



Introduction

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Introduction

WELCOME

Thank you for choosing the ADDERLink™ INFINITY 4000 (aka ALIF4000) high capacity extenders. The ALIF4000 range offers dual-head 4K, audio and USB delivered over a single fiber connection. Pixel-perfect color; accurate picture quality at 4K60 and USB2.0 with fast switching.

Product in brief

- Dual-head 4K, video, audio and USB over a single fiber connection,
- Pixel-perfect, color accuracy at 4K60,
- Bi-directional analog audio,
- Adder's USB True Emulation for fast switching,
- Backwards compatibility with existing ALIF range,
- Plug and play.

Safety

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

Linking

ALIF4000 units can be linked in two main 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.

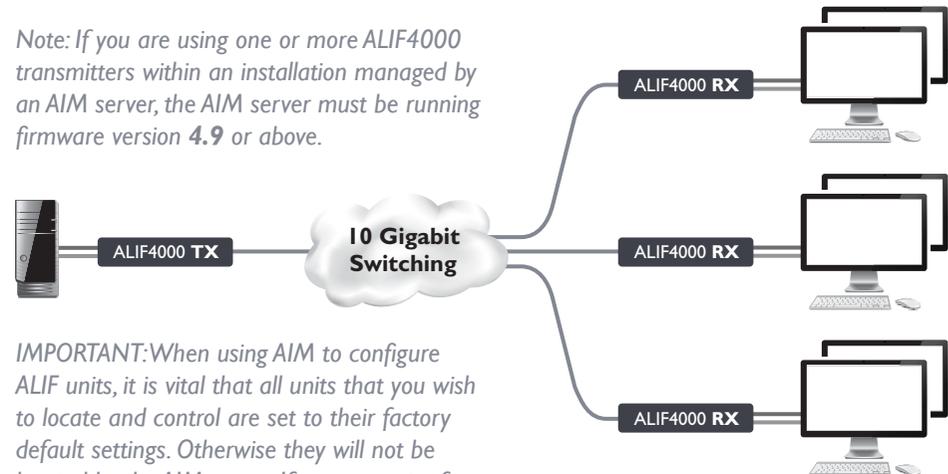


Networked linking

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** - You need to specify the network addresses of the ALIF4000 units so that they can locate each other. This can be done using via 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.

Technical Specifications

Operating/storage conditions

| | |
|--|----------------------------|
| Operating temperature: | 0 to 40°C / 0 to 104°F |
| Storage temperature: | -10 to 60°C / 14 to 140 °F |
| Storage and operating relative humidity: | 10-90% non-condensing |
| Altitude: | < 3000m |

Power

| | |
|----------------------------|-------------|
| External power: | 12VDC, 3A |
| Typical power consumption: | 20W |
| BTU: | 68.24BTU/hr |

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 display port, 2x USB type B, 2x 3.5mm audio jack sockets, 1x DB9 socket. |
| Ethernet: | 2x 8p8c (RJ45), 2x SFP+ cages. |
| Power: | 3 pin Kycon socket. |

Remote Unit - Receiver (RX)

| | |
|-----------|---|
| Desk: | 2x display port, 5x USB type A, 2x 3.5mm audio jack sockets, 1x 3.5mm SPDIF socket. |
| Ethernet: | 1x 8p8c (RJ45), 2x SFP+ cages. |
| Power: | 3 pin Kycon socket. |

USB

4 ports of USB2.0 with USB True Emulation to support keyboard, mouse and touch.
USB device seen as: 7 or 13 port hub

Max video resolution

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

Audio

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

Ethernet

10GbE (No 10/100/1000 support)

