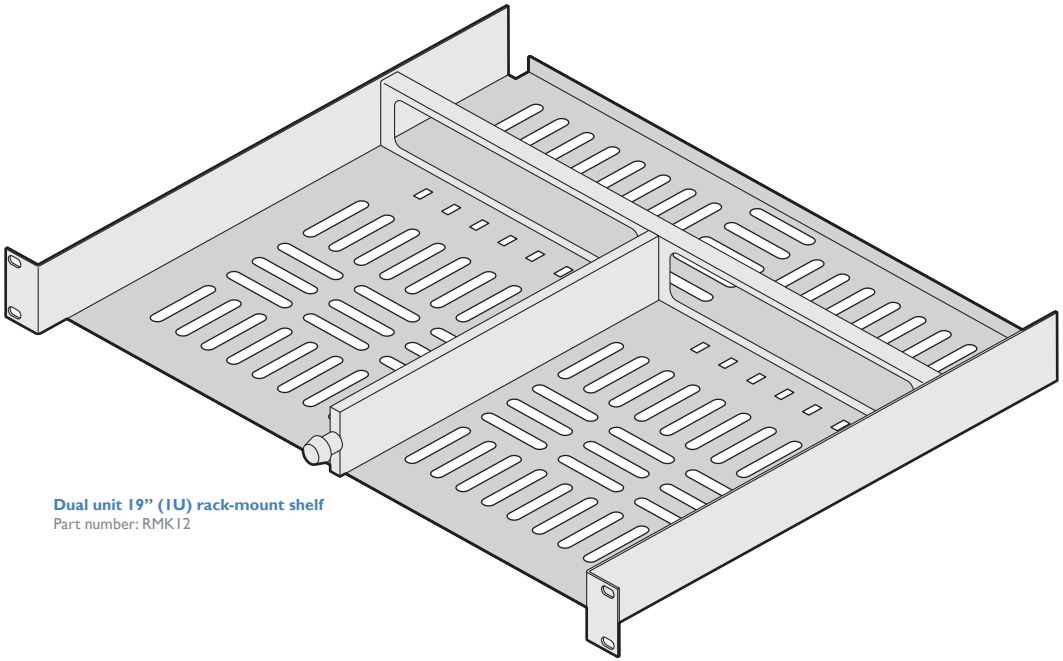
Information wallet containing:

Four self-adhesive rubber feet
Quick start guide
Safety document

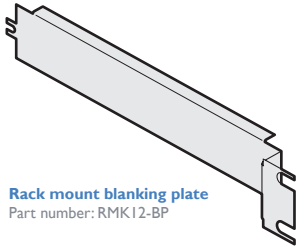


Power adapter with locking connector and country-specific power cord

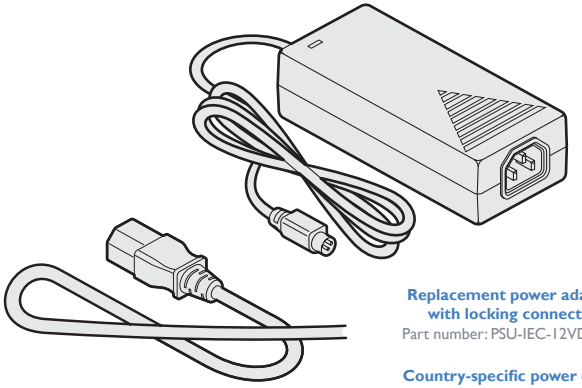
OPTIONAL EXTRAS



Dual unit 19" (1U) rack-mount shelf
Part number: RMK12



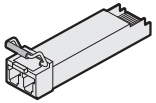
Rack mount blanking plate
Part number: RMK12-BP



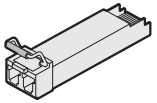
Replacement power adapter with locking connector
Part number: PSU-IEC-12VDC-5A

Country-specific power cords

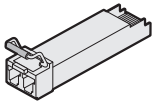
CAB-IEC-AUS	*(Australia)*
CAB-IEC-EURO	*(Central Europe)*
CAB-IEC-UK	*(United Kingdom)*
CAB-IEC-USA	*(United States)*
CAB-IEC-JP	*(Japan)*
CAB-IEC-CN	*(China)*



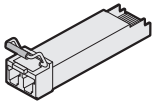
1GbE single mode fiber SFP module*
Part number: SFP-SM-LC



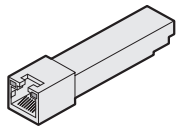
10GbE single mode fiber SFP module
Part number: SFP-SM-LC-10G



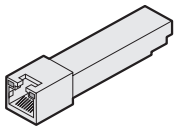
1GbE multi mode fiber SFP module
Part number: SFP-MM-LC



10GbE multi mode fiber SFP module
Part number: SFP-MM-LC-10G



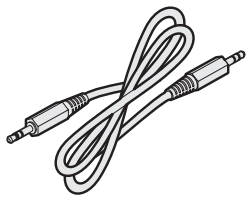
1GbE fixed rate copper SFP module*
Part number: SFP-CATX-RJ45



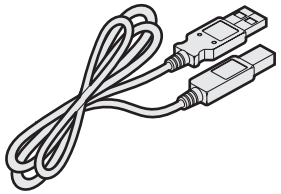
10, 5, 2.5 and 1GbE multi-rate copper SFP module
Part number: SFP-CATX-MR

Please refer to the table in Appendix G for information about fiber modules and cables.

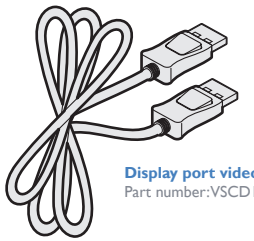
** Software version v5.05 or later required.*



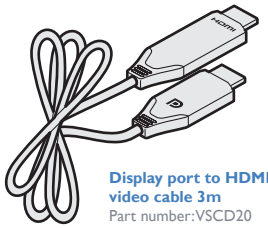
Audio cable 2m (3.5mm stereo jacks)
Part number:VSC22



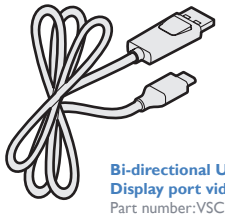
USB cable 2m (type A to B)
Part number:VSC24



Display port video cable 2m
Part number:VSCD10A



Display port to HDMI 2.1 video cable 3m
Part number:VSCD20



Bi-directional USB type C to Display port video cable 2m
Part number:VSCD21

Installation

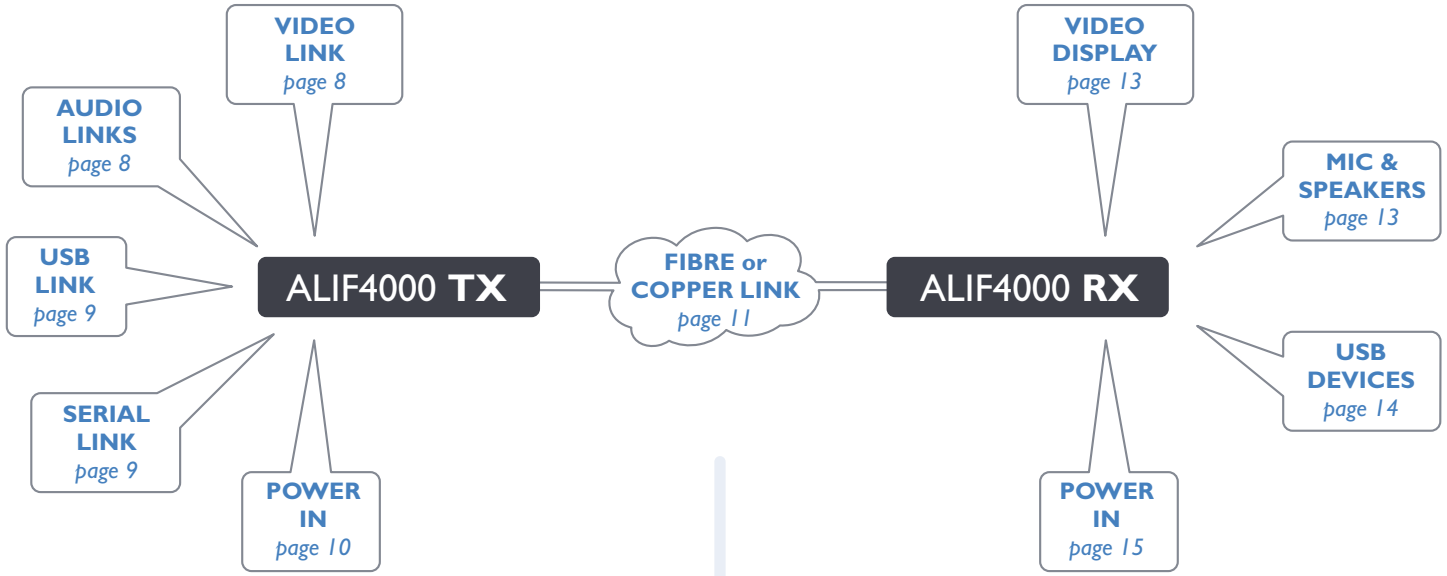
CONNECTIONS

Installation involves linking the ALIF4000 TX unit to various ports on the host computer, while the ALIF4000 RX unit is attached to your peripherals (collectively known as the *Console*:

MOUNTING

Please see Appendix H for details about mounting options for the ALIF units.

IMPORTANT: When mounting the ALIF units (and their power adapters), ensure that the vents are not obscured and that there is sufficient airflow. The operating temperature range is 0 to 50°C (32 to 122°F) and must not be exceeded.



Note: RS232 connections are supported when a USB to serial adaptor is used.

Click a connection to see details

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

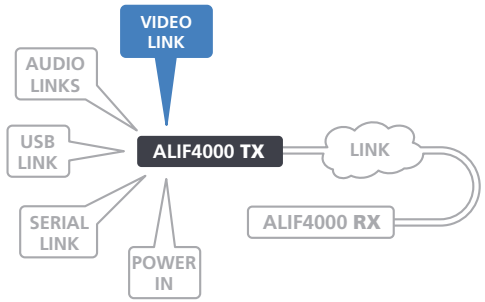
Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

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 AIM server. If necessary, perform a factory reset on each ALIF unit.

Please also see Appendix C - Tips for success when networking ALIF units

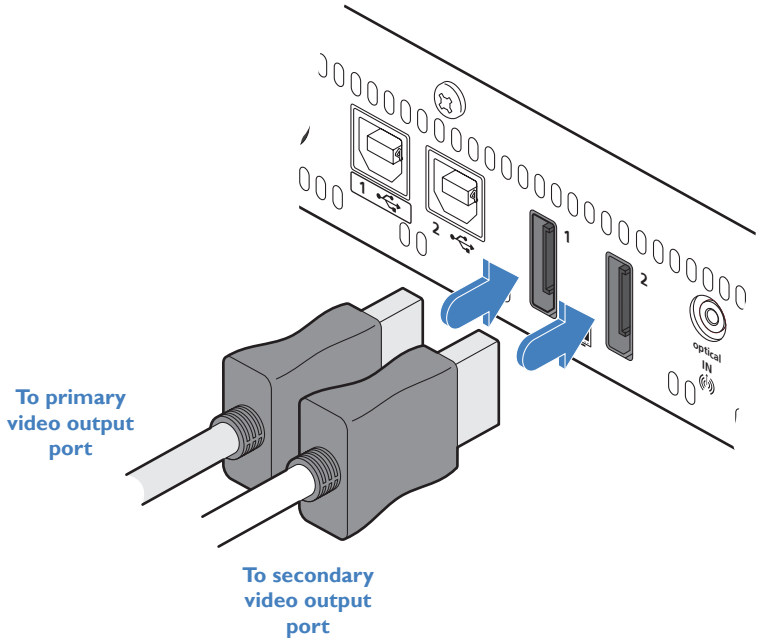
TX video links

The TX unit supports two DisplayPort connections, each up to 5K 5120 pixels by 2880, 2160 or 1440, with refresh rates of 30, 50 and 60Hz respectively and at dynamic ranges of SDR8, SDR10 or HDR10 (ie 24-bit per pixel standard dynamic range, 30-bpp standard dynamic range, or 30-bpp high dynamic range). Digital audio, with support for stereo, 5.1 surround or 7.1 surround sound, is also supported via the DisplayPort connections.



To make a video link

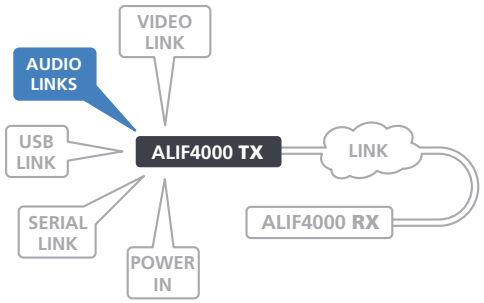
1 Connect your digital video link cable(s) to the DisplayPort socket(s) on the TX unit rear panel:



2 Connect the plug at the other end of the cable(s) to the corresponding video output socket(s) of the host computer.

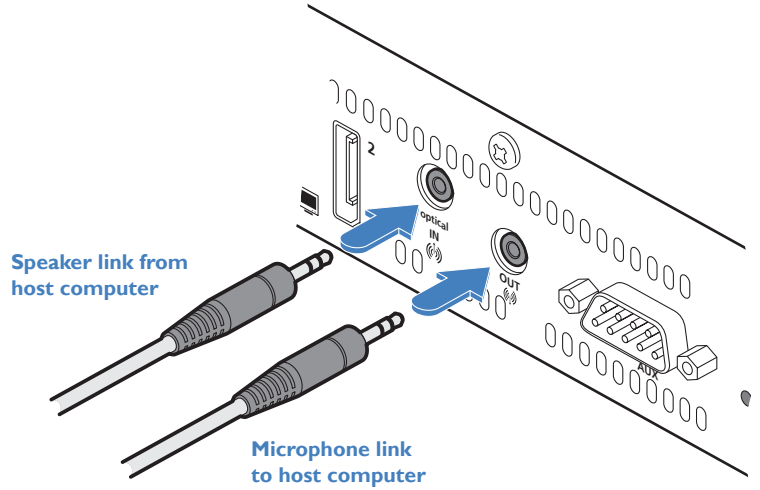
TX analog audio links

The TX unit supports two way stereo analog audio so that you can use a remote microphone as well as speakers. Digital audio is handled separately via the DisplayPort connectors. See Appendix B - Support for analog and digital audio for details.



To make audio links

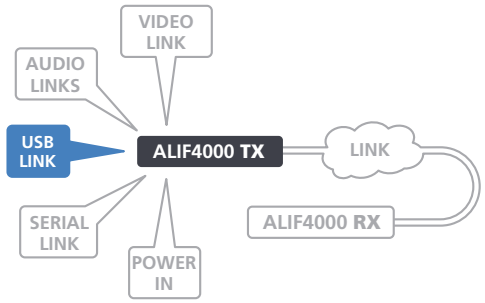
1 Connect an audio link cable between the **optical IN** socket on the TX unit rear panel and the speaker output socket of the host computer.



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

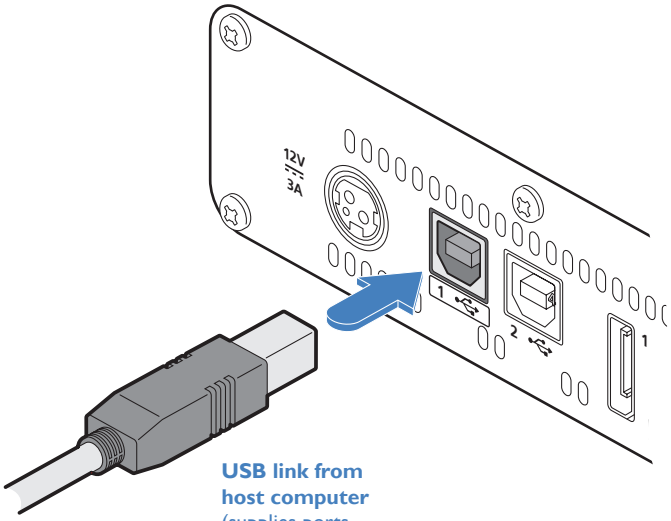
TX USB links

The TX unit has two USB type B sockets on the rear panel. Port 2 is not currently used.



To make a USB link

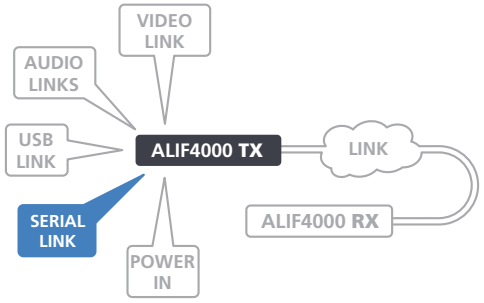
1 Connect the type B connector of the supplied USB cable to the USB port 1 on the TX unit rear panel.



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

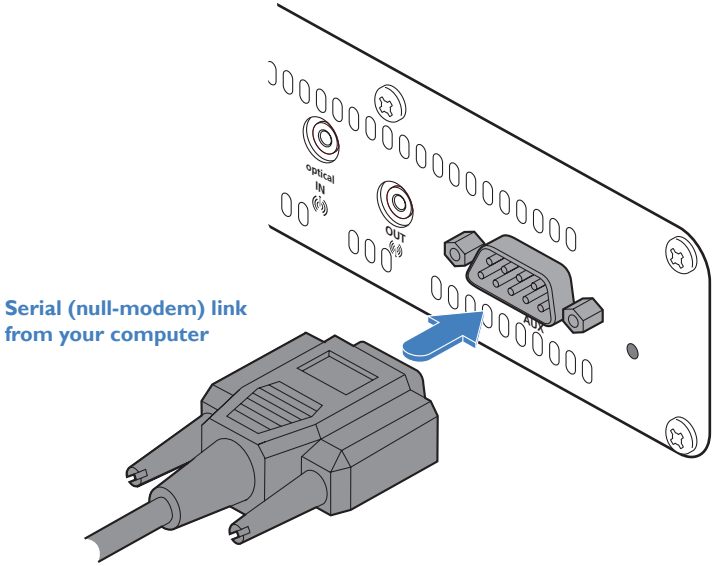
TX AUX (serial) port

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. A third-party USB-to-serial adaptor is required at each RX unit (that is required to make a serial link).



To connect the AUX port

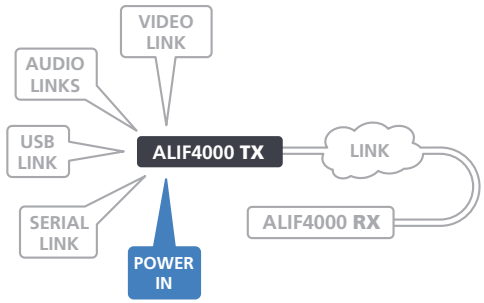
1 Connect a suitable serial 'null-modem' cable (see Appendix F for pin-out) between a vacant serial port on your computer and the AUX port on the right hand side of the ALIF rear panel.



2 At the required RX unit(s), use a USB-to-serial adaptor connected to one of the USB ports.

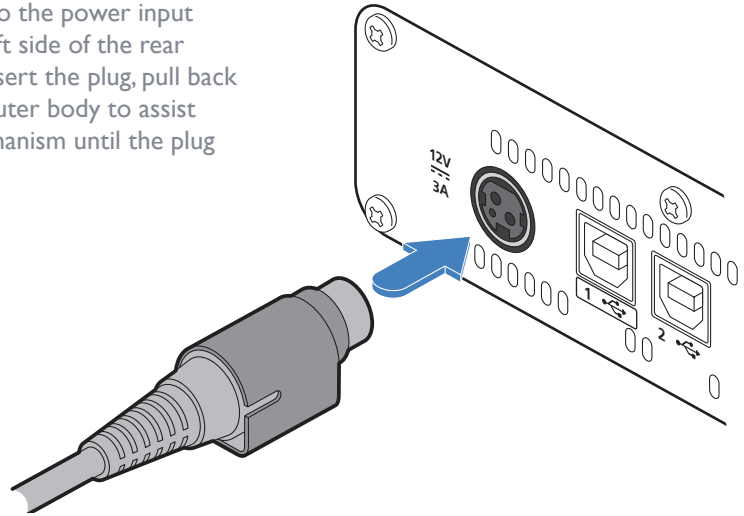
TX power in

Each unit is supplied with a power adapter and country-specific power cord. The supplied power adapter uses a locking-type plug to help prevent accidental disconnection; please follow the instructions shown on the right when disconnecting a power adapter.



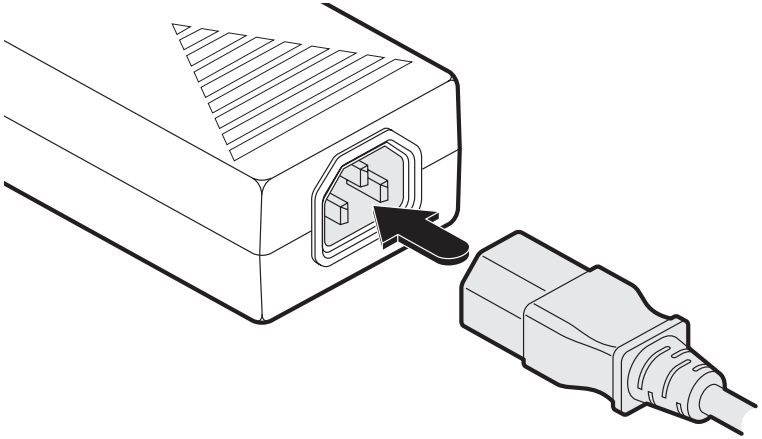
To connect the power adapter

1 Attach the output plug of the supplied power adapter to the power input socket on the left side of the rear panel. As you insert the plug, pull back slightly on the outer body to assist the locking mechanism until the plug is fully inserted.