Packing Box

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

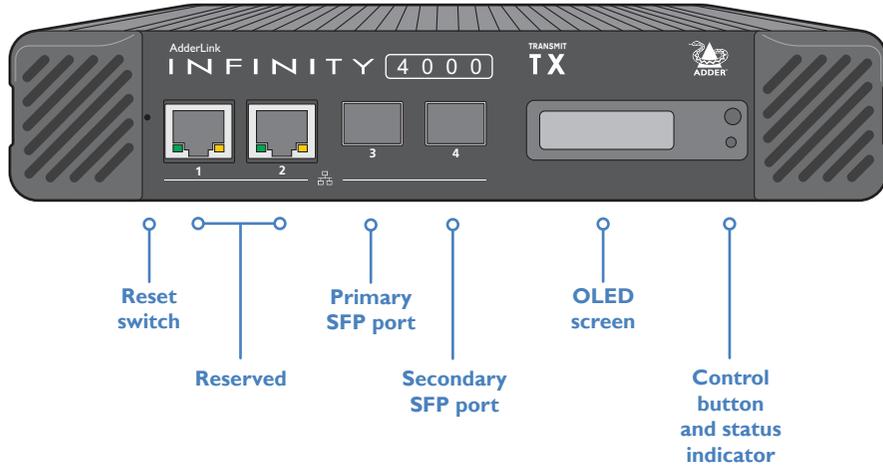
Approvals / Compliance

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

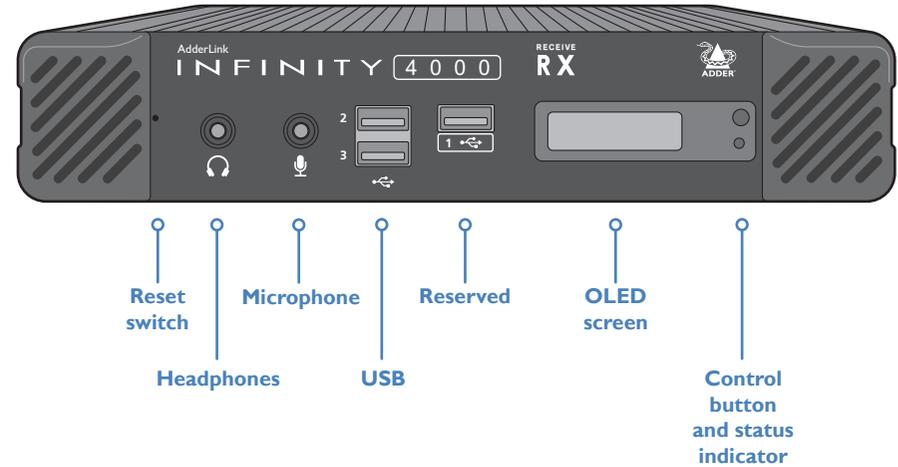
ALIF4000 UNIT FEATURES

The ALIF4000 units are housed within durable, vented enclosures with connectors situated on the front and rear panels. The smart front faces also feature an OLED information screen with control button (to scroll through the various informational pages) and also a status indicator.

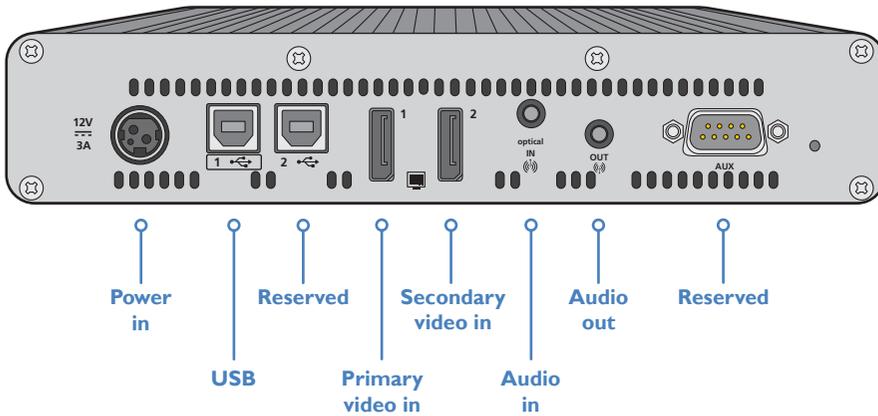
Transmitter - front



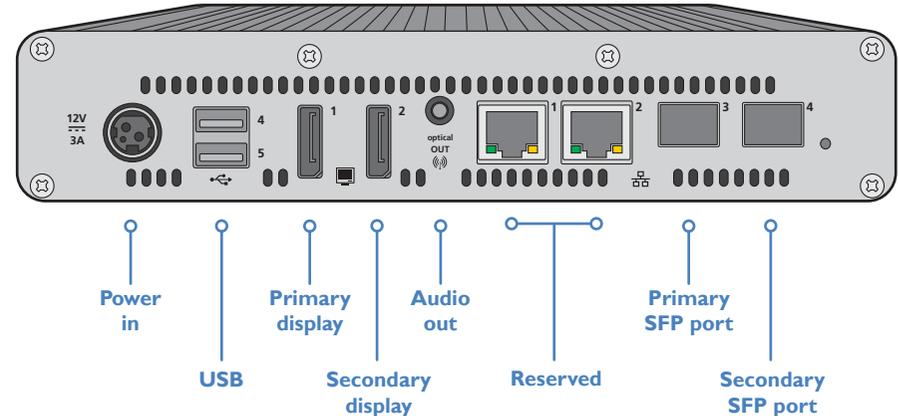
Receiver - front



Transmitter - rear

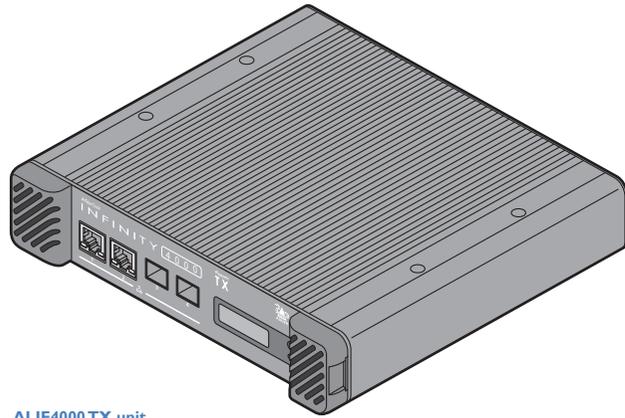


Receiver - rear



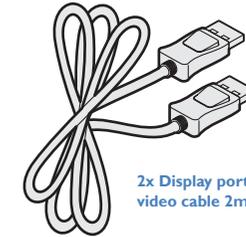
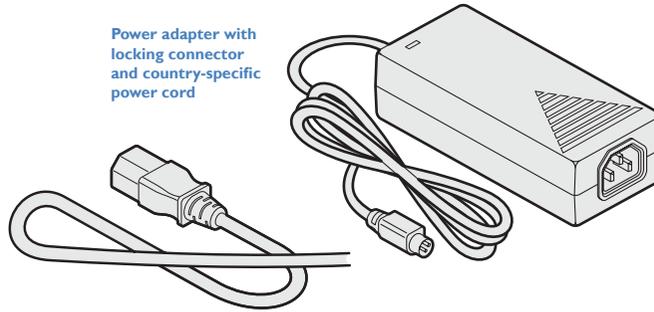
SUPPLIED ITEMS

ALIF4000 TX package

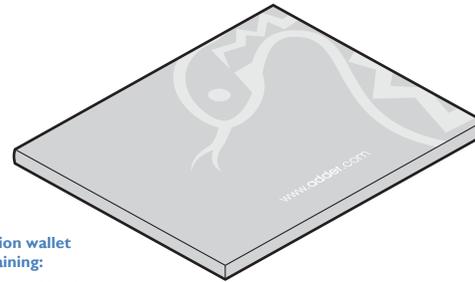


ALIF4000 TX unit

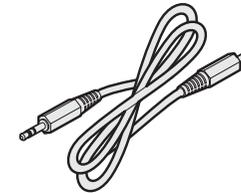
Power adapter with locking connector and country-specific power cord



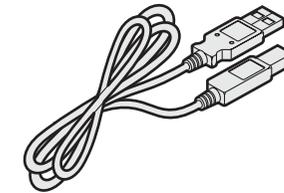
2x Display port video cable 2m



Information wallet containing:
Four self-adhesive rubber feet
Quick start guide
Safety document

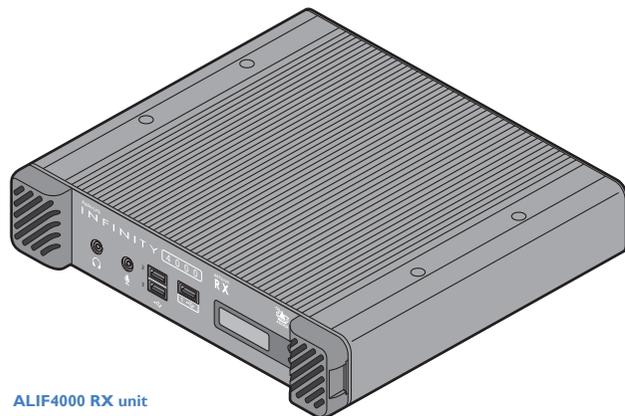


2x Audio cable 2m (3.5mm stereo jacks)