From the power adapter

2 Insert the IEC connector of the supplied country-specific power cord to the socket of the power adapter.



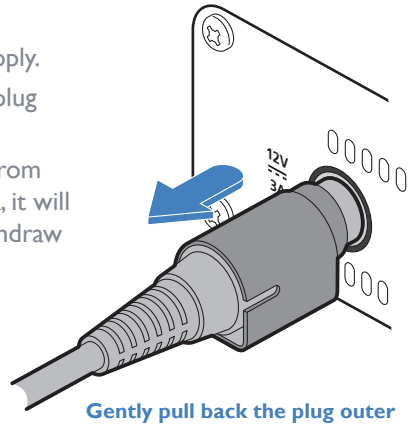
3 Connect the power cord to a nearby mains supply socket.

To disconnect the power adapter

1 Isolate the power adapter from the mains supply.

2 Grasp the outer body of the power adapter plug where it connects with the node.

3 Gently pull the body of the outer plug away from the node. As the body of the plug slides back, it will release from the socket and you can fully withdraw the whole plug.



Gently pull back the plug outer body to release the lock

IMPORTANT: Please read and adhere to the electrical safety information given within the Safety information booklet provided with this product. In particular, do not use an unearthed power socket or extension cable.

Note: The unit and the power adapter 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 50 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 50 degrees Centigrade.

TX/RX high speed links

ALIF4000 units can be either connected directly to each other or via a high speed (up to 10GbE) network. There are three main ways to make high speed links:

- Using the in-built CATx port(s) for connections up to 1GbE (ALIF4021 only, see below),

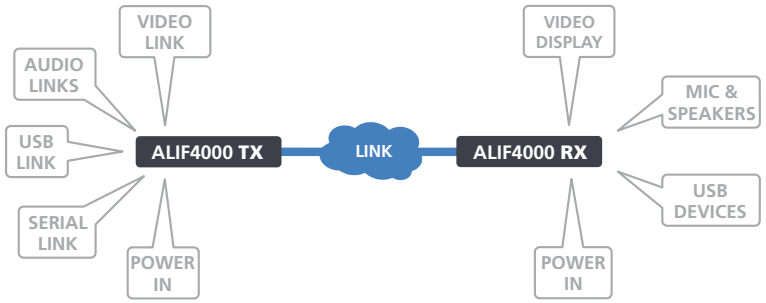
  Allows high video resolutions but with reduced frame rates. Use both CATx ports in combination for teaming to mitigate the relatively slow data rate and improve video quality.

- Using the SFP port(s) with optional CATx module(s) for connections up to 10GbE (see next page),

  Single or dual 10GbE links will allow full resolution and high frame rate video to be transferred. Slower links may be subject to varying frame rates, depending on the video content and CODEC settings. Dual links to provide teaming will help a great deal, particularly with slower connection speeds.

- Using the SFP port(s) with optional fiber (FCoE) module(s) for connections up to 10GbE (see next page),

  Single or dual 10GbE links will allow full resolution and high frame rate video to be transferred. Dual links to provide teaming will help a great deal, particularly with slower connection speeds.



Optional SFP module types

- SFP-CATX-RJ45 for use with CAT5e (and above) cable (1GbE)*.
- SFP-CATX-MR for use with CAT5e (and above) cable (10, 5, 2.5 and 1GbE).
- SFP-SM-LC modules require OS1 or OS2 single mode fiber (1GbE)*.
- SFP-SM-LC-10G modules require OS1 or OS2 single mode fiber (10GbE).
- SFP-MM-LC modules require OM1, OM2, OM3 or OM4 multi-mode fiber (1GbE).
- SFP-MM-LC-10G modules require OM1, OM2, OM3 or OM4 multi-mode fiber (10GbE).

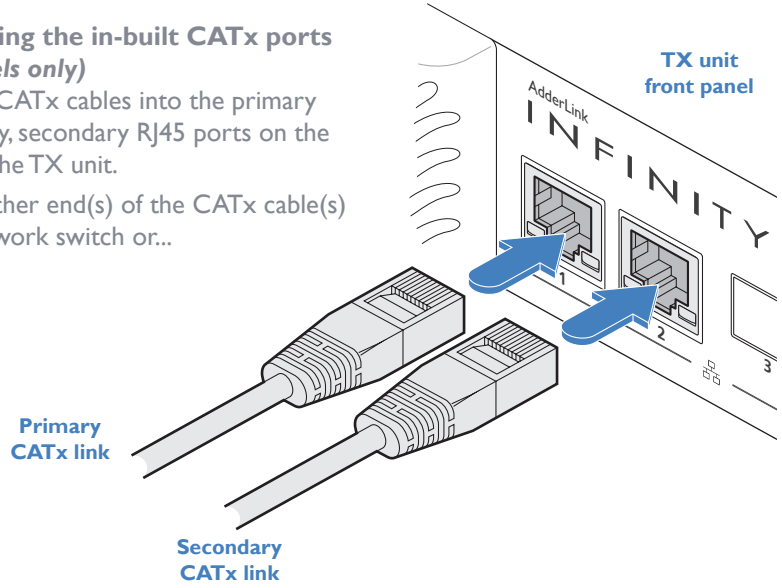
See Appendix G for further details about SFP modules and cable lengths.

* *Software version v5.05 or later required.*

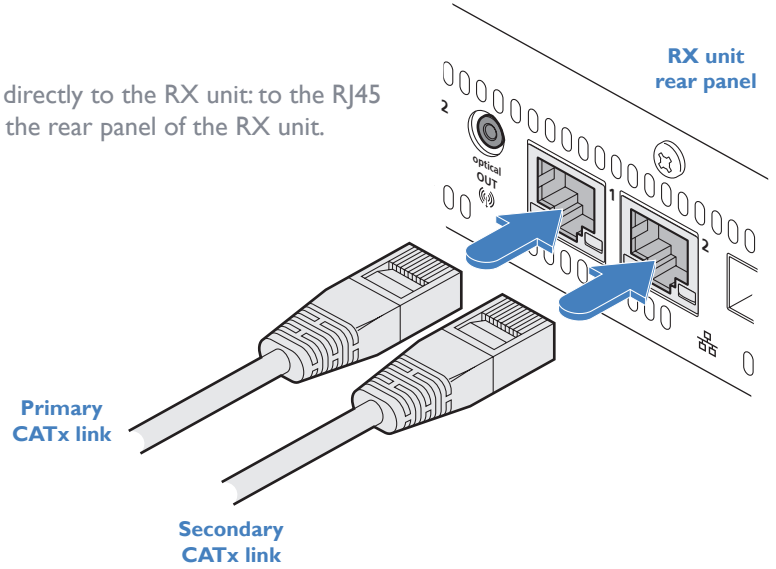
To link units using the in-built CATx ports *(ALIF4021 models only)*

1 Insert suitable CATx cables into the primary and, if necessary, secondary RJ45 ports on the front panel of the TX unit.

2 Connect the other end(s) of the CATx cable(s) to either a network switch or...



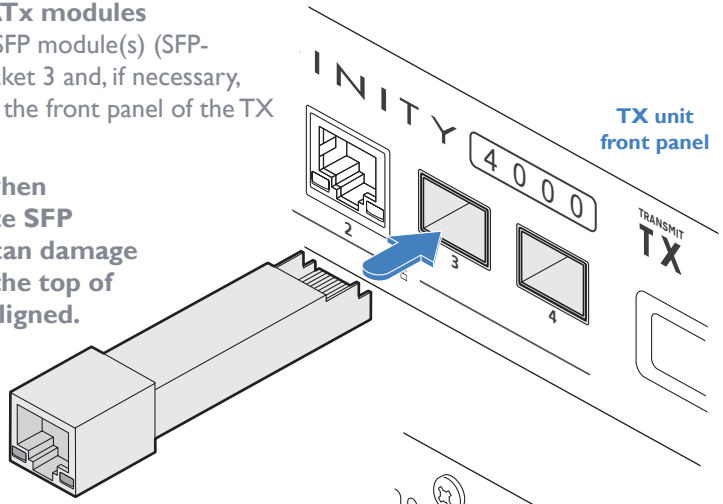
... connect directly to the RX unit: to the RJ45 port(s) on the rear panel of the RX unit.



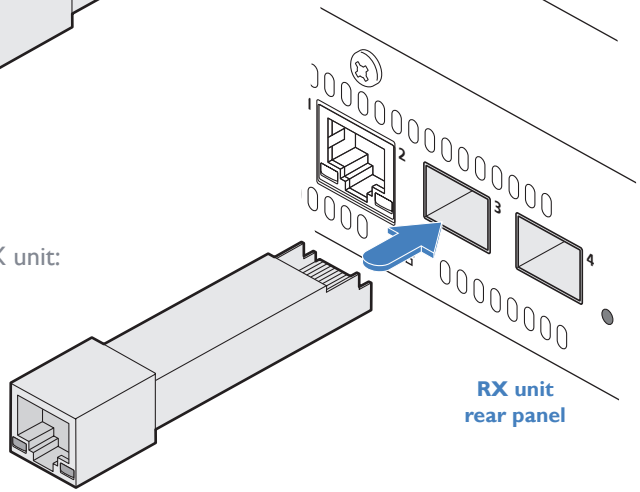
To link units via CATx modules

1 Insert the optional SFP module(s) (SFP-CATX-MR) into socket 3 and, if necessary, socket 4 located on the front panel of the TX unit...

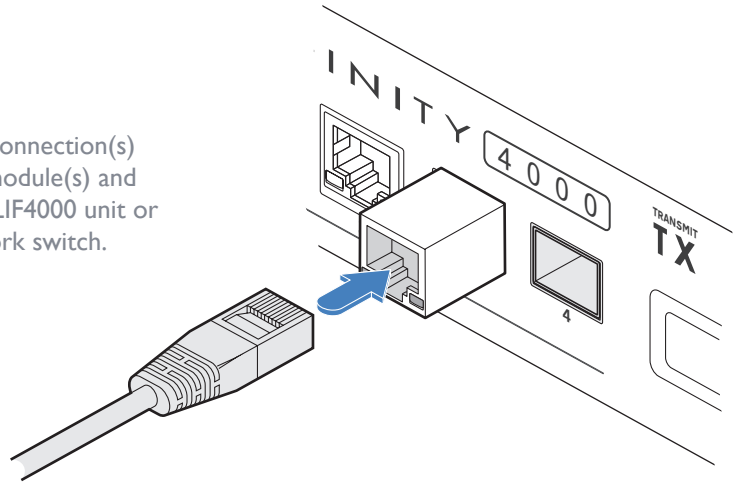
Note: Take care when inserting multirate SFP modules as they can damage the metal tab at the top of the socket if misaligned.



...and the rear panel of the RX unit:

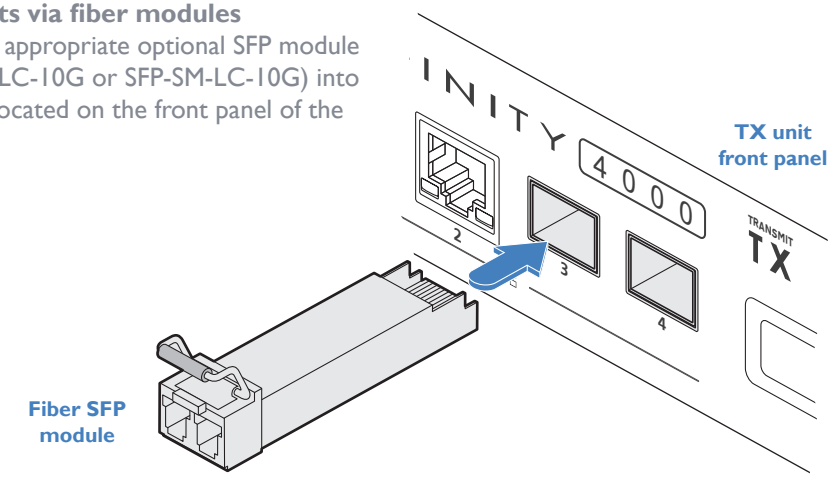


2 Make your CATx connection(s) between the SFP module(s) and either the other ALIF4000 unit or to a suitable network switch.

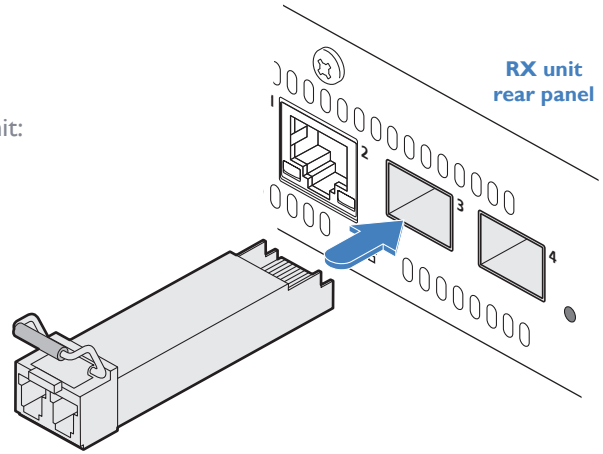


To link units via fiber modules

1 Insert the appropriate optional SFP module (SFP-MM-LC-10G or SFP-SM-LC-10G) into socket 3 located on the front panel of the TX unit...

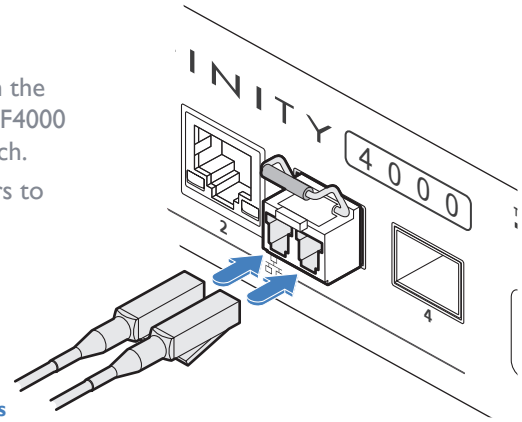


...and the rear panel of the RX unit:



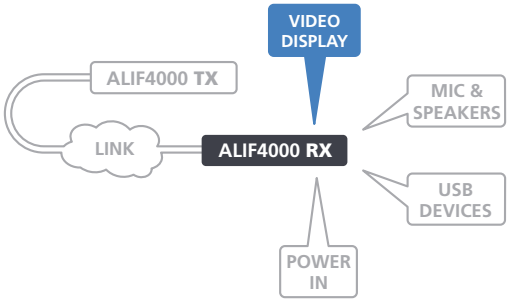
2 Make your fiber connection(s) between the SFP module(s) and either the other ALIF4000 unit or to a suitable fiber network switch.

3 Close the latch over the link connectors to lock them into place.



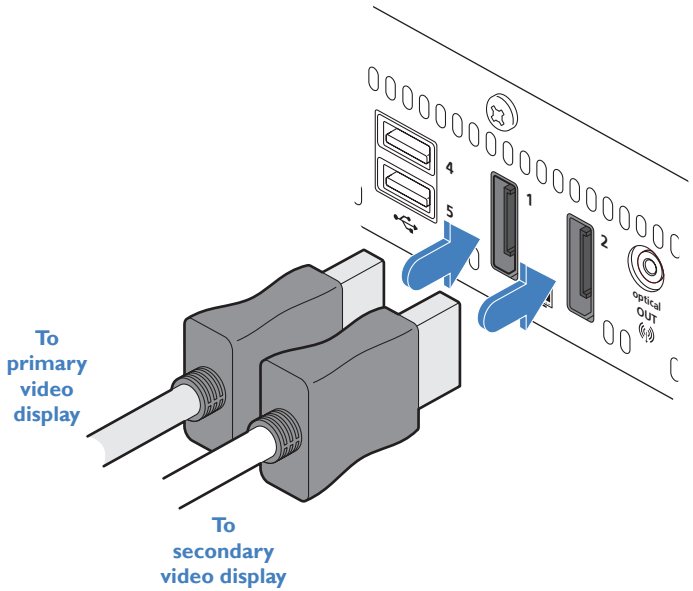
RX video display

The RX unit supports two DisplayPort connections, each up to 5K 5120 pixels by 2880, 2160 or 1440, with refresh rates of 30, 50 and 60Hz respectively. Digital audio, with support for stereo, 5.1 surround or 7.1 surround sound, is also supported via the DisplayPort connections.



To connect video displays

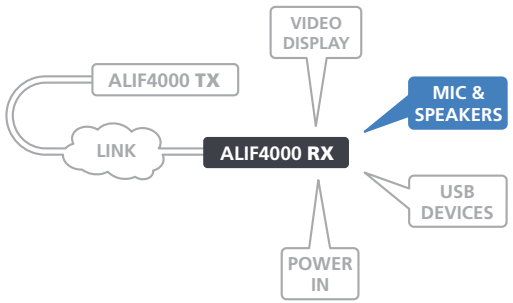
1 Connect the lead from the primary video display to the DisplayPort socket marked '1' on the RX unit rear panel:



2 If required, connect the lead from the second video display to the DisplayPort socket marked '2' on the RX unit rear panel.

RX microphone & speakers

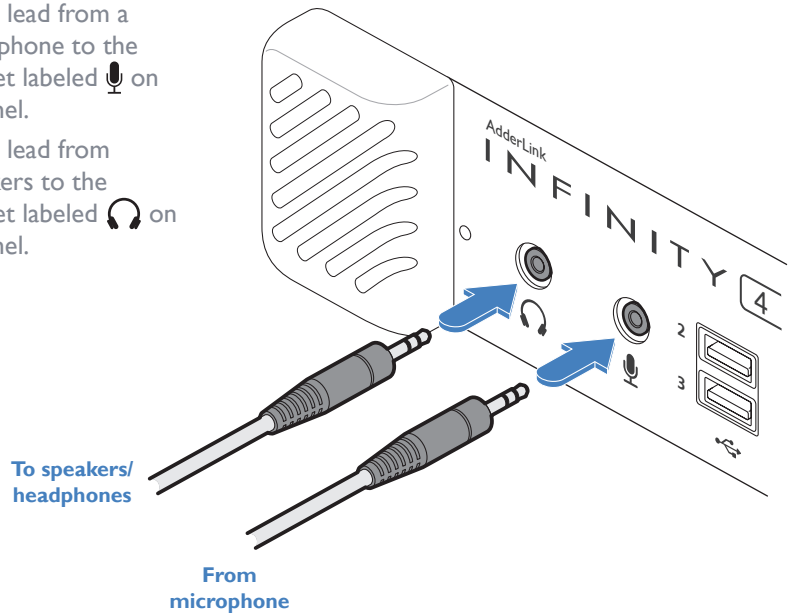
The RX unit can support a microphone as well as speakers providing the necessary connections have been made between the TX unit and the host computer. Digital audio is handled separately via the DisplayPort connectors. See Appendix B - Support for analog and digital audio for details.



To connect a microphone (or line in) and/or speakers

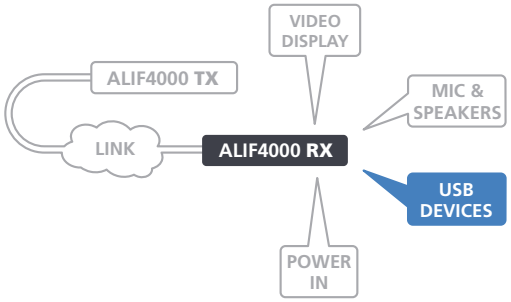
1 Connect the lead from a mono microphone to the 3.5mm socket labeled on the front panel.

2 Connect the lead from stereo speakers to the 3.5mm socket labeled on the front panel.



RX USB devices

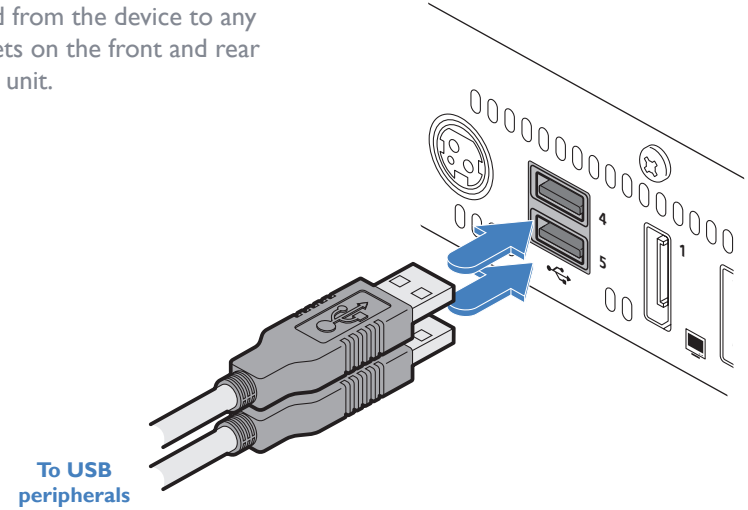
The ALIF RX unit has five USB ports (three on the front panel and two on the rear) to which peripherals may be connected.



To connect more than five 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.