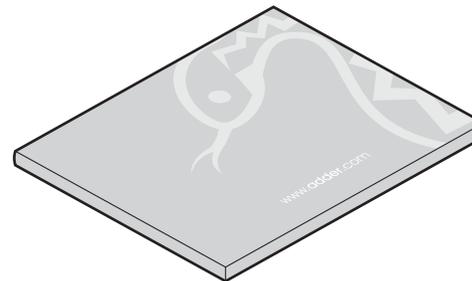


2x USB cable 2m (type A to B)
Part number: VSC24

ALIF4000 RX package

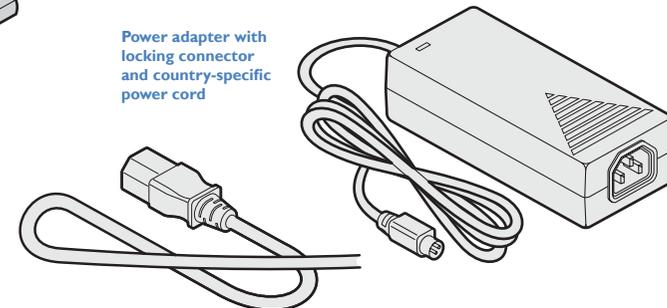


ALIF4000 RX unit

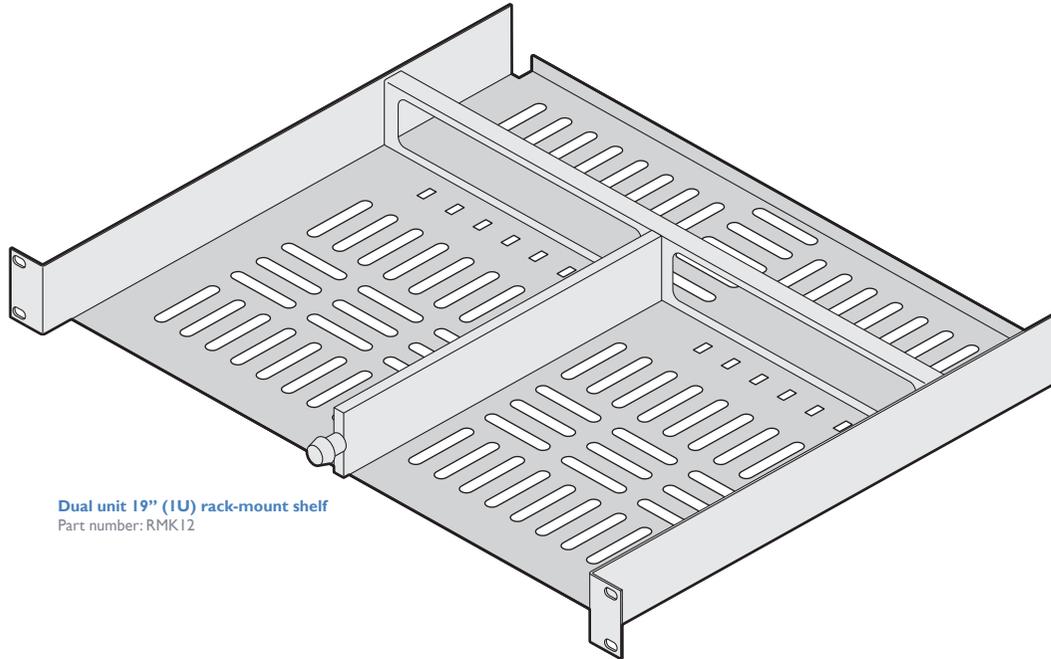


Information wallet containing:
Four self-adhesive rubber feet
Quick start guide
Safety document

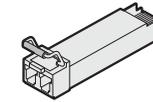
Power adapter with locking connector and country-specific power cord