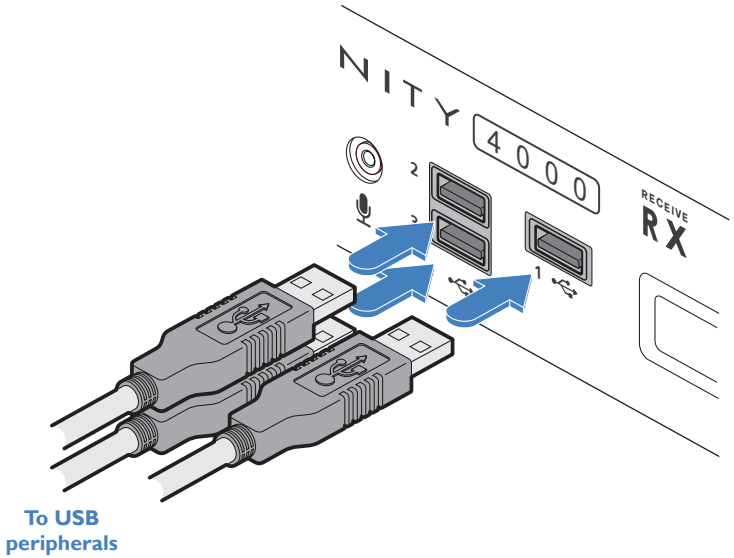
To connect USB devices

1 Connect the lead from the device to any of the USB sockets on the front and rear panels of the RX unit.



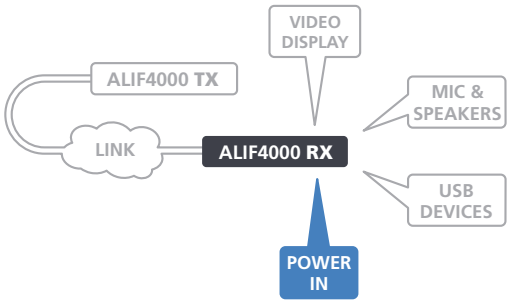
RS232 serial support

To support RS232 serial connections, use a third-party USB-to-serial adaptor connected to any of the USB ports from 2 to 5. The serial connection will be replicated at the serial port on the connected ALIF4000 TX unit.



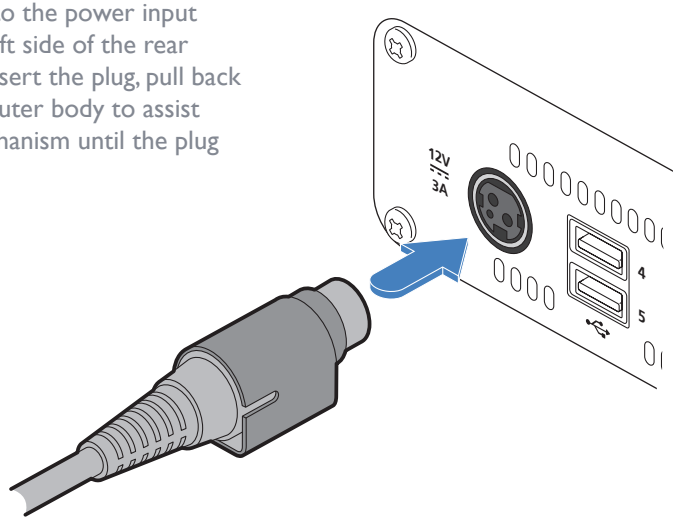
RX power in

Each unit is supplied with a power adapter and country-specific power cord. The supplied power adapter uses a locking-type plug to help prevent accidental disconnection; please follow the instructions shown on the right when disconnecting a power adapter.



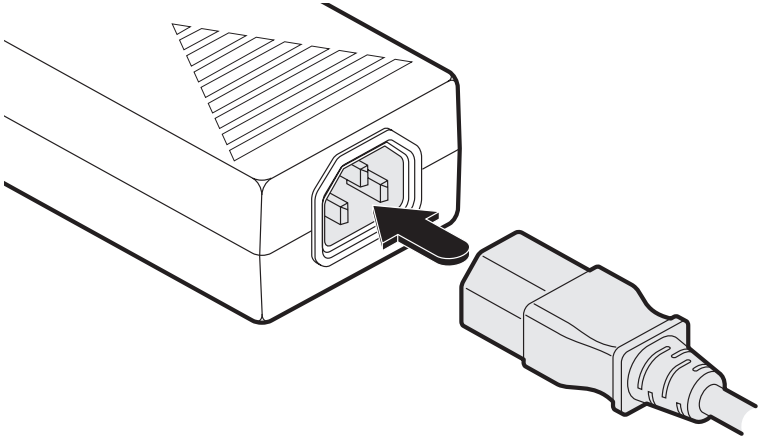
To connect the power adapter

1 Attach the output plug of the supplied power adapter to the power input socket on the left side of the rear panel. As you insert the plug, pull back slightly on the outer body to assist the locking mechanism until the plug is fully inserted.



From the power adapter

2 Insert the IEC connector of the supplied country-specific power cord to the socket of the power adapter.



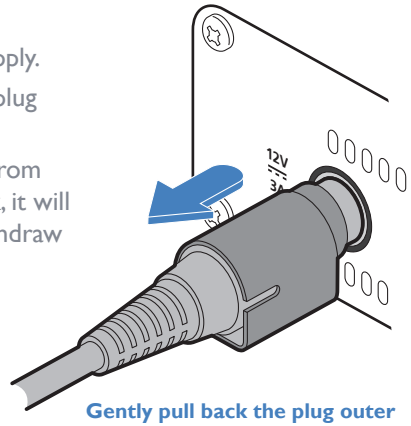
3 Connect the power cord to a nearby mains supply socket.

To disconnect the power adapter

1 Isolate the power adapter from the mains supply.

2 Grasp the outer body of the power adapter plug where it connects with the node.

3 Gently pull the body of the outer plug away from the node. As the body of the plug slides back, it will release from the socket and you can fully withdraw the whole plug.



Gently pull back the plug outer body to release the lock

IMPORTANT: Please read and adhere to the electrical safety information given within the Safety information booklet provided with this product. In particular, do not use an unearthed power socket or extension cable.

Note: The unit and the power adapter 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 50 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 50 degrees Centigrade.

Configuration

ALIF4000 CONFIGURATION VIA WEB PAGES

Each ALIF4000 unit hosts its own internal set of web pages which contain all configuration details and settings *(see also Start of Life, shown right)*. You will need to use a computer connected to the same network as each ALIF4000 unit to access the web pages. Additionally, on the console attached to the ALIF4000 RX unit, you can access its configuration details via the On Screen Display (OSD) by pressing **CTRL** + **ALT** + **C** (or by tapping the icon on the touchscreen) - see page 25.

To manually configure ALIF4000 units via their web pages

Run a web browser on your computer and enter the IP address of the required ALIF4000 unit:

The default addresses (if using ports **1** or **3**) are **TX:** https://169.254.1.33
RX: https://169.254.1.32

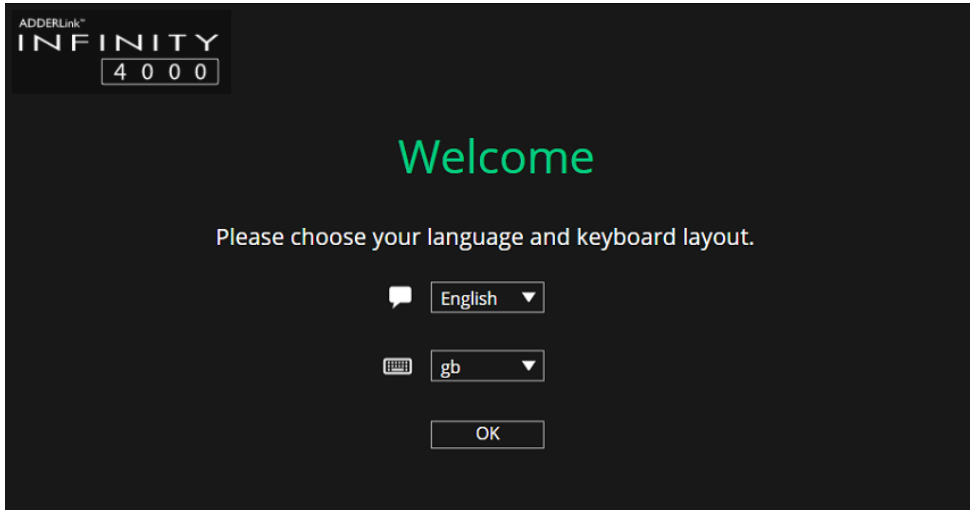
The default addresses (if using ports **2** or **4**) are **TX:** https://169.254.1.43
RX: https://169.254.1.42

If the IP address of a unit has been changed, you can either:

- Discover the unit's main IP address by pressing the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)*.

- Alternatively, providing it is appropriate to do so, perform a manual factory reset (see next page) to restore the default address.

The opening page should be displayed:



For explanations of the options within each page, please see Appendix A.

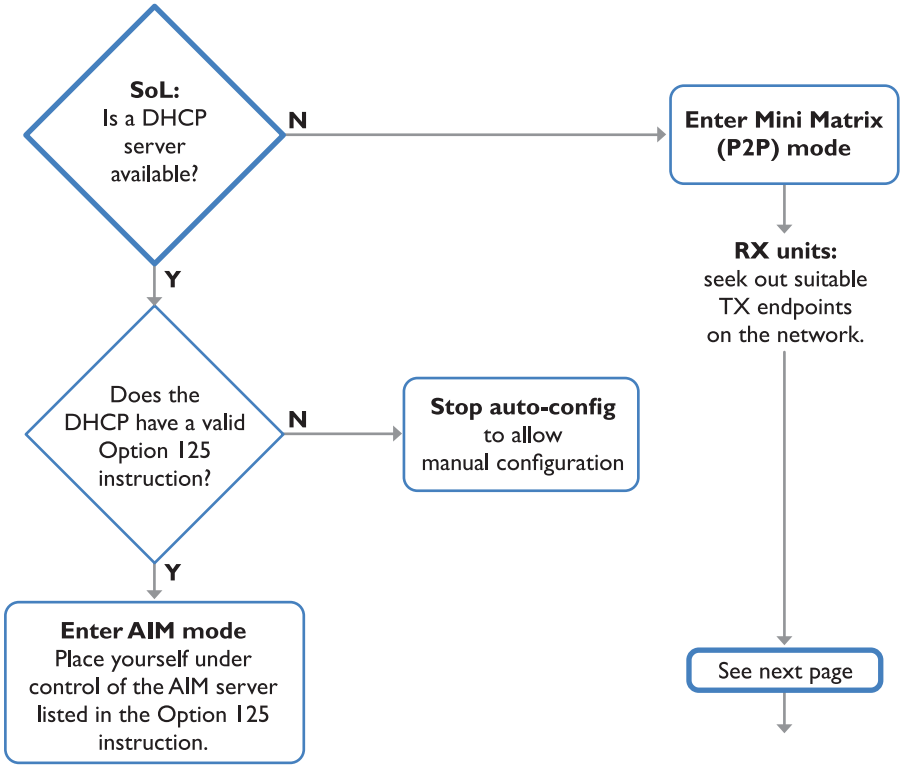
Start of Life: AIM or Point to Point configuration

To streamline initial configuration processes, all ALIF4000 units employ a Start of Life (SoL) procedure when they are in an unconfigured state; either because they are new or because they have undergone a factory reset.

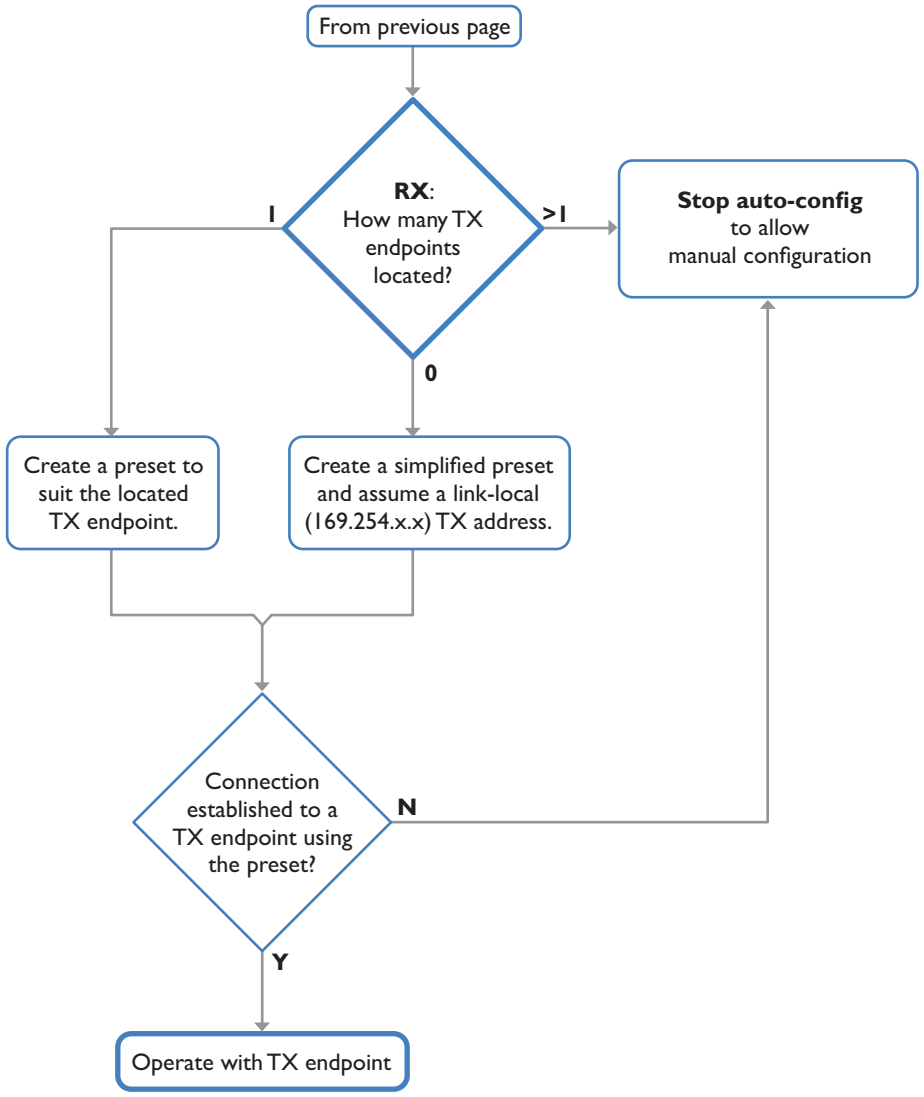
When an unconfigured ALIF4000 unit boots, its SoL procedure will guide it to automatically determine which of two modes it should adopt:

- **AIM mode** - place itself into the control of a specific AIM server on the network, whereupon the ALIF4000 will be assigned suitable configuration details to fit within the network of similar units.
- **Mini Matrix (P2P) mode** - place itself into Point to Point (P2P) mode to allow manual configuration of links with other ALIF units.

The SoL procedure follows this basic logic flow to determine the correct mode:



Start of Life configuration (continued)



Once the mode has been set to AIM control, an ALIF4000 will remain operating that way until it undergoes a factory reset. If set to Mini Matrix (P2P) mode, an ALIF4000 will remain thus until it undergoes a factory reset or is discovered by an AIM server.

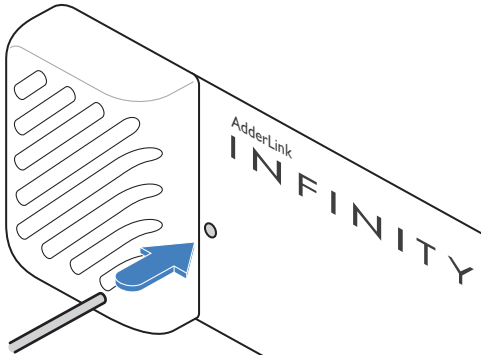
PERFORMING A MANUAL FACTORY RESET

A factory reset returns ALIF4000 unit to its default configuration.

To perform a manual factory reset

1 Power on the ALIF4000 unit.

2 Use a long narrow implement (e.g. a straightened-out paper clip) to press-and-hold the recessed reset button on the front panel for roughly ten seconds, until the status indicator turns **blue** *(Note: alternating red/green indications will occur during the ten second period while the button is still pressed).*



3 Release the reset switch. The indicator will change to **red** for a short while (less than ten seconds) and then back to **blue** while ALIF4000 unit performs the reset and should then change to an alternative color, usually **orange** initially, signifying that the operation is complete.

Note: If you are performing a factory reset and intend to disconnect the power immediately after the reset, you must wait at least 30 seconds after you have released the reset button for it to complete the process.

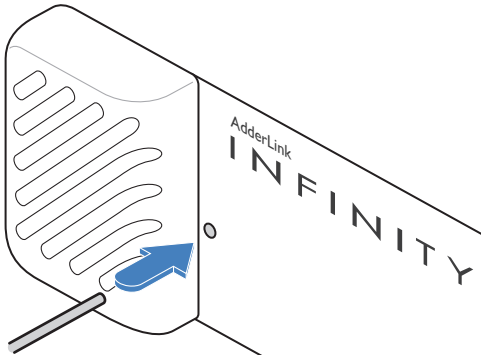
PLACING THE DEVICE INTO RECOVERY MODE

Recovery mode may allow an ALIF4000 unit to be diagnosed or upgraded in the event of the main mode being non-operational.

To boot the device into recovery mode

1 Power on the ALIF4000 unit.

2 Use a long narrow implement (e.g. a straightened-out paper clip) to press-and-hold the recessed reset button on the front panel (for less than ten seconds) until the status indicator starts alternating **red**/**green**. *Note: A solid **blue** indication will occur after the ten second period.*



3 Release the reset switch. The indicator will change to **red** for a short while (less than ten seconds) and then alternating **red**/**green** signifying that the device is in recovery mode. *Note: If the indicator turns **blue**, then a factory reset has been performed instead, the device will not be in recovery mode and the operation will need to be attempted again.*

CONFIGURING DUAL TOUCHSCREENS

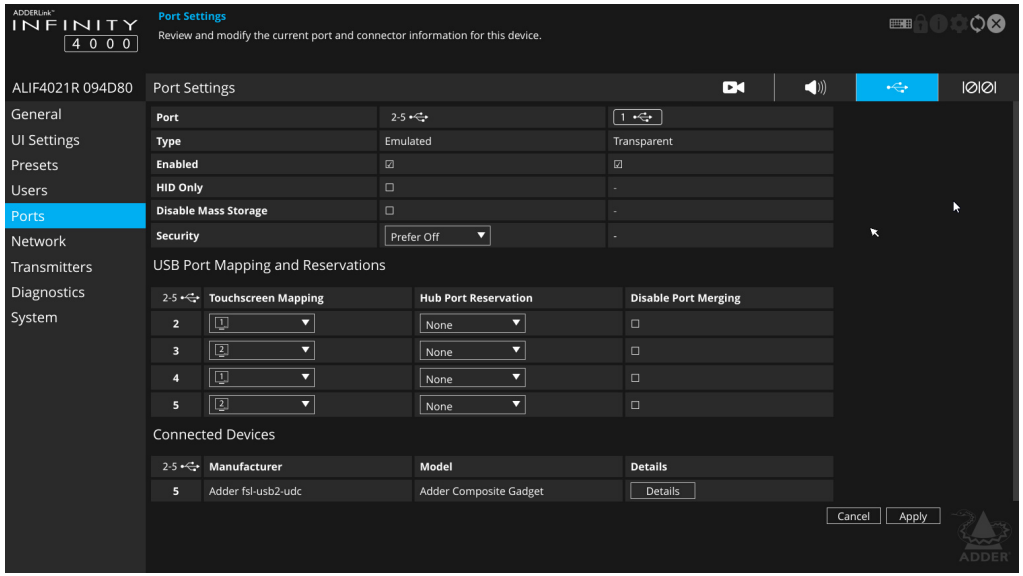
When a single touchscreen is used with an ALIF RX, it should operate correctly as soon as the USB link is made between the screen and the ALIF RX. However, if two touchscreens are installed it may be necessary to instruct the ALIF RX which screen to correctly attribute to each USB input.

To attribute dual touchscreens

1 Access the Configuration pages on the ALIF RX - see page 25.

2 Click the Ports entry from the list of pages on the left side.

3 Click the USB page icon: [ ] to display the following:



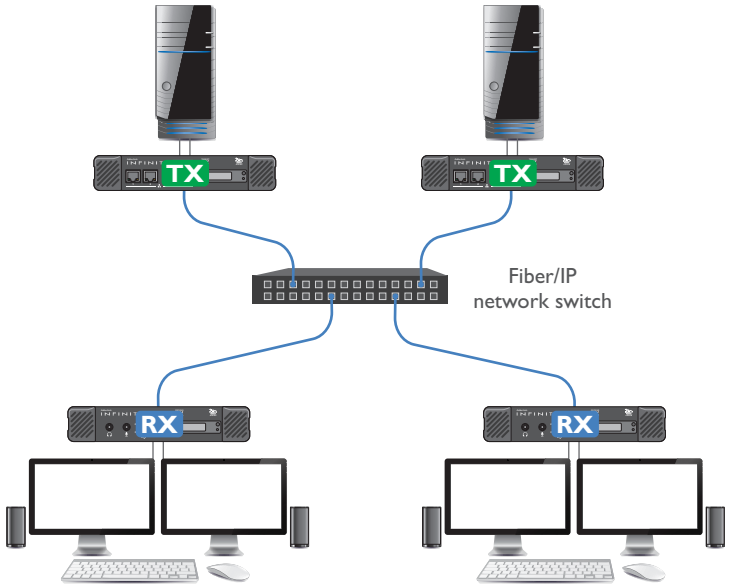
4 In the USB Port Mapping and Reservations section, match the primary touchscreen to the port number (2 -5) that its USB cable is connected to.

5 Repeat step 4 for the secondary touchscreen.

6 Click the Apply button and exit from the configuration pages.

CREATING AN UNMANAGED MATRIX

Although ALIF units are most often organised and managed by a central AIM server, it is possible to create small networks of ALIF units, most often in matrix arrangements, ie multiple TX and RX units which can freely cross-connect.



This method of connection works well for small numbers of TX and RX units, but will become more difficult to manage as more units are attached. The maximum number of TX sources that can be made available to any RX is 16.

To create an unmanaged matrix

1 Connect ALIF4000 TX and RX units (with their various hosts and peripherals) to a suitable switch, as described in the Installation section - see page 9.

Note: If any device was previously managed by AIM, then it will need to be given a factory reset before continuing with this procedure. There must not be an AIM connected on the matrix network otherwise, when such devices undergo a factory reset, they will automatically revert to AIM control.

You now need to perform the following procedure on each ALIF RX in turn:

2 Access the Configuration pages - see page 25.

3 Click the Transmitters option from the list on the left side. This page will list all of the available TX units which are not under AIM control. See page 37.

4 Click the Presets option from the list on the left side. Use this page to add each TX unit to the list of presets for the RX that you are editing. See page 32.

To use the matrix

- On each RX, use the OSD to access the required TX units in the usual manner. See page 25.

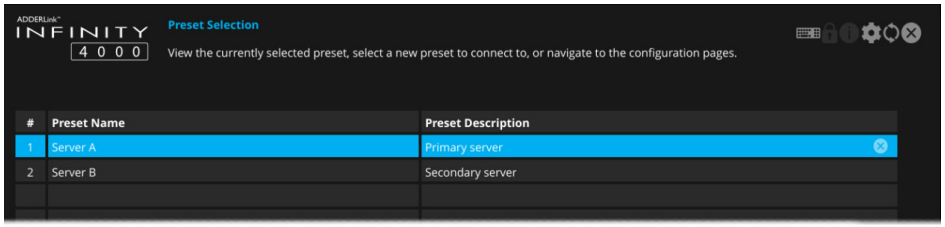
CREATING AND EDITING PRESETS

Presets allow you to create shortcuts from any ALIF receivers to any available ALIF transmitters. These are particularly useful when using an ALIF installation that is not under AIM control.

To access the Preset configuration page

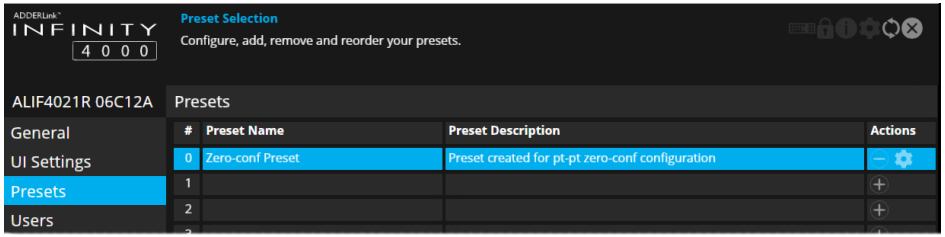
1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the ☰ icon on the touchscreen.

2 The Preset Selection page will be displayed:



3 Click/tap the ⚙ icon in the top right corner.

4 Choose the Presets option from the list on the left side of the screen. This page will show the same list of presets, but with options to add (⊕) or edit (⚙) entries:



To remove a preset

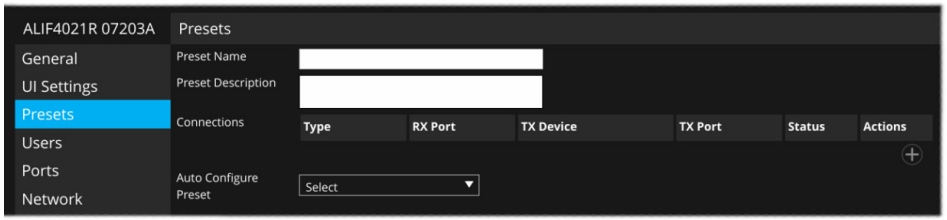
1 Access the Preset configuration page as discussed above.

2 In the Actions column, click the ⊖ icon for the entry that you wish to remove.

To add a preset

1 Access the Preset configuration page as discussed above.

2 Click the ⊕ icon on the right hand side of the list to display the configuration page:



3 Enter a name and description for the new preset.

4 You can now choose how to configure your new preset - Auto or Custom:

- **Auto** - Click the Auto Configure Preset drop down and choose the ALIF transmitter that you wish to connect with. All of the supported default connections will be configured (on a 1-to-1 basis) between the receiver and chosen transmitter. Click the Apply button.
- **Custom** - Configure individual connections (useful when unusual cross connections are required).
  1 Click the ⊕ icon on the right side to add a new connection entry.
  2 Check that the correct ALIF4000 TX is shown in the TX Device column. Click and change this entry, if required.
  3 In the Type column, click the Select option (highlighted in red) and choose the type of connection: Video, Audio, USB or Serial.
  4 Click the RX Port drop down and choose the required port.
  5 Click the TX Port drop down and choose the port that you wish the current RX port to connect with. If only one option is available it will be auto-selected.
  6 Repeat steps 1 to 5 for each of the required ports.
  7 Click the Apply button.

To edit a preset

1 Access the Preset configuration page as discussed left.

2 In the Actions column, click the ⚙ icon for the preset entry you wish to edit. An editable list of connections will be shown, together with their status representations:

3 Make your changes as required and then click the Apply button to save.

To re-order presets

1 Access the Preset configuration page as discussed left.

2 Click and drag a preset to the required position within the list.

For more information about the options and status indications, see page 32.

Operation

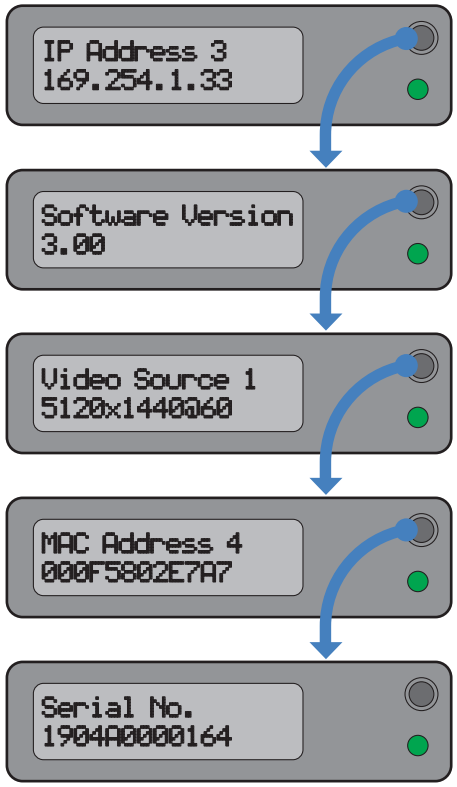
In operation, many ALIF4000 installations require no intervention once configured. The TX and RX units take care of all connection control behind the scenes so that you can continue to work unhindered.

FRONT PANEL INDICATIONS

The front panel of each ALIF4000 unit features an OLED information screen plus a single indicator capable of producing numerous color and flash patterns to provide a useful guide to operation.

OLED screen

Press and release the button to wake the OLED screen and begin showing information. Press the button repeatedly to change between subjects:



Base IP address

Internal firmware version

Video source

MAC addresses

Serial number

Indicator color and flash patterns

The single front panel indicator uses varying color and flashing patterns to signal key status:

Off	No power.
Green	All services present as compared to the configuration required.
Amber	Running but video, USB or network link missing (or not connected to another ALIF unit).
Red	Booting before processor loaded or failed.
Blue	Factory reset mode active.
Red/green flash	Booting into factory recovery mode.
Green/blue flash	Upgrade mode active.
Fast green flash	Identify mode active.

USING THE ON SCREEN DISPLAY

The OSD provides a quick and easy way to access ALIF transmitters as well as configuration details.

To access the OSD

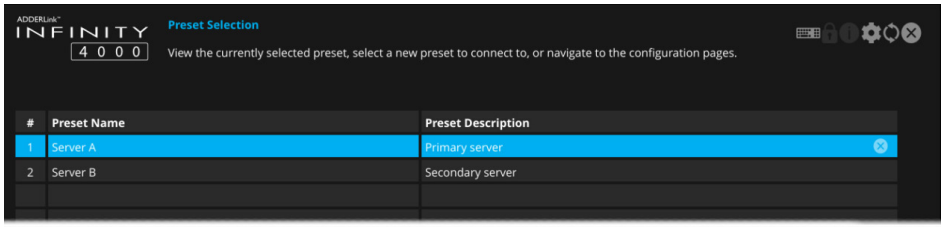
1 On the console of your ALIF4000 RX unit, either:

- Press **CTRL** + **ALT** + **C** on the keyboard,

  or

- Tap the icon* on the touchscreen.

2 The Preset Selection page will be displayed:

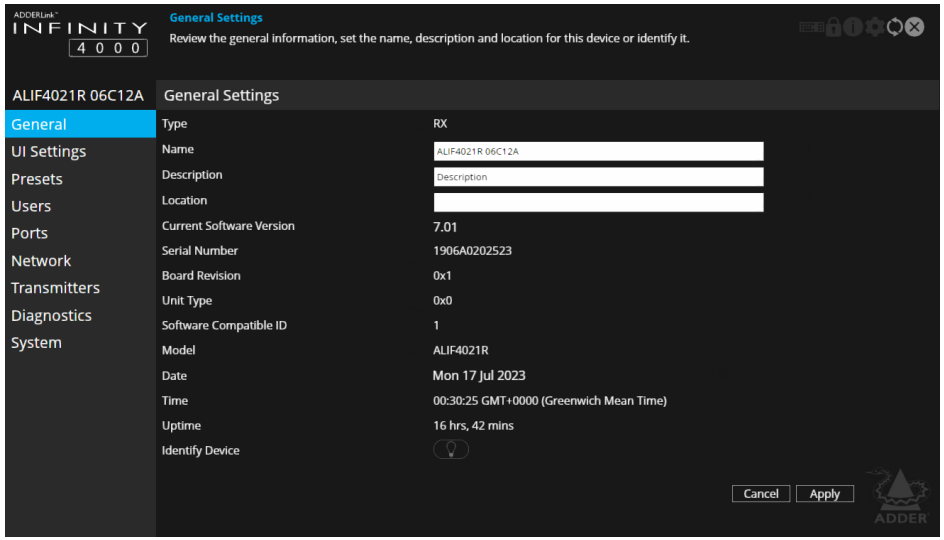


3 On the preset page, either

- Click/tap a preset entry to connect with the required ALIF TX,

  or

- Click/tap the icon to enter the first Configuration page:



For explanations of the options within each page, please see Appendix A.

To use the OSD keyboard (when using a touchscreen)

1 Access the OSD as discussed left.

2 Tap the icon in the top right corner:

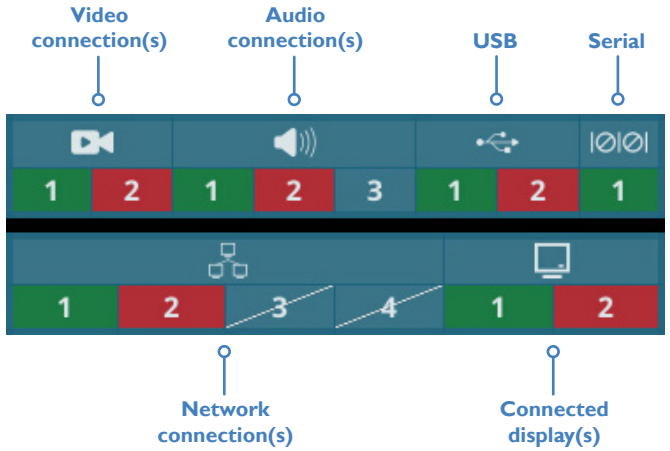
3 The OSD keyboard will be displayed to assist you when entering text and numerics:

To hide the OSD keyboard

1 Tap the icon in the top right corner.

*To move the icon on your touchscreen, tap and hold it until it changes color and then drag it to the best position.

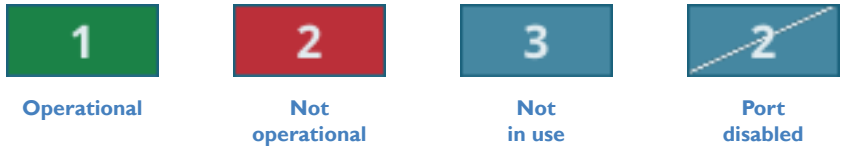
PORT STATUS POPUPS



These useful status indicators will be displayed in the top left corner (or elsewhere according to UI Settings) of the primary console display:

- Whenever the OSD is in use,
- If any issues occur with one or more ports (when the OSD is not in use).

The status of each port will be shown as follows:



Further information

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

- Getting assistance - see right
- Appendix A - Configuration pages
- Appendix B - Support for analog and digital audio
- Appendix C - Tips for success when networking ALIF units
- Appendix D - Troubleshooting
- Appendix E - Glossary
- Appendix F - RS232 'null-modem' cable pinout
- Appendix G - Fiber modules and cables
- Appendix H - Using the optional ALIF4000 rack shelf
- Appendix I - Open source licenses

GETTING ASSISTANCE

If you are still experiencing problems after checking the information contained within this guide, then please refer to the Support section of our website:

www.adder.com

APPENDIX A - Configuration pages

This section covers the web page configuration for the ALIF4000 units:

To access the OSD

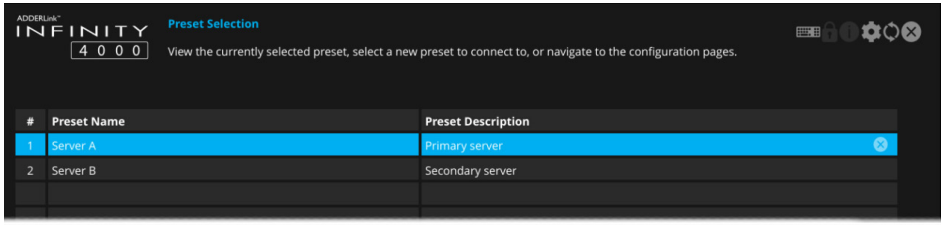
1 On the console of your ALIF4000 RX unit, either:

- Press **CTRL** + **ALT** + **C** on the keyboard,

  or

- Tap the icon* on the touchscreen.

2 The Preset Selection page will be displayed:



3 On the preset page, either

- Click/tap a preset entry to connect with the required ALIF TX,

  or

- Click/tap the icon to enter the first Configuration page:

To use the OSD keyboard (when using a touch screen)

1 Access the OSD as discussed on page 25.

2 Tap the icon in the top right corner of the screen.

3 The OSD keyboard will be displayed to assist you when entering text and numerics:

To hide the OSD keyboard

1 Tap the icon in the top right corner.

RX - General Information

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

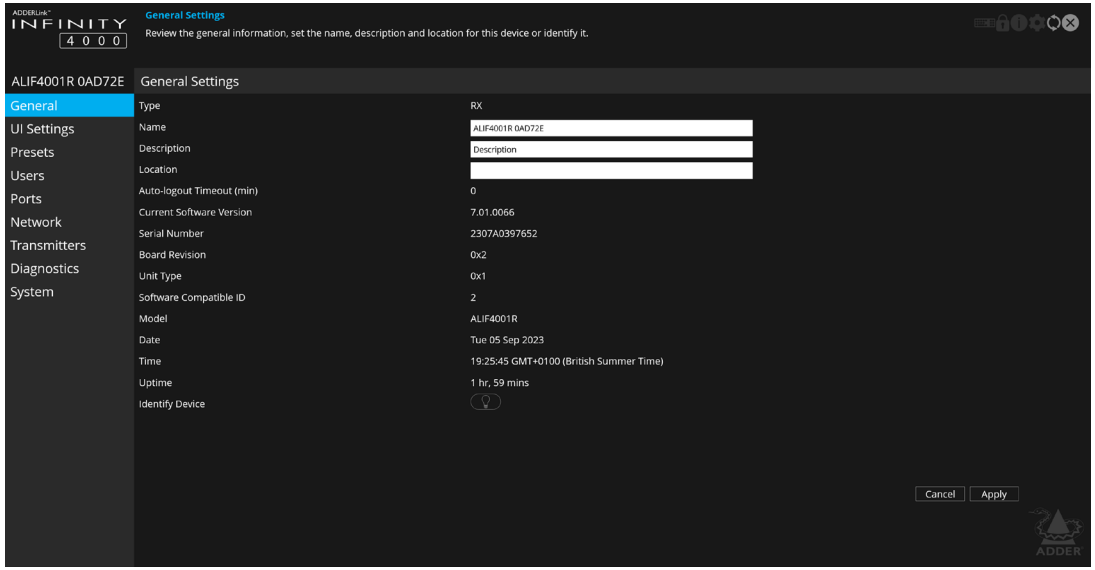
3 If necessary, click the **General** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or* 1 *(or IP Address 4 or* 2) and use that address.

3 If necessary, click the **General** link.



General Information

Type - States whether the device is a transmitter (TX) or a receiver (RX).

Name - Name details that you can alter to distinguish this unit from all others. Not shown when operating under AIM server control.

Description - Allows you to optionally add a description of the device. Useful when many ALIF units are being used. Not shown when operating under AIM server control.

Location - Allows you to optionally add a description of the device's location. Useful when many ALIF units are being used. Not shown when operating under AIM server control.

Auto-logout Timeout - Determines the period of inactivity (in minutes) after which the configuration page should automatically log out.

Current Software Version - Displays the version number of the currently installed (and active) internal software.

Serial Number - Displays the fixed serial number of the device.

Board Revision - Displays the revision number of the device's main circuit board.

Unit Type - Used for Adder technical support purposes, this entry shows a code depicting the type of the main circuit board.

Software Compatible ID - Used for Adder technical support purposes, this entry shows the software compatible ID of the main circuit board.

Model - Displays the model number of the device.

Date and Time - Displays the current date and time used by the device when this page was last loaded (select refresh icon to update).

Uptime - Shows the time period for which the device has currently being running since the last time this page was loaded (select refresh icon to update).

Identify Device - When clicked, this button will cause the indicator on the front panel of the device to flash to assist with identification when multiple units are installed in the same area. A popup dialog will also be displayed on screen showing all relevant identification details. Click the Cancel button to stop the identification process or click the OK button to close the popup (and then click the Identify Device button when you're ready to cancel this operation).

RX - UI Settings

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

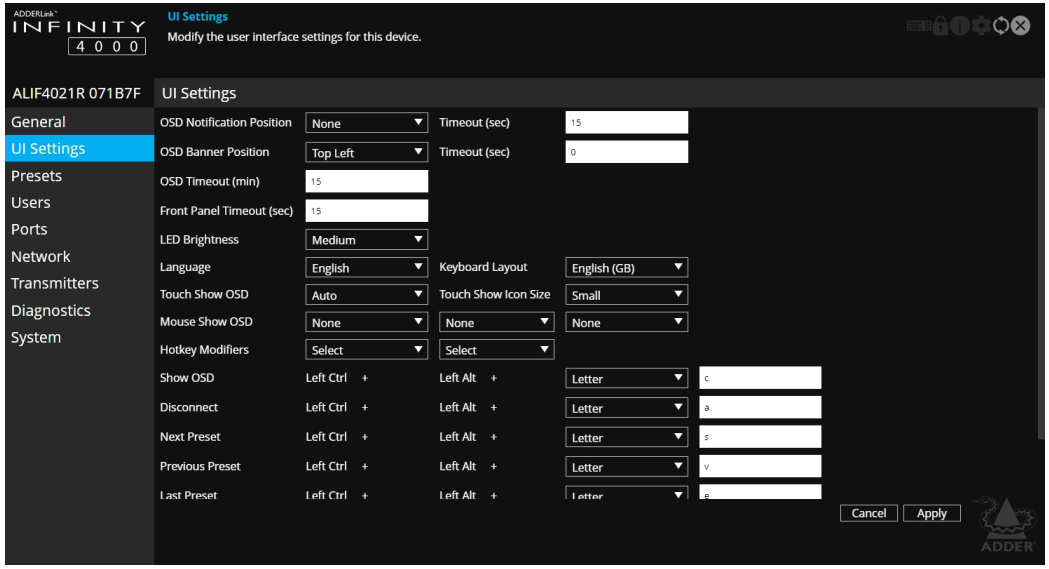
3 Click the **UI Settings** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or 1 (or IP Address 4 or 2)* and use that address.

3 Click the **UI Settings** link.



UI Settings

OSD Notification Position (plus Timeout) - Determines the location and persistence of notifications issued on users' screens.

OSD Banner Position (plus Timeout) - Determines the location and persistence of banners (a banner is a popup showing the current preset/channel name) displayed on users' screens.

OSD Timeout - Determines the period (in minutes) of inactivity that should elapse before the OSD is closed.

Front Panel Timeout - Determines the period of inactivity (in seconds) that should elapse before the front panel display should return to a blank state.

LED brightness - Determines the brightness of the front panel LED indicator.

The following entries are also editable when the unit is not under AIM control:

Language - Determines the language used for all text labels within the configuration pages.

Keyboard Layout - Determines the appropriate keyboard layout for use with the configuration pages.

Touch Show OSD - (When touch screens are used) Determines whether the Show OSD icon is displayed continually, not at all or automatically.