OPTIONAL EXTRAS

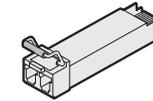


Dual unit 19" (1U) rack-mount shelf
Part number: RMK12

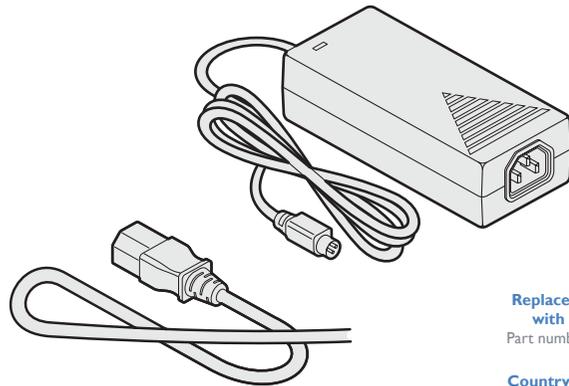


10GbE single mode fiber SFP module
Part number: SFP-SM-LC-10G

Please refer to the table in [Appendix F](#) for information about fiber modules and cables.

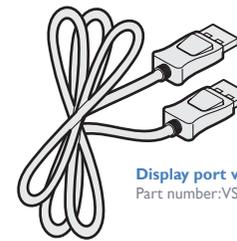


10GbE multi mode fiber SFP module
Part number: SFP-MM-LC-10G

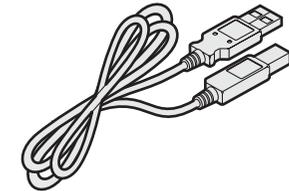


Replacement power adapter with locking connector
Part number: PSU-IEC-12VDC-5A

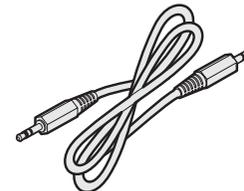
- Country-specific power cords**
- CAB-IEC-AUS (Australia)
 - CAB-IEC-EURO (Central Europe)
 - CAB-IEC-UK (United Kingdom)
 - CAB-IEC-USA (United States)
 - CAB-IEC-JP (Japan)
 - CAB-IEC-CN (China)



Display port video cable 2m
Part number: VSCD10A



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



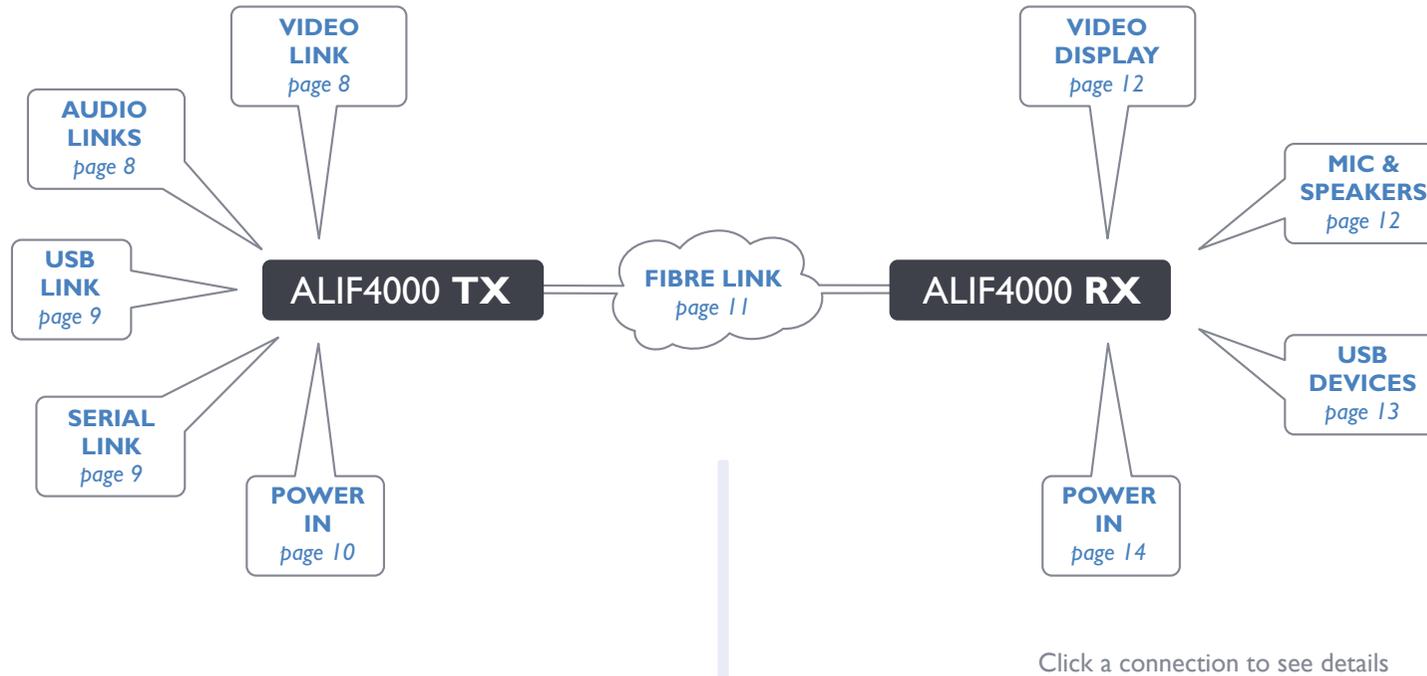
Audio cable 2m (3.5mm stereo jacks)
Part number: VSC22