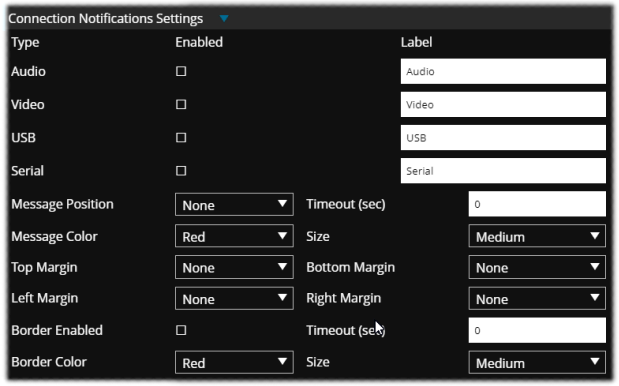
Touch Show Icon Size - (When touch screens are used) Determines the size of the Show OSD icon. Options range from Small to Very Large.

Mouse Show OSD - Determines the mouse button press combination that should be used to call the OSD.

Hotkey Modifiers - Determines the special modifier keys that will be used to form the basis of all the hotkey functions listed below.

Show OSD... ...Last Preset - These entries determine the hotkey letters required (together with the modifier keys selected above) to enact various presets and modes. Not shown when operating under AIM server control.

Connection Notification Settings - A collection of settings that can be used to configure the visual appearance, location, and timeout for notifications. Click the arrow to reveal the available options:



Enabled tick box - enables/disables connection notification messages for each connection type.

Label - defines the text label to use in the notification messages in place of the "%type%" token - see "Connection Notification Messages" on next page.

Position - "None" = All Connection notifications messages are disabled (regardless of enabled settings above). All other values for this setting enable the messages for the given connection types above that are enabled.

Timeout - 0 = no timeout, messages remain on screen indefinitely (unless user "clicks" on them to clear them using the mouse when OSD is onscreen). Any other value sets the duration in seconds that a given notification message remains on screen.

Message Colour - set the colour of the notification messages.

Size - set the size of the notification messages.

Margins (top,right,bottom,left) - each can be set to None, Small, Medium or Large to determine an offset that will be applied to the notification messages dependent on their displayed position.

Border Enabled - enable/disable border. If enabled, then a border is drawn around the whole screen (only on the video head that shows the OSD) when any preset connection is in an error state/status.

Border Colour - set the border colour to use.

Size - width of border to use.

continued

Connection Notification Messages - These settings are used to configure the message text for each possible connection state or status, and can be customised as required to give different descriptions (or in different languages) as needed. Click the arrow to reveal the available options:

Connection Notification Messages ▼	
Disconnected	%type% to %sinkId% from %sourceId% disconnected
Connecting	%type% to %sinkId% from %sourceId% connecting
Connected	%type% to %sinkId% from %sourceId% connected
Incompatible Version	%type% to %sinkId% from %sourceId% has an incompatible version
Incompatible Security Settings	%type% to %sinkId% from %sourceId% has incompatible security settings
Bad Authorisation	%type% to %sinkId% from %sourceId% has incorrect authorization credentials
Bad Association	%type% to %sinkId% from %sourceId% has failed to associate
Source In Rma	TX device is operating in RMA mode
Source In Recovery	TX device is operating in RECOVERY mode
Source Not Supported	%type% to %sinkId% from %sourceId% - source port is not supported by the TX
Too Many Connections	%type% to %sinkId% from %sourceId% failed due to too many connections at the TX
Source Disabled	%type% to %sinkId% from %sourceId% failed as the port is disabled at the TX
Source Port Not Connected	%type% to %sinkId% from %sourceId% is not connected at the TX
No Source	%type% to %sinkId% from %sourceId% has no input signal at the TX
Source Out Of Range	%type% to %sinkId% from %sourceId% has an unsupported input signal at the TX
Source Out Of Resources	%type% to %sinkId% from %sourceId% has insufficient resources at the TX
Insufficient Bandwidth	%type% to %sinkId% from %sourceId% has insufficient network bandwidth
Encoding Stopped	%type% to %sinkId% from %sourceId% has stopped encoding at the TX
Port Not Connected	%type% to %sinkId% from %sourceId% is not connected at the RX
No Data	%type% to %sinkId% from %sourceId% is not receiving data from the TX
Out Of Range	%type% to %sinkId% from %sourceId% is not supported at the RX
Out Of Resources	%type% to %sinkId% from %sourceId% is out of resources at the RX
Decoding Stopped	%type% to %sinkId% from %sourceId% has stopped decoding at the RX

The *%type%*, *%sinkId%* and *%sourceId%* entries are special tokens that are replaced when the notification is generated:

- *%type%* will be replaced with the connection type *Label* entry defined above in Connection Notification Settings.
- *%sinkId%* will be replaced with the connection type's destination port number on the RX, eg. for the secondary video head connection this would be "2".
- *%sourceId%* will be replaced by the connection type's TX source port number, eg. for the Primary Video head this would be "1".

RX - Presets

To get here

You can access this page in two ways, however, the first method is not available if the module is under AIM control:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 If necessary, click the **Presets** link.

4 Either add a new preset (click ⊕) or click to edit an existing one.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or 1 (or IP Address 4 or 2)* and use that address.

3 Click the icon in the top right corner.

4 If necessary, click the **Presets** link.

5 Either add a new preset (click ⊕) or click to edit an existing one.

Preset Information

This page lists the details and connection status for the current channel/preset which the receiver is using. Under AIM control this lists the connection details for the channel that the RX is currently connected to.

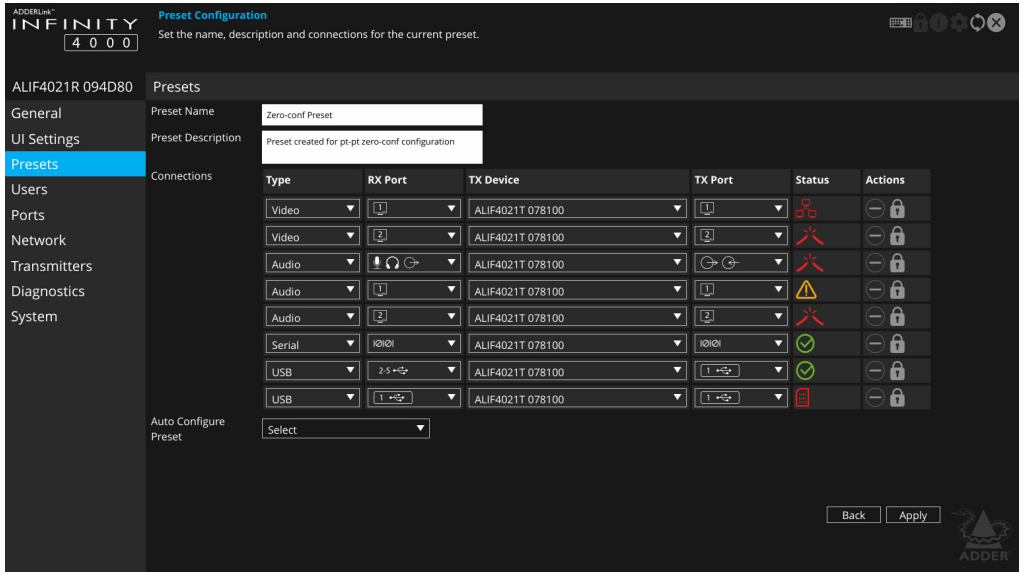
Each row details one type of connection which has been made. It lists the output port on the RX and the source port from the TX which it is connected to, as well as the name of the device it is connected to.

⊖ Click this icon in the *Actions* column to remove a particular row of connections from the list.

Click this icon to manually set the password for the specified device so that it has the necessary permission to access the appropriate channel on the selected transmitter. In most connections, the access passwords for all the peripherals will be set collectively during the initial linking between the receiver and transmitter. The links given here provide an alternative method as backup.

⊕ Click this icon to add a new connection to the list.

Auto Configure Preset - Select to automatically create a new set of connection presets from the selected TX.



Analog and digital audio

ALIF4000 units support both analog and digital audio connections from the host PC. Although originating from possibly the same audio source, these two connections are switched completely separately and cannot be mixed. In the connections table, the two types are represented thus:

- **Analog** audio ( ) at RX only connects to ( ) at TX.
- **Digital** audio (or) at RX only connect to (or) at TX.

For more details, please see Support for analog and digital audio.

Status

The following icons may be shown within the Status column:

The connection is fully operational.

A connection has not been established.

The control protocol version is incompatible/unsupported between the peer and this device.

The control protocol security settings are incompatible/unsupported between the peer and this device.

The connection failed the authorisation stage (most likely a bad password).

The connection is established but there is no input signal being received from the peer device.

The connection has an invalid or unsupported input source signal peer device (audio and video connections only), or

The connection is currently out of resources at the peer device, or

There is insufficient network bandwidth to support the requested data for this connection.

The encoding of the source data at the peer has stopped (due to an error or fault).

There is no input device available on the port for this connection (eg. no PC connected).

There is no output device available on the port for this connection (eg. no monitor connected).

There is no data currently being received by the device.

The video data for the connection produces an output signal that is out of range for the capabilities of this device, or the appliance connected to this device, or

The device is currently out of resources to process the video data for this connection.

The audio data for the connection produces an output signal that is out of range for the capabilities of this device, or the appliance connected to this device, or

The device is currently out of resources to process the audio data for this connection.

The decoding of the data at this device has stopped (due to an error or fault).

RX - Users

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

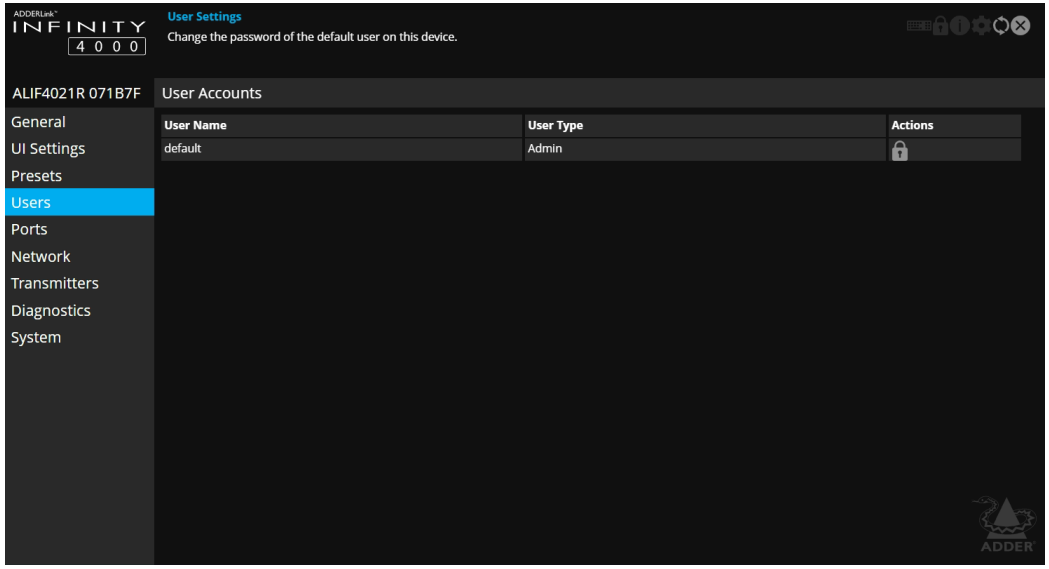
3 Click the **Users** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or* 1 *(or IP Address 4 or* 2) and use that address.

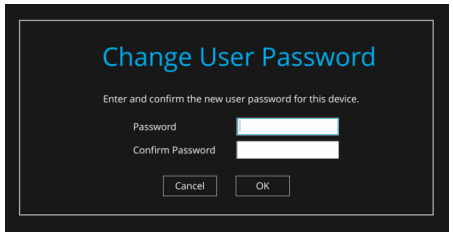
3 Click the **Users** link.



User accounts

This page allows you to change the password for the admin user.

Click the icon to display the following dialog:



Enter and confirm the current and new admin password and click OK.

RX - Ports

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

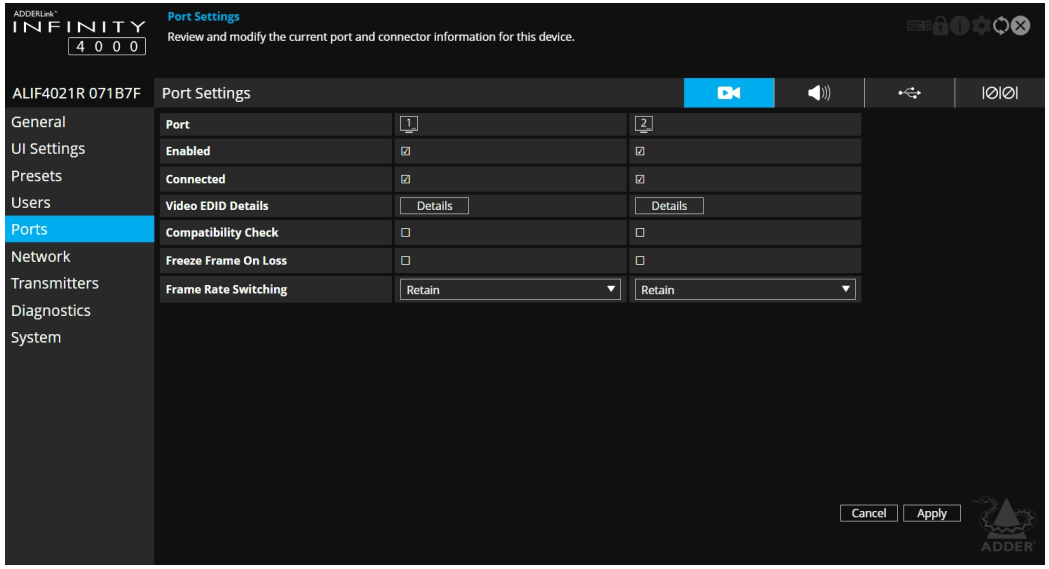
3 Click the **Ports** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or 1 (or IP Address 4 or 2)* and use that address.

3 Click the **Ports** link.



Video Ports

This page provides basic information about the two video ports located on the RX unit.

Enabled - Confirms whether each video port is enabled or disabled.

Connected - Confirms whether functioning video displays are connected to the two video ports.

Video EDID Details - Click the Details button to show a popup for the connected video display. EDID details listed include: *Manufacturer, model, serial number, manufacture date, EDID version as well as supported (and preferred) EDID modes, maximum bits per color, encodings, colorimetry and dynamic range masterings supported by the monitor. Note: EDID modes that are supported by the monitor but not by the device will be greyed out. In cases where a resolution reported by the video display is supported, but at a lower frame rate than the display calls for, such entries will be shown in italics.*

Compatibility Check - *WARNING: Disabling this option can result in damage to display monitors in certain circumstances.* When ticked this option confirms video compatibility between the source and display device, (such as the video display's maximum resolution, bpp, SDR/HDR, etc.) and prevents signals being sent that the video display can't support. When unticked, signals will always be sent regardless of video display's declared capabilities. If you untick the option, the following warning will be displayed:

Freeze Frame On Loss - If disabled (default), video will blank when a video connection error occurs. If enabled, video will freeze (or remain blank if no video yet received) when error occurs. Video will resume once error clears. Video will blank if frozen and connection is terminated (eg. different preset selected). A coloured border and messages can be added in the Connection Notification Settings - see page 30.

Frame Rate Switching - Determines the strategy to use for the frame rate when switching resolutions. Similar in function to the *Match Frame Rate* setting on AIM servers:

Force 60 - The frame rate is always forced to be 60Hz unless the Compatibility check option is on and the monitor does not indicate it supports 60Hz.

Retain - When switching to the same resolution with a potentially different frame rate, it will retain the current frame.

Auto - The frame rate always changes to match the mode it is connected to.

Audio Ports

This page provides basic information about the analog and digital audio ports located on the RX unit.

Enabled - Confirms whether the audio ports are enabled or disabled.

Connected - Confirms whether devices are connected to respective ports.

Gain - (Analog audio only) Determines the microphone amplification level:

None - no device connected on this port.

Mic - standard gain for normal microphone input devices.

Mic boost - 20dB boost to volume for microphone input devices.

Audio EDID Details - Click the Details button to show a popup listing the audio capabilities of the device connected to that DP port. Unsupported formats will be greyed out.

Compatibility Check - When ticked, the RX will not output audio on this port if it is not compatible with the attached device's audio capabilities. If unticked, audio will be output regardless of the attached device's capabilities. For example, if an attached device supports 2 channel stereo but the incoming stream is 6 channels, turning this off may allow L & R audio output to work - if the attached device can cope, but other channels will be lost (ie. there is no down-mix support).

USB Ports

This page provides basic information about the USB ports numbered 2 to 5 inclusive, located on the RX unit. USB port 1 is transparent and its devices are not listed.

Type - Identifies the type of the USB port. Port 1 on the front of the RX is Transparent, 2-3 on the front, 4-5 on the back are the Emulated ports.

Enabled - Confirms whether the USB ports are enabled or disabled.

HID Only - (For emulated USB ports only) When ticked, all ports are limited to supporting Human Interface Devices only, such as keyboards and mice.

Disable Mass Storage - When ticked, this option prevents the use of USB mass storage devices on the receiver unit. This could be useful in situations where smart card readers need to be used for security purposes but the use of USB drives need to be prevented.

Security - (For emulated USB ports only) Controls whether USB data is encrypted. *On* forces always on, *Off* forces always off and *Prefer off* will be off unless the TX requests it.

continued

RX - Ports (continued)

USB Port Mapping and Reservations - This section is useful when multiple touchscreens are in use and allows you to match each USB port input to the correct touchscreen.

Connected Devices - This section lists all connected devices with manufacturer and model details where reported. Click the Details button against each device to view further information, such as the Device Type, Protocol Version, Speed and Max Power Consumption.

Serial Port

This page provides basic information about the serial option port located on the RX unit.

Enabled - Confirms whether the serial port is enabled or disabled. Disabling the serial port (or excluding it from the preset connection list) allows an attached USB-serial adapter to instead be used over the USB connection to the TX, rather than the explicit serial connection.

RX - Network

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

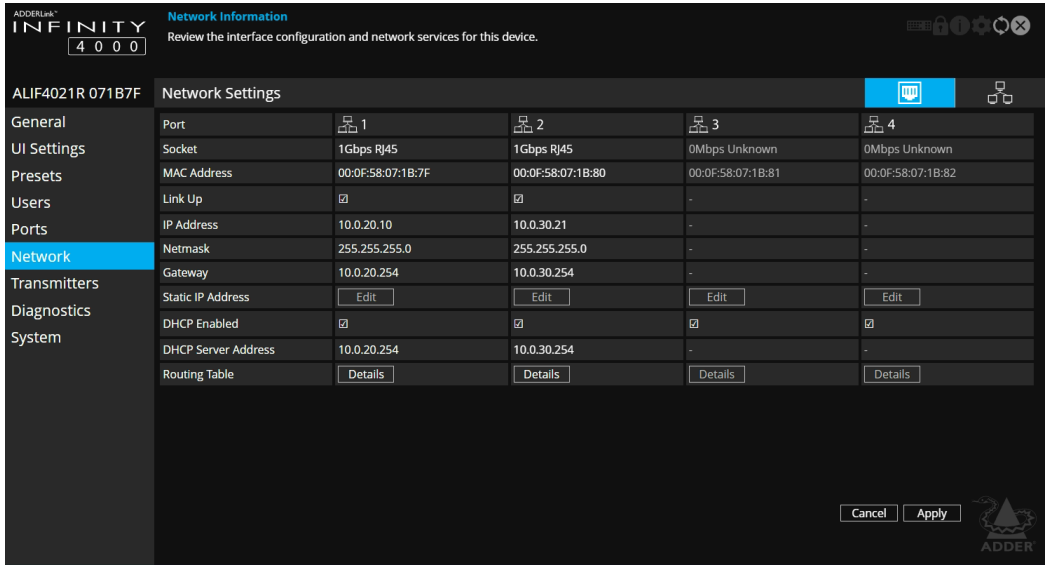
3 Click the **Network** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or 1 (or IP Address 4 or 2)* and use that address.

3 Click the **Network** link.



Note: ALIF4001 models will list only two ports on this page.

Port Settings

This page provides numerous network details for each of the installed ports on the RX unit.

Socket - Details each operational network socket and what connection speeds they have established. Sockets 3 and 4 are determined by the SFP modules plugged into them.

MAC Address - Displays the unique, fixed hardware identification number for each port.

Link Up - Indicates whether the link state of this network interface is up. This should be the case if the device is connected to a functioning network.

IP Address - This shows the IP address in use, which can be obtained via DHCP, a static IP or a link local (zero-config).

Netmask - The netmask of this network interface. The device can function in a network zero-config state which does not require the setting of a static netmask.

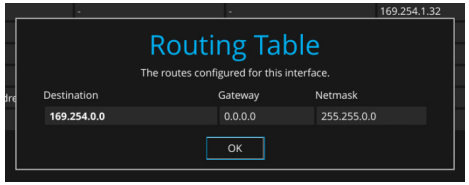
Gateway - The gateway address of this network interface. The device can function in a network zero-config state which does not require the setting of a static gateway.

Static IP Address - When the 'DHCP enabled' option (below) is unchecked, click on 'Edit' to enter/edit a static IP Address, Netmask and Gateway for the unit.

DHCP Enabled - When ticked, the corresponding port will derive its IP Address, Netmask and Gateway details from the DHCP server listed in the field below.

DHCP Server Address - Indicates the server that provided the DHCP details.

Routing Table - Click on 'Details' to show the routing table entries corresponding to this network interface. In it are the destination address, gateway and netmask for the routes to particular network destinations.



Network Information

Default Domain - Reserved for future use.

Independent Networks - When ticked, the ALIF4000 receiver will treat its two main network ports as independent routes to the transmitter(s) and not attempt to find secondary cross connections, which may not be possible due to the network topology. This setting will have no effect when ALIF4000 receivers link with ALIF4000 transmitters due to their use of auto discovery. However, when an ALIF4000 receiver links with other dual port ALIF transmitters (such as an ALIF2002T), enabling this option can prevent unnecessary delays due to the time taken looking for routes that are effectively network dead ends.

Route of Last Resort - In a multi-interface device such as this, the interface which is ticked will be used as the default whenever it is unclear which interface should be used for network traffic.

Dynamic DNS Servers - List of DNS server addresses obtained via DHCP.

Static DNS Servers - Lists DNS server addresses that have been manually configured.

NTP Enabled - When ticked, the unit will derive its time and date information from a suitable NTP server.

NTP Key ID - The ID of the key used for secure NTP.

NTP Key Value - The value of the key used for secure NTP as a hexadecimal string.

Dynamic NTP Servers - Lists NTP server addresses obtained via DHCP.

Static NTP Servers - Lists NTP server addresses that have been manually configured.

AIM Enabled - Indicates whether server management is enabled for this device.

Dynamic AIM Servers - Lists AIM server addresses obtained via DHCP.

Static AIM Servers - Lists management server addresses that have been manually configured.

RX - Transmitters

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

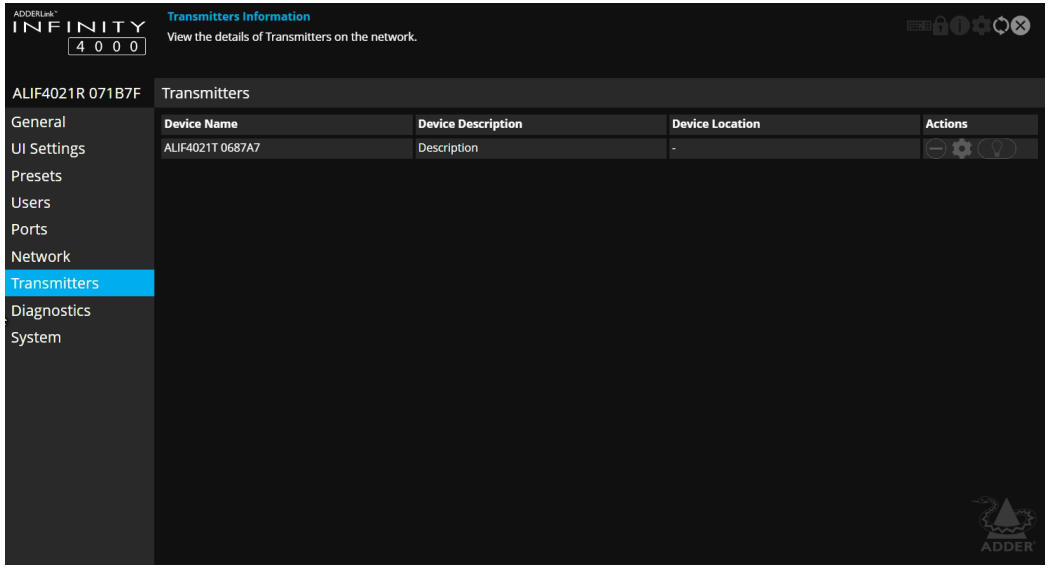
3 Click the **Transmitters** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or* 1 *(or IP Address 4 or* 2) and use that address.

3 Click the **Transmitters** link.



Transmitters

This page lists the available transmitters on the network which aren't under AIM control - *Note: ALIF1xxxT and ALIF2xxxT units are generally not discoverable using this process, however, if the Start of Life process was able to connect point-to-point to an ALIF2xxx then it will have created a 'static' device entry and thus it will appear on this screen. However, the cog and light bulb icons will not function for the entry.*

In the Actions column you can perform the following functions for each listed transmitter:

- Click to view the configuration page of the TX. When clicked, you will be directed to the General page for the chosen TX. See page 40.
- Click to flash the front panel indicators on the transmitter to assist with identification.
- [When viewing TX pages] Click the X button in the top right corner to return to the RX pages.

RX - Diagnostics and Statistics

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

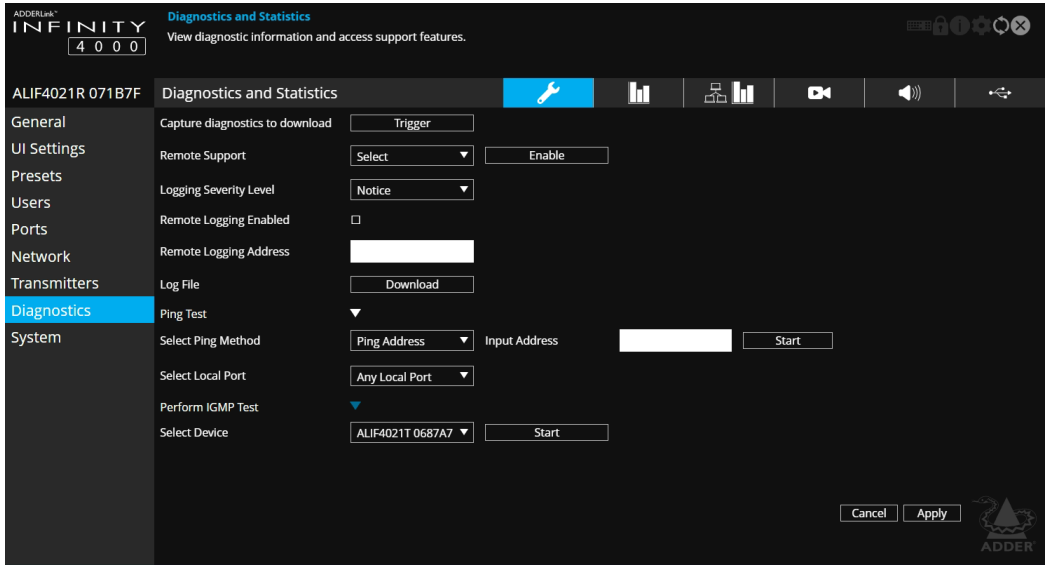
3 Click the **Diagnostics** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or 1 (or IP Address 4 or 2)* and use that address.

3 Click the **Diagnostics** link.



Log Settings

This page provides numerous key diagnostic log settings.

Capture diagnostics to download - (Only shown when viewing this page using a PC browser). Request generation of a diagnostics dump file. This will then be downloaded by the host computer's browser, this is an encrypted diagnostics file which can be used by technical support to diagnose and fix an issue. If using the local OSD, then this will show 'Capture diagnostics to USB' and will download the same file onto a USB memory stick inserted into USB ports 2-5. *Note: When in point to point mode, you will need to plug in a USB flash drive and capture the logs to it.*

Remote Support - When using the Adder remote server, this option determines which port will be used. Multiple options are offered in case one or more ports are blocked by your firewall.

Logging Severity Level - Defines the level of messages that will be logged (according to RFC5424). Level 5 *(Notice: normal but significant condition)* is the default setting; ALIF4000 supports levels 1 to 7. Choosing levels 6 *(Informational)* or 7 *(Debug)* will cause larger numbers of lesser events to also be logged, with a potential impact to overall performance. These levels should only be used if working with the support team to diagnose a specific issue.

Remote Logging Enabled - Tick to send log files to the chosen *Remote Logging Address*.

Remote Logging Address - Enter a valid IP address for a syslog server on the local network where status logs can be sent.

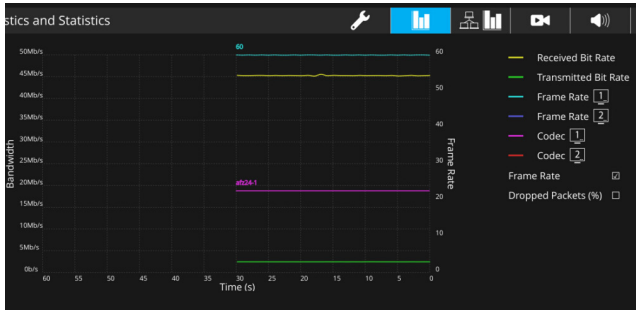
Log File - If viewing this page using a browser: Click to download the log file to the host computer's browser. If viewing this page via the OSD, the log will be shown as a scrollable list.

Ping Test - Allows you to conduct a ping test to any selected address or device.

Perform IGMP Test - Allows you to conduct an IGMP test on connected devices, selectable from the drop-down list.

Basic Graph

This page shows a real time graph with the following entries:



- **Received and Transmitted Bit Rates** - the values of these correspond to the bandwidth axis on the left.
- **Frame Rate** - for both heads. Values are labeled when they change and correspond to the axis on the right.
- **Codec** - for both heads. These represent the compression used: 1 is better than 4.
- **Dropped Packets** - for both heads. Values are labeled when they change and correspond to the axis on the right.

Note: Use the Frame Rate and Dropped Packets tick box options to determine which is displayed at any given time.

Network Statistics

This page allows you to view current communication statistics and also to create graphs in real time.

Capture and Graph Statistics - When ticked, the page will create a real time graph plotting Received Bytes alongside Received Packets.

After *Capture and Graph Statistics* is enabled, the *Show Legend* checkbox will show all other items that can be included on the plot. Click an item to tick and include it.

Video Port Status and Statistics

This page provides wide ranging information for support purposes.

Audio Port Status and Statistics

This page provides wide ranging information for support purposes.

USB Port Status and Statistics

This page provides wide ranging information for support purposes. Currently only supported for transparent USB.

RX - System

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

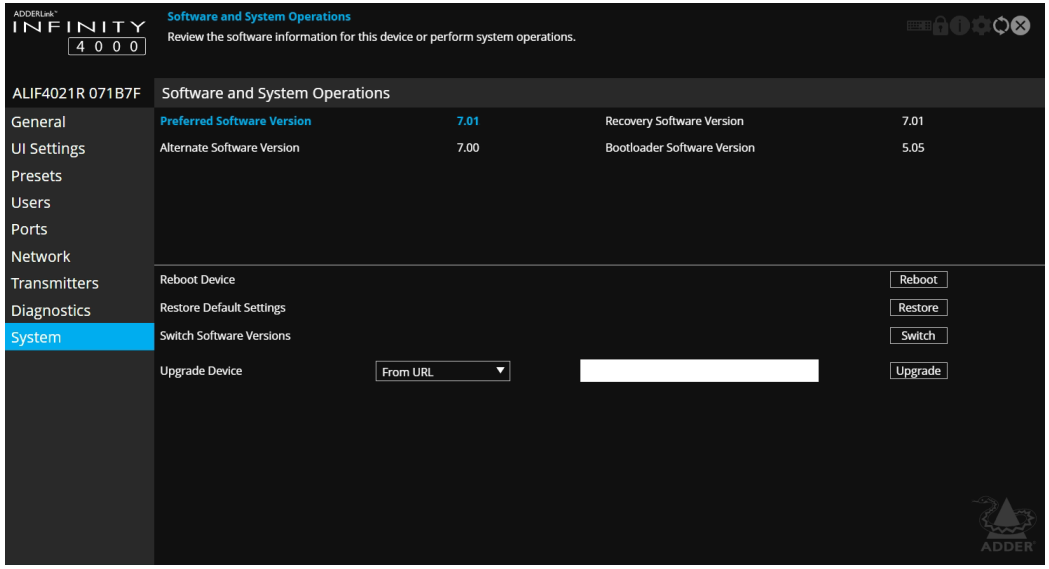
3 Click the **System** link.

OR

1 Connect a computer to the same network as the RX unit.

2 Run a web browser and enter the IP address of the RX unit: **https://169.254.1.32** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2, then the default address will be **https://169.254.1.42** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 or* 1 *(or IP Address 4 or* 2) and use that address.

3 Click the **System** link.



Software and System Operations

This page contains various indications and options related to the internal software of the unit.

Note:The highlighted (and colored) entry is the version of software currently running.

Preferred Software Version - The software version the device will boot into upon a reboot.

Recovery Software Version - The software version the device will boot into if placed into recovery mode.

Alternate Software Version - The other (backup) version of software the device has available.

Reboot Device - Click the Reboot button to Reboot the device.

Restore Default Settings - Click the Restore button to restore the device to factory default settings.

Switch Software Versions - Click to switch to the listed 'Alternative Software Version'.

Upgrade Device - If viewing this page using a browser: Allows you to upgrade the firmware either from a trusted URL or from a locally stored file. Use the field to define the source and then click the Upgrade button.

TX - General Information

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

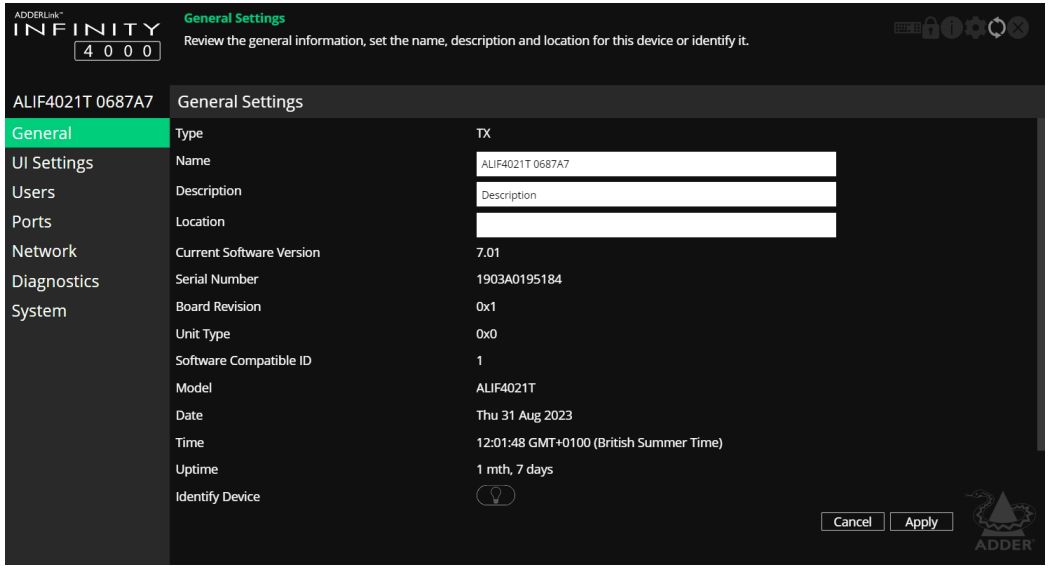
4 If necessary, click the **General** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 If necessary, click the **General** link.



General Information

Type - States whether the device is a transmitter (TX) or a receiver (RX).

Name - Name details that you can alter to distinguish this unit from all others. Not shown when operating under AIM server control.

Description - Allows you to optionally add a description of the device. Useful when many ALIF units are being used. Not shown when operating under AIM server control.

Location - Allows you to optionally add a description of the device's location. Useful when many ALIF units are being used. Not shown when operating under AIM server control.

Current Software Version - Displays the version number of the currently installed and running internal software (unit can have two different software versions installed at once).

Serial Number - Displays the fixed serial number of the device.

Board Revision - Displays the revision number of the device's main circuit board.

Unit Type - Used for Adder technical support purposes, this entry shows a code depicting the type of the main circuit board.

Software Compatible ID - Used for Adder technical support purposes, this entry shows the software compatible ID of the main circuit board.

Model - Displays the model number of the device.

Date and Time - Displays the current date and time used by the device when this page was last loaded (select refresh icon to update).

Uptime - Shows the time period for which the device has currently being running since the last time this page was loaded (select refresh icon to update).

Identify Device - When clicked, this button will cause the indicator on the front panel of the device to flash to assist with identification when multiple units are installed in the same area. A popup dialog will also be displayed on screen showing all relevant identification details. Click the Cancel button to stop the identification process or click the OK button to close the popup (and then click the Identify Device button when you're ready to cancel this operation).

Access Password - Sets the password that a RX device must provide in order to connect (video, audio, etc) to the TX

Insecure Connections - Controls whether the TX will accept insecure connections from RX devices. Insecure connections are those from older ALIF products where the security credentials are not implemented. Initially, the TX will default to 'auto' which allows it to decide the setting based on the type of device that first connects to it. Once a device has connected, the setting will be changed to either 'Allowed' or 'Disallowed'.

TX - UI Settings

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

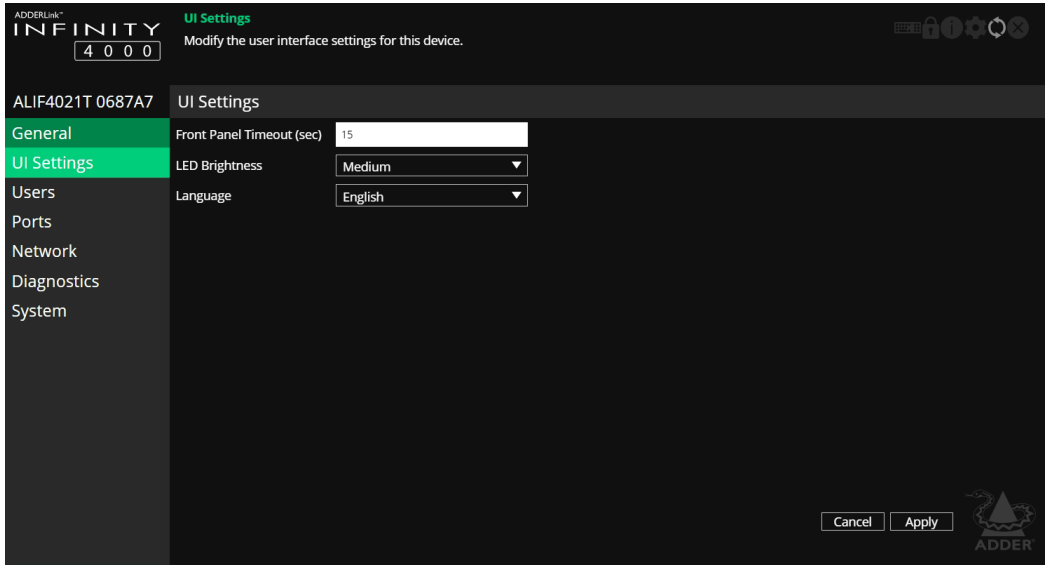
4 Click the **UI Settings** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 Click the **UI Settings** link.



UI Settings

Front Panel Timeout - Determines the period of inactivity that should elapse before the front panel display should return to a blank state.

LED brightness - Determines the brightness of the front panel LED indicator.

Language - Determines the language used for all text labels within the configuration pages.

TX - Users

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

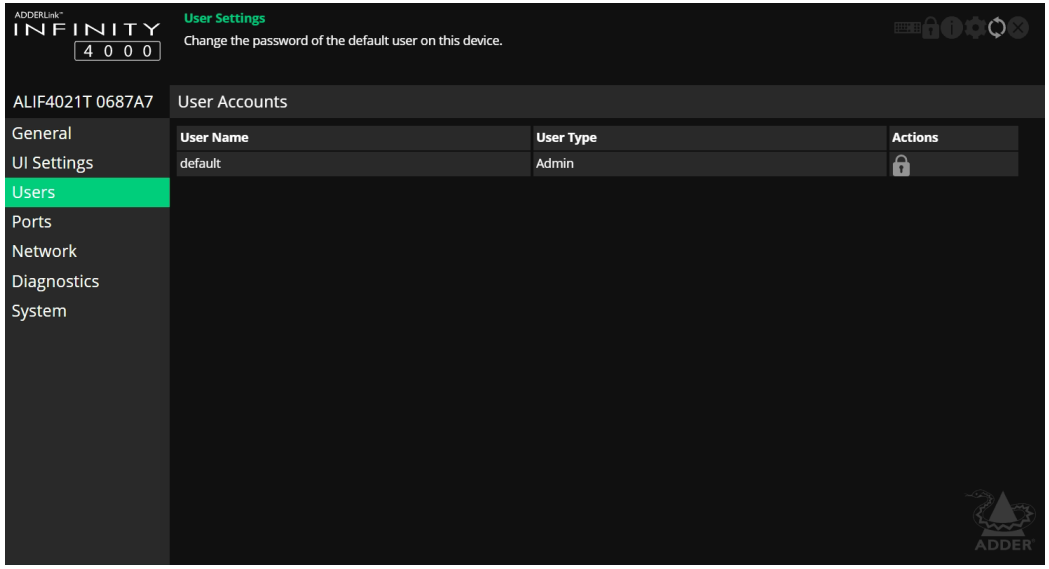
4 Click the **Users** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

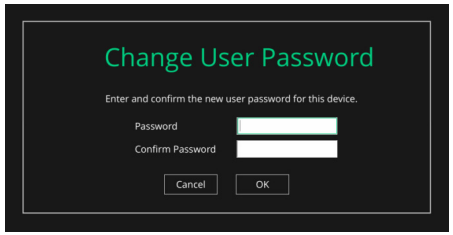
3 Click the **Users** link.



User accounts

This page allows you to change the password for the admin user.

Click the icon to display the following dialog:



Enter and confirm the current and new admin password and click OK.

TX - Ports

To get here
You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

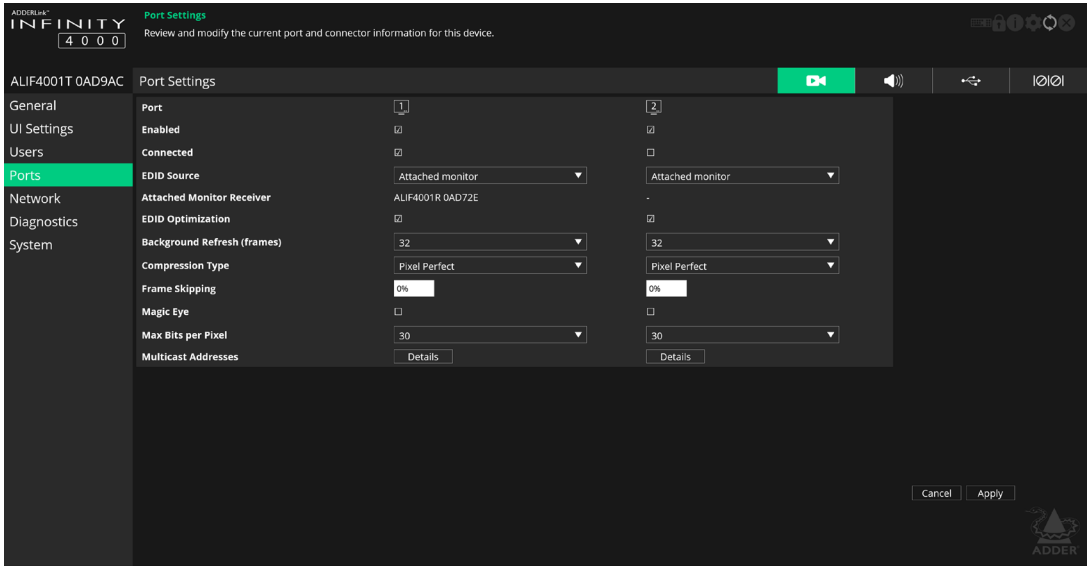
4 Click the **Ports** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 Click the **Ports** link.



Video Ports

This page provides basic information about the two video ports located on the TX unit.

Enabled - Confirms whether each video port is enabled or disabled.
Connected - Confirms whether functioning host video drivers are connected to the two video ports.

EDID Source - Lists the EDID mode currently being output on the two video connectors. An option called *Saved attached monitor* is available and will save that first RX's EDID in persistent storage and use that EDID forever (including over reboot, powercycle, etc) until it is cleared (see below) or a Fixed EDID is selected instead.

To save a monitor EDID and use it for that given video and/or audio port, select the *Saved Attached Monitor* option. The current Attached monitor EDID will be saved in persistent storage on the TX and used from now on by the TX until is it cleared (see below).

To clear the saved monitor EDID, either:

- Factory reset the TX
- Select "Attached Monitor" EDID on both the video and audio EDID Source settings for the same physical DP port.

For more information about how video and audio EDID data are derived, see Support for analog and digital audio. *Note: Fixed EDIDs were updated in v3.00 to add support for higher frame rates at each fixed EDID resolution. The default frame rate remains as given in the fixed EDID name (eg. 60), however, HD and higher resolutions will include higher rates which are supported at those resolutions. eg. 240Hz for 1920x1080p60.*

Dynamic Range - This option is shown only when a fixed EDID is selected and allows you to determine a particular color depth and dynamic range. When set to HDR10, the transmitter will also declare support for the lower SDR8 and SDR10 modes. See page 4.

Attached Monitor Receiver - If the 'Attached monitor' option has been selected as the 'EDID Source', then this displays the name of the RX device that supplied the EDID currently being used.

EDID Optimization - When ticked, and if the *EDID source* option is set to 'Attached monitor'; upon connecting with a new receiver, the transmitter will compare the preferred video mode of the new monitor with the current video output from the host PC. Only if they differ will the transmitter present the new monitor's EDID to the host PC. This option speeds up switching as the host PCs graphics card does not have to go through a hotplug detect routine each time a new receiver is connected. If this setting is unticked, the transmitter will always present a new EDID to the host PC.

Background Refresh (frames) - The system will send all changing video as soon as it changes. In addition, it is possible to send unchanging video in the background, to overcome problems of lost network traffic. This control will configure how often a whole frame of video will be sent alongside changing video. In situations of frequently changing video, or high reliability networks, this value can be set to a higher number, or even set to disabled.

Compression Type - Allows you to select the compression method to best suit the nature of the video sources. Settings are: Pixel Perfect, Adaptive, Smoothest Video or Advanced (which allows you to set the maximum and minimum compression levels).

Frame Skipping - 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%.

Magic Eye - When ticked, this feature increases performance and reduces network traffic if ALIF units are used with host computers that have dithered video output. It also improves performance if the video source is noisy.

Max Bits per Pixel - Allows you to choose the maximum color bit depth that is passed through from the host computer to the ALIF4000 receivers and their connected video display(s). The options are 24-bits per pixel (Standard Dynamic Range) or 30-bits per pixel to support newer video displays that support the SDR10 and HDR10 (High Dynamic Range) standards. When set to 24, an incoming 30-bpp signal will be converted down to 24-bpp before being transmitted, most commonly used to ensure that all ALIF receivers are able to receive the video output. When set to 30, incoming 30-bpp will pass through unchanged, as will 24-bpp See page 4.

Multicast Addresses - This section lists all video multicast IP addresses that have been configured. Setting the field to a blank (empty string) value will cause the system to automatically generate a default multicast address.

continued

Audio Ports

This page provides basic information about the audio ports located on the TX unit.

Enabled - Confirms whether the audio ports are enabled or disabled.

Connected - Confirms whether devices are connected to respective ports.

EDID Source - Determines which audio EDID should be used:

Attached Monitor - use the audio capabilities reported by the monitor.

Saved Attached Monitor - save the audio capabilities reported by the attached monitor EDID in persistent storage on the TX and use them until they are cleared (see below).

None - remove audio support from the EDID presented by the TX to the connected PC.

2-, 6-, 8-Channel - apply a generic audio EDID.

For more information about how video and audio EDID data are derived, see Support for analog and digital audio.

To clear the saved monitor EDID, either:

- Factory reset the TX
- Select "Attached Monitor" EDID on both the video and audio EDID Source settings for the same physical DP port.

Attached Monitor Receiver - If the 'Attached monitor' option has been selected as the 'EDID Source', then this displays the name of the RX device that supplied the EDID currently being used.

EDID Optimization - When ticked, and if the *EDID source* option is set to 'Attached monitor'; upon switching to a new receiver, the transmitter will compare the preferred audio mode of the new monitor/audio subsystem with the current video output from the host PC. Only if they differ will the transmitter present the new audio EDID to the host PC. This option speeds up switching as the host PC does not have to go through a hotplug detect routine each time a new receiver is connected. If this setting is unticked, the transmitter will always present a new EDID to the host PC.

For audio there is also an extra check. Because the audio stream may not always be active (whereas video always is); if there is currently no audio stream being output by the PC, the transmitter will compare the audio capabilities of the current EDID with the new EDID. If the new EDID's capabilities are a subset of the current EDID's, the existing one will be changed for the new one. For example, if the current EDID supports 8 channel audio and the new only supports 6, the new will be selected to ensure the host PC doesn't attempt to output 8 channel audio to a device that can't handle it.

Multicast Addresses - This section lists all audio multicast IP addresses that have been configured. Setting the field to a blank (empty string) value will cause the system to automatically generate a default multicast address.

USB Ports

This page provides basic information about the USB ports located on the TX unit.

Type - Identifies the type of the USB port.

Enabled - Confirms whether the USB ports are enabled or disabled.

Connected - Confirms whether valid devices are connected to either USB port. *Note: As both USB ports share the same physical port, it is not possible to detect whether a specific port has a device connected.*

Rate Limit - This option allows you to place an upper limit on the bandwidth that can be consumed by the transparent USB subsystem as a whole. This can be useful in situations where the overall network bandwidth is quite low and high resolution video performance is being impacted by USB operation; particularly during large file transfers to or from a mass storage device inserted into the ALIF receiver. Using this option you can choose an appropriate USB bandwidth rate limit between 1 and 480Mbps.

Reserved Ports - Allows USB ports to be optionally reserved for use with particular devices. Once reserved, certain rules can be applied to them via the AdderLink Infinity Manager (AIM) application.

Present Boot Keyboard - When ticked, the TX unit will report 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.

Max Hub Size - Using this option you can select whether the TX unit 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.

Security - Controls whether USB data is encrypted. *On* forces always on, *Off* forces always off and *Prefer off* will be off unless the RX requests it.

Serial Port

This page provides basic information about the serial option port located on the TX unit. These options are configurable via the AIM server.

Enabled - Confirms whether the serial port is enabled or disabled.

Connected - Confirms whether a valid serial device is connected to the port.

Speed - The 'baud rate' of the serial device.

Data Bits - The number of data bits to be used (5, 6, 7, or 8).

Stop Bits - The number of stop bits to be used (1 or 2).

Parity - The parity checking to be used (none, odd or even).

TX - Network

To get here
You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

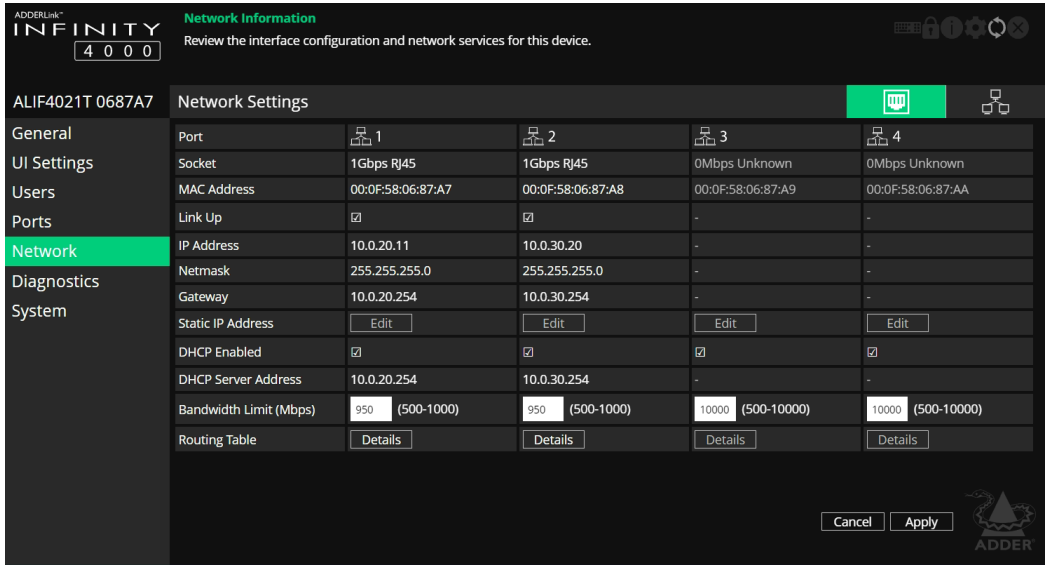
4 Click the **Network** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 Click the **Network** link.



Note: ALIF4001 models will list only two ports on this page.

Port Settings

This page provides numerous network details for each of the installed ports on the TX unit.

Socket - Details each operational network socket. Sockets 3 and 4 are determined by the SFP modules plugged into them.

MAC Address - Displays the unique, fixed hardware identification number for each port.

Link Up - Indicates whether the link state of this network interface is up. This should be the case if the device is connected to a functioning network.

IP Address - This shows the IP address in use, which can be obtained via DHCP, a static IP or a link local (zero-config).

Netmask - The netmask of this network interface. The device can function in a network zero-config state which does not require the setting of a static netmask.

Gateway - The gateway address of this network interface. The device can function in a network zero-config state which does not require the setting of a static gateway.

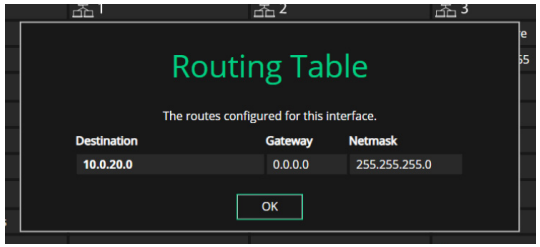
Static IP Address - When the 'DHCP enabled' option (below) is unchecked, click on 'Edit' to enter/edit a static IP Address, Netmask and Gateway for the unit.

DHCP Enabled - When ticked, the corresponding port will derive its IP Address, Netmask and Gateway details from the DHCP server listed in the field below.

DHCP Server Address - Indicates the server that provided the DHCP details.

Bandwidth Limit - This option can be used to set an upper limit (between 500 and 10000 Mbps aka 10Gbps) to the amount of the network bandwidth used on the physical interface. This could be useful if multiple devices share a common network link upstream; without a limit, the link could become overloaded and drop data.

Routing Table - Click on 'Details' to show the routing table entries corresponding to this network interface. In it are the destination address, gateway and netmask for the routes to particular network destinations:



Network Settings

Default Domain - Reserved for future use.

Route of Last Resort - In a multi interface device such as this, the interface which is ticked will be used as the default whenever it is unclear which interface should be used for network traffic.

Dynamic DNS Servers - List of DNS server addresses obtained via DHCP.

Static DNS Servers - Lists DNS server addresses that have been manually configured.

NTP Enabled - When ticked, the unit will derive its time and date information from a suitable NTP server.

NTP Key ID - The ID of the key used for secure NTP.

NTP Key Value - The value of the key used for secure NTP as a hexadecimal string.

Dynamic NTP Servers - Lists NTP server addresses obtained via DHCP.

Static NTP Servers - Lists NTP server addresses that have been manually configured.

AIM Enabled - Indicates whether server management is enabled for this device.

Dynamic AIM Servers - Lists AIM server addresses obtained via DHCP.

Static AIM Servers - Lists management server addresses that have been manually configured.

TX - Diagnostics and Statistics

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

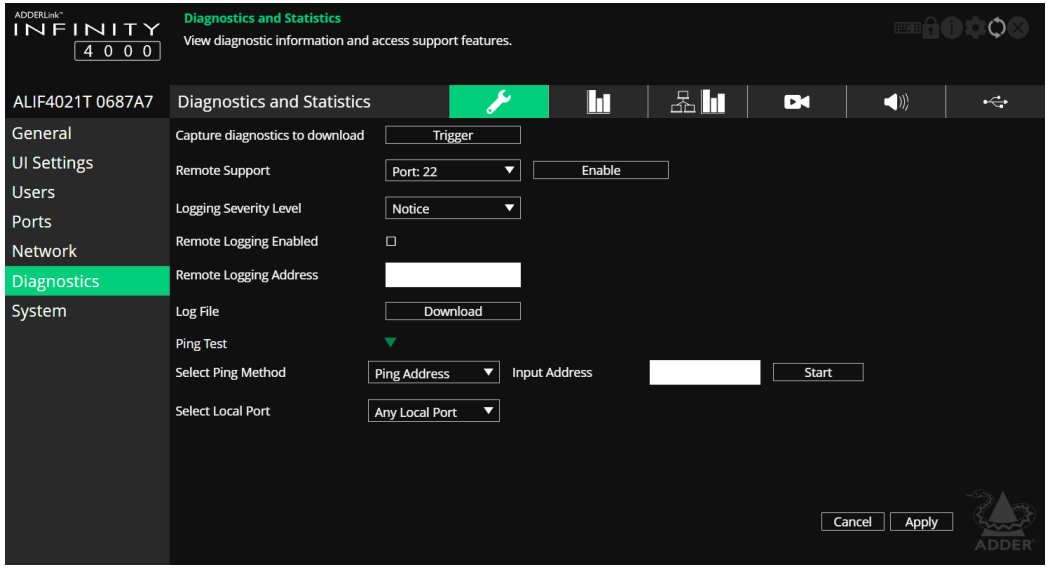
4 Click the **Diagnostics** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 Click the **Diagnostics** link.



Log Settings

This page provides numerous key diagnostic log settings.

Capture diagnostics to download - (Only shown when viewing this page using a PC browser). Request generation of a diagnostics dump file. This will then be downloaded by the host computer's browser, this is an encrypted diagnostics file which can be used by technical support to diagnose and fix an issue.

Remote Support - When using the Adder remote server, this option determines which port will be used. Multiple options are offered in case one or more ports are blocked by your firewall. When the Enable button is clicked, it will indicate the password to be used.

Logging Severity Level - Defines the level of messages that will be logged (according to RFC5424). Level 5 *(Notice: normal but significant condition)* is the default setting; ALIF4000 supports levels 1 to 7. Choosing levels 6 *(Informational)* or 7 *(Debug)* will cause larger numbers of lesser events to also be logged, with a potential impact to overall performance. These levels should only be used if working with the support team to diagnose a specific issue.

Remote Logging Enabled - Tick to send log files to the chosen *Remote Logging Address*.

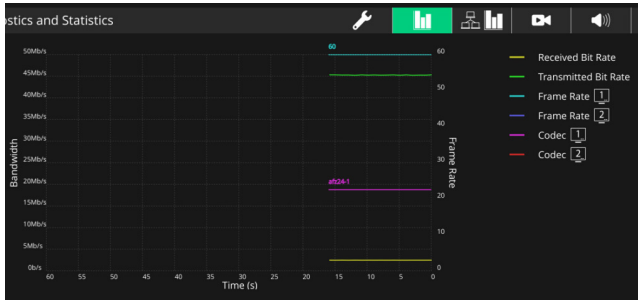
Remote Logging Address - Enter a valid IP address for a syslog server on the local network where status logs can be sent.

Log File - If viewing this page using a browser: Click to download the log file to the host computer's browser. If viewing this page via the OSD, the log will be shown as a scrollable list.

Ping Test - Provides a quick and easy way to check the link status to an ALIF RX. You can specify either an IP address or choose the device from a list. Click the Start button to begin; a summary of the results will be displayed.

Basic Graph

This page shows a real time graph with the following entries:



- **Received and transmitted bit rates** - the values of these correspond to the bandwidth axis on the left.
- **Frame rate** - for both heads. Values are labeled when they change and correspond to the axis on the right.
- **Codec** - for both heads. These represent the compression used: 1 is better than 4.
- **Dropped packets** - for both heads. Values are labeled when they change and correspond to the axis on the right.

Network Statistics

This page allows you to view current communication statistics and also to create graphs in real time.

Capture and Graph Statistics - When ticked, the page will create a real time graph plotting Received Bytes alongside Received Packets.

After *Capture and Graph Statistics* is enabled, the *Show Legend* checkbox will show all other items that can be included on the plot. Click an item to tick and include it.

Video Port Status and Statistics

This page provides wide ranging information for support purposes.

Audio Port Status and Statistics

This page provides wide ranging information for support purposes.

USB Port Status and Statistics

This page provides wide ranging information for support purposes. Currently only supported for transparent USB.

TX - System

To get here

You can access this page in two ways:

1 On the console keyboard attached to the RX unit, access the OSD by pressing **CTRL + ALT + C** or tap the touchscreen icon. The Preset Selection page will be displayed.

2 Click the icon in the top right corner.

3 Click the **Transmitters** option and then click the icon for the required transmitter.

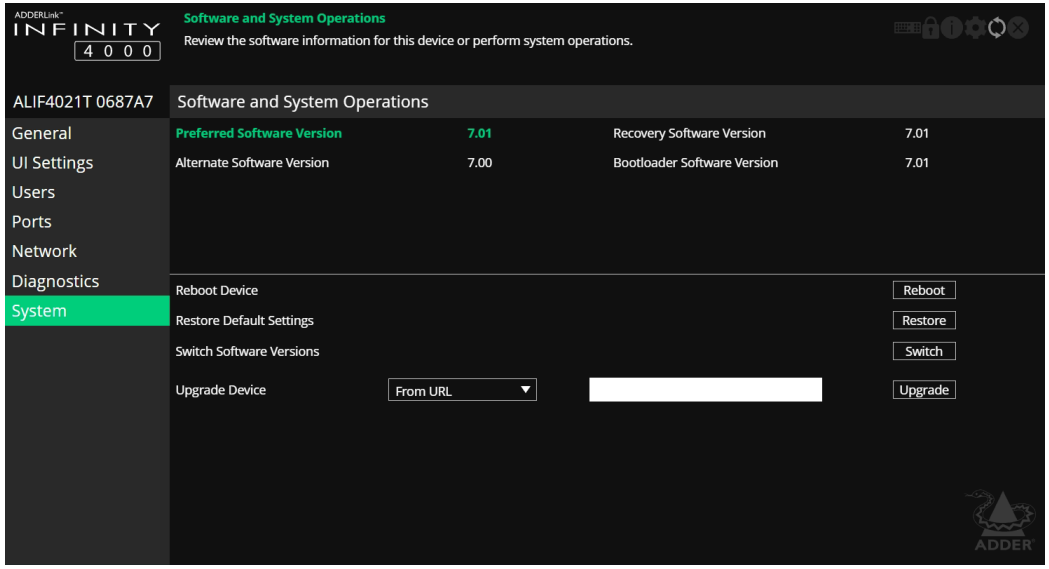
4 Click the **System** link.

OR

1 Connect a computer to the same network as the TX unit.

2 Run a web browser and enter the IP address of the TX unit: **https://169.254.1.33** (this is the default address when using SFP port 3 or RJ45 port 1). If you are using SFP port 4 or RJ45 port 2 then the default address will be **https://169.254.1.43** If the IP address is unknown, press the small button on the front panel next to the OLED screen to reveal the value for *IP Address 3 (or IP Address 4)* and use that address.

3 Click the **System** link.



Software and System Operations

This page contains various indications and options related to the internal software of the unit.

Note: The highlighted (and colored) entry is the version of software currently running.

Preferred Software Version - The software version the device will boot into upon a reboot.

Recovery Software Version - The software version the device will boot into if placed into recovery mode.

Alternate Software Version - The other (backup) version of software the device has available.

Reboot Device - Click the Reboot button to Reboot the device.

Restore Default Settings - Click the Restore button to restore the device to factory default settings.

Switch Software Versions - Click to switch to the listed 'Alternative Software Version'.

Upgrade Device - Allows you to upgrade the firmware either from a trusted URL or from a locally stored file. Use the field to define the source and then click the Upgrade button.

APPENDIX B - Support for analog and digital audio

The ALIF4000 benefits from two different streams of audio signals:

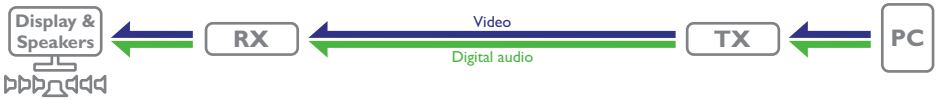
- **Analog audio** - as would be output directly from the host PCs jack socket,
- **Digital audio** - as derived from the Host PC's DisplayPort video connection.

Even though the analog and digital outputs from a particular host PC might be carrying signals that originated from the same audio source, the two types are handled completely separately throughout the ALIF system and can never be mixed.

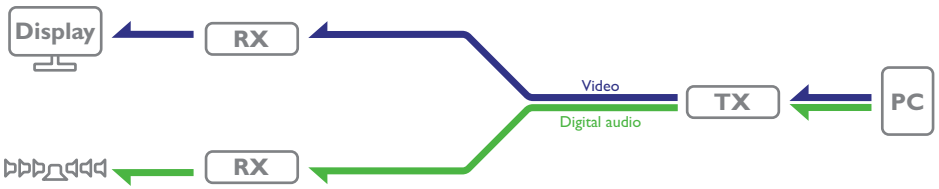
While standard analog audio will be limited to stereo only; digital audio offers the ability to send stereo or alternatively, surround sound in either the 5.1 or 7.1 varieties. In order for the host PC to know which variety of digital audio signal to send out, a valid definition of the requirement must be sent to the host PC. This is done as an audio sub-set of the EDID definition that is used to declare the video display capabilities/ requirements.

In the diagram below the display and speaker installation send their video and digital audio portions of the EDID *(Extended Display Identification Data)* definition via the ALIF4000 receiver and transmitter to the host PC:

In response, the host PC begins sending video and audio signals that are appropriate for the receiving peripherals:



In the above case, the video and digital audio from the host PC are both sent to the same receiver. However, the flexibility of the ALIF system is such that peripherals and hosts can be mixed as required. For instance, the video feed could be sent to one receiver, while the digital audio is used by a set of speakers on a different receiver:



This presents an issue for the host PC and its ALIF4000 transmitter as they must now respond to separate EDID definitions from the video display on one receiver (which will probably also have its own EDID audio sub-set) and the EDID definition from the digital audio device on the other receiver:

To solve potential conflicts, the ALIF4000 transmitter uses a set of rules to determine how it mixes different EDID definitions. Firstly, for any connected video or digital audio devices, the ALIF system can consider each one using any of three selectable states:

- **Attached** - ALIF will interrogate the attached video/audio device to ascertain its exact capabilities/requirements.
- **Fixed** - ALIF will use a fixed definition (e.g 3840x2160p60 and 6-channel audio) to represent the video/audio device(s).
- **None** - No representation will be made for the device.

The above states are then combined by the ALIF4000 transmitter, as connections are made to the different devices, using the following rules:

Video EDID →	**Audio EDID** →	**Action** *(taken by the TX as it feeds info to the PC)*
Fixed	Fixed	Merge the video and audio EDID definitions.
Fixed/Attached	None	Send video EDID definition only.
Attached	Attached	Use whichever EDID definition is available first.
Attached/Fixed	Fixed/Attached	Wait for the *Attached* device to declare and then use its data to modify those of the *Fixed* device. *Note: The video EDID retains precedence for setting general items, such as serial no., manufacturer, etc.*

Note: The analog audio is switched entirely separately to the digital audio feed.

Analog and digital audio specifications

- **Analog audio**: Line in/out - 2 channel 16bit 48KHz 1V RMS in / 1V RMS out
- **Digital audio** (DisplayPort):

  Up to 8 audio channels,

  Seven choices of sampling frequencies: 32, 44.1, 48, 88.2, 96, 176.4 or 192kHz.

  Three choices of bit depth, using LPCM *Linear Pulse Code Modulation*: 16, 20 or 24bit,

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:

- 10Gigabit 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, 10Gbps 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.

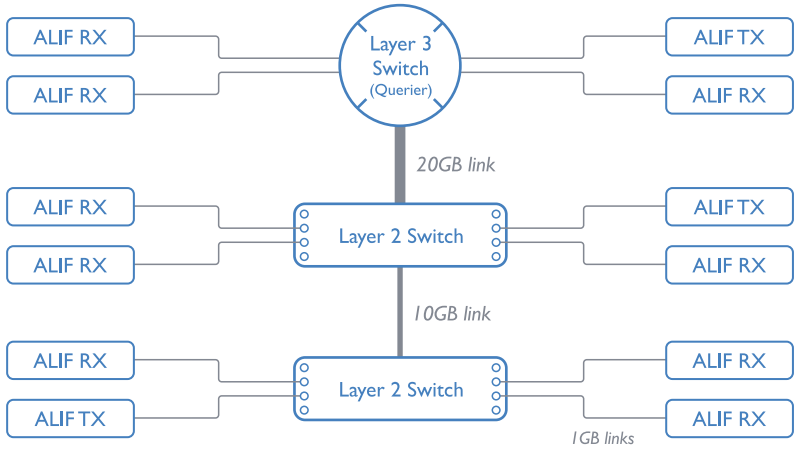
Creating an efficient network layout

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 AIM server is used to administer multiple ALIF transceivers, ensure the AIM server and all ALIF units reside in the same subnet.
- Do not use VGA to DisplayPort converters, instead replace VGA video cards in older systems with suitable DisplayPort 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, 2048 x 2048), 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 moving video images are being shown frequently, then leave Frame Skipping at a low percentage and instead reduce the Peak bandwidth limiter.
  - 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.

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.
- 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 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: AIM 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 AIM discovery. If you have a working network of ALIF's without AIM and then add AIM to the network, AIM 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 AIM 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 AIM server are located within the same subnet because AIM 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 AIM is attempting to locate ALIF units.

Problem: Video performance is affected when using USB storage.

This issue could be related to a relatively slow link connection speed being affected by high bandwidth data transfers to a USB storage device.

Remedies:

Try placing a limit on the bandwidth being used by the transparent USB ports. Via the OSD, link to the TX - Ports page, change to the *USB Ports* section and adjust the *Rate Limit* option.

Problem: Following a firmware upgrade to 4.xx, the ALIF4000 units still cannot support SDR10 or HDR10 video signals.

When an ALIF4000 unit is upgraded, it may not support the new 30-bits per pixel modes if manual changes had previously been made to the video configuration. This could mean that the Max Bits per Pixel setting may remain set to 24-bits, causing the unit to not support SDR10 and HDR10 signals.

Remedies:

Access the TX Ports configuration page and change the Max Bits per Pixel setting to '30'. See page 43.

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.

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:

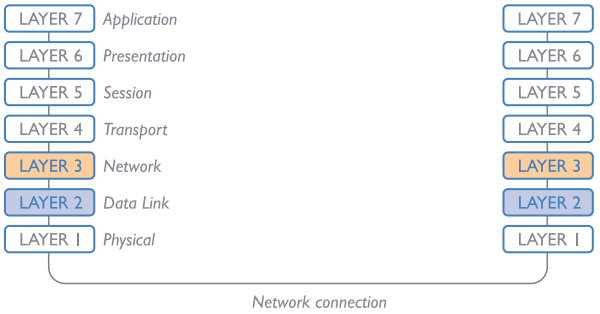
- **Store and forward** is the original method and requires the switch to save each entire data packet to buffer memory, run an error check and then forward if no error is found (or otherwise discard it).
- **Cut-through** was developed to address the latency issues suffered by some store and forward 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.

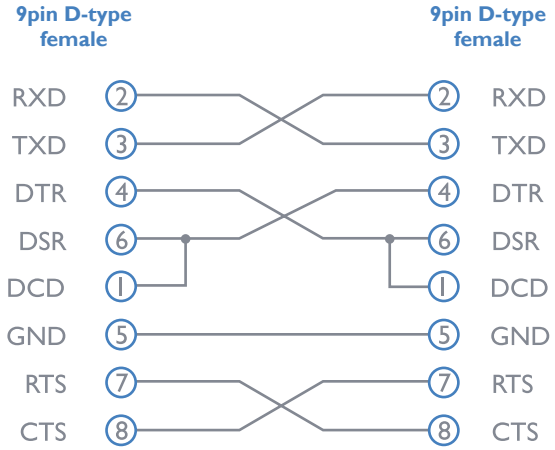
The job of any network switch is to receive each incoming network packet, strip away only the first few wrappers to discover the intended destination then rewrap the packet and send it in the correct direction.

continued

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 - Null modem cable pinout

RS232 'null-modem' cable pin-out



APPENDIX G - Fiber/copper modules and cables

To suit your installation layout, fiber and copper modules are available for the ALIF4000 units to support various fiber optic and CATx cables. The specifications for all are summarized in this table:

Name	Fiber size	Type	Coding		Distance at 1Gbps	Adder part number for SFP module	Distance at 10Gbps	Adder part number for 10Gbps SFP modules
			Normal applications	Suggested print nomenclature				
OM1	(62.5/125)	Multimode (TIA-492AAAA)	Orange	62.5/125	220m	SFP-MM-LC	2-26m	SFP-MM-LC-10G
OM2	(50/125)	Multimode (TIA-492AAAB)	Orange	50/125	550m	"	2-26m	"
OM3	(50/125)	Multimode (850 nm Laser-optimized) (TIA-492AAAC)	Aqua	850 LO 50 /125	550m	"	2-82m	"
OM4	(50/125)	Multimode (850 nm Laser-optimized) (TIA-492AAAC)	Aqua	850 LO 50 /125	550m	"	2-300m	"
OS1 and OS2	(9/125)	Single-mode (TIA-492C000 / TIA-492E000)	Yellow	SM/NZDS, SM	20km	SFP-SM-LC	10Km	SFP-SM-LC-10G
CATx	n/a	Multi-rate CAT5e and above	n/a	n/a	100m	SFP-CATX-RJ45	See below	SFP-CATX-MR

Speed	Cable type	Distance
10GbE	CAT 6	30m
100MbE to 5GbE	CAT 5e and above	100m

APPENDIX H - Using the optional ALIF4000 rack shelf

1 Install the empty ALIF4000 rack mount tray into your 19" rack frame and fully secure it.

2 Place an ALIF4000 unit into each side of the rack mount tray so that their rear panels butt up against the small pegs located on each of the side walls.

3 Locate the supplied thumbscrew and spacer.

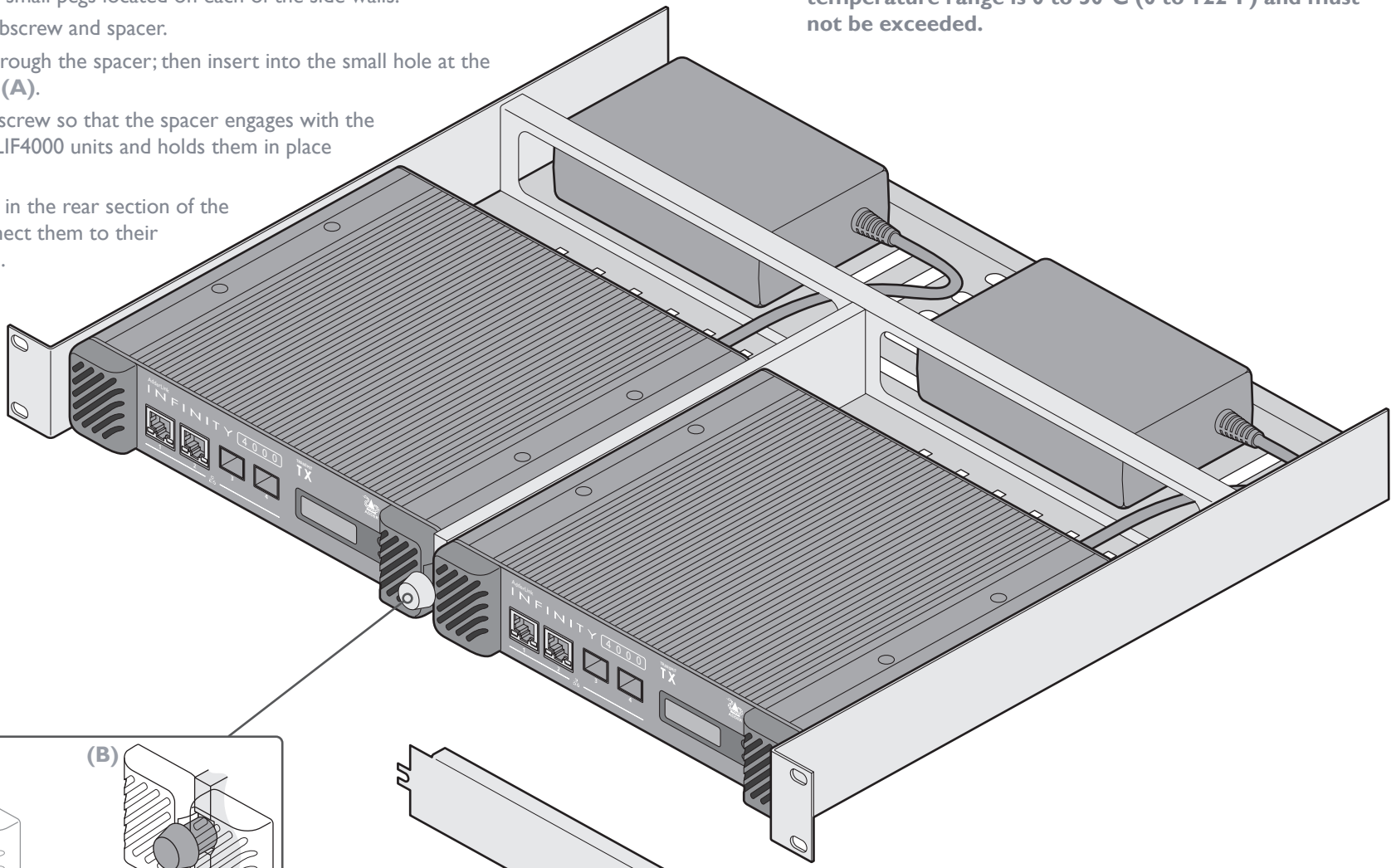
4 Insert the thumbscrew through the spacer; then insert into the small hole at the end of the center divider **(A)**.

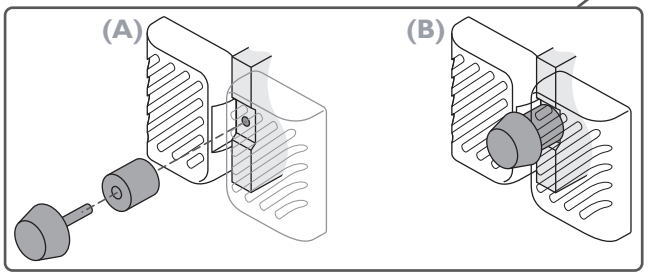
5 Gently tighten the thumbscrew so that the spacer engages with the inner edges of the two ALIF4000 units and holds them in place **(B)**.

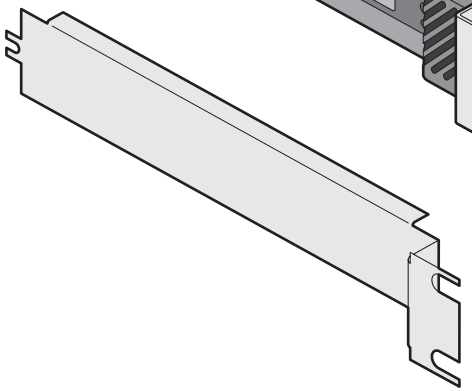
6 Place the power adapters in the rear section of the rack mount tray and connect them to their respective ALIF4000 units.

7 Make all other necessary connections to the ALIF4000 units.

IMPORTANT: When mounting the ALIF units (and their power adapters), ensure that the vents are not obscured and that there is sufficient airflow. The operating temperature range is 0 to 50°C (0 to 122°F) and must not be exceeded.







An optional blanking plate (part number: RMK12-BP) is available to seal the airflow if only one ALIF4000 unit is installed within a rack mount tray.

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

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- Module: pcre2
-

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Written by: Philip Hazel
Email local part: Philip.Hazel
Email domain: gmail.com

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3. [3]Bernd Altmeier <altmeier@atlsoft.de> hopf Elektronik serial line and PCI-bus devices
4. [4]Viraj Bais <vbais@mailman1.intel.com> and [5]Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
5. [6]Michael Barone <michael,barone@lmco.com> GPSVME fixes
6. [7]Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
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10. [11]Nelson B Bolyard <nelson@bolyard.me> update and complete broadcast and crypto features in sntp
11. [12]Jean-Francois Boudreault <Jean-Francois.Boudreault@viagenie.qc.ca> IPv6 support
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13. [14]Steve Clift <clift@ml.csiro.au> OMEGA clock driver
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16. [17]John A. Dundas III <dundas@salt.jpl.nasa.gov> Apple A/UX port
17. [18]Torsten Duwe <duwe@immd4.informatik.uni-erlangen.de> Linux port
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19. [20]John Hay <jhay@icomtek.csir.co.za> IPv6 support and testing
20. [21]Dave Hart <davehart@davehart.com> General maintenance, Windows port interpolation rewrite
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25. [26]Jeff Johnson <jbj@chatham.usdesign.com> massive prototyping overhaul
26. [27]Hans Lambermont <Hans.Lambermont@nl.origin-it.com> or [28]<H.Lambermont@chello.nl> ntpsweep
27. [29]Poul-Henning Kamp <phk@FreeBSD.ORG> Oncore driver (Original author)
28. [30]Frank Kardel [31]<kardel (at) ntp (dot) org> PARSE <GENERIC> (driver 14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup, dynamic interface handling
29. [32]Johannes Maximilian Kuehn <kuehn@ntp.org> Rewrote sntp to

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30. [33]William L. Jones <jones@hermes.chpc.utexas.edu> RS/6000 AIX modifications, HPUX modifications
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33. [36]George Lindholm <lindholm@ucs.ubc.ca> SunOS 5.1 port
34. [37]Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication
35. [38]Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305
36. [39]Danny Mayer <mayer@ntp.org>Network I/O, Windows Port, Code Maintenance
37. [40]David L. Mills <mills@udel.edu> Version 4 foundation, precision kernel; clock drivers: 1, 3, 4, 6, 7, 11, 13, 18, 19, 22, 36
38. [41]Wolfgang Moeller <moeller@gwdgv1.dnet.gwdg.de> VMS port
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41. [44]Kamal A Mostafa <kamal@whence.com> SCO OpenServer port
42. [45]Derek Mulcahy <derek@toybox.demon.co.uk> and [46]Damon Hart-Davis <d@hd.org> ARCRON MSF clock driver
43. [47]Rob Neal <neal@ntp.org> Bancomm refclock and config/parse code maintenance
44. [48]Rainer Pruy <Rainer.Pruy@informatik.uni-erlangen.de> monitoring/trap scripts, statistics file handling
45. [49]Dirce Richards <dirce@zk3.dec.com> Digital UNIX V4.0 port
46. [50]Wilfredo S nchez <wsanchez@apple.com> added support for NetInfo
47. [51]Nick Sayer <mrapple@quack.kfu.com> SunOS streams modules
48. [52]Jack Sasportas <jack@innovativeinternet.com> Saved a Lot of space on the stuff in the html/pic/ subdirectory
49. [53]Ray Schnitzler <schnitz@unipress.com> Unixware1 port
50. [54]Michael Shields <shields@tembel.org> USNO clock driver
51. [55]Jeff Steinman <jss@pebbles.jpl.nasa.gov> Datum PTS clock driver
52. [56]Harlan Stenn <harlan@pfcs.com> GNU automake/autoconfigure makeover, various other bits (see the ChangeLog)
53. [57]Kenneth Stone <ken@sdd.hp.com> HP-UX port
54. [58]Ajit Thyagarajan <ajit@ee.udel.edu>IP multicast/anycast support
55. [59]Tomoaki TSURUOKA <tsuruoka@nc.fukuoka-u.ac.jp>TRAK clock driver
56. [60]Brian Utterback <brian.utterback@oracle.com> General codebase, Solaris issues
57. [61]Loganaden Velvindron <loganaden@gmail.com> Sandboxing (libseccomp) support
58. [62]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver
59. [63]Ulrich Windl <Ulrich.Windl@rz.uni-regensburg.de> corrected and validated HTML documents according to the HTML DTD

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If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```
---------------------------------------------------------------------------
-
- Modules:  kmod systemd libdaemon avahi glib libgpg-error libgcrypt gnutls
libmicrohttpd strace
-
---------------------------------------------------------------------------
```

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That's all there is to it!

-

- Modules: libunistring gmp nettle
-

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-
- Modules: dhcp libjwt
-

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