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 G](#) for details about mounting options for the ALIF units.

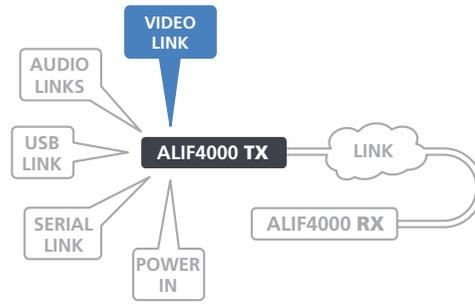


Click a connection to see details

IMPORTANT: When using an ADDERLink™ INFINITY Management box to configure ALIF units, it is vital that all ALIF units that you wish to locate and control are set to their factory default settings. Otherwise they will not be located by the AIM server. If necessary, perform a [factory reset](#) on each ALIF unit. Please also see [Appendix B - Tips for success when networking ALIF units](#)

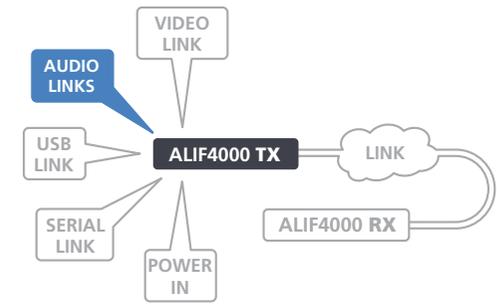
TX video links

The TX unit supports two display port connections, each up to 4K UHD (3840 x 2160) or DCI (4096 x 2160), with refresh rates up to 60Hz.



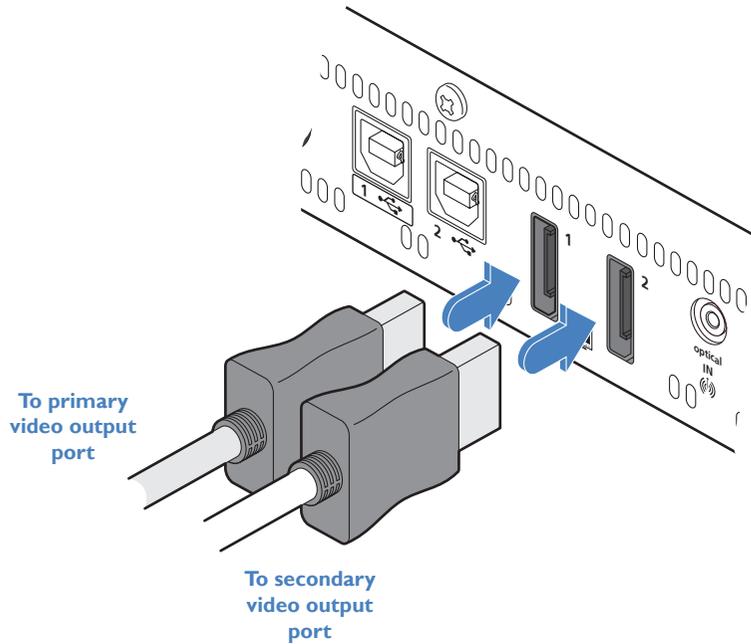
TX audio links

The TX unit supports two way stereo digital sound so that you can use a remote microphone as well as speakers.



To make a video link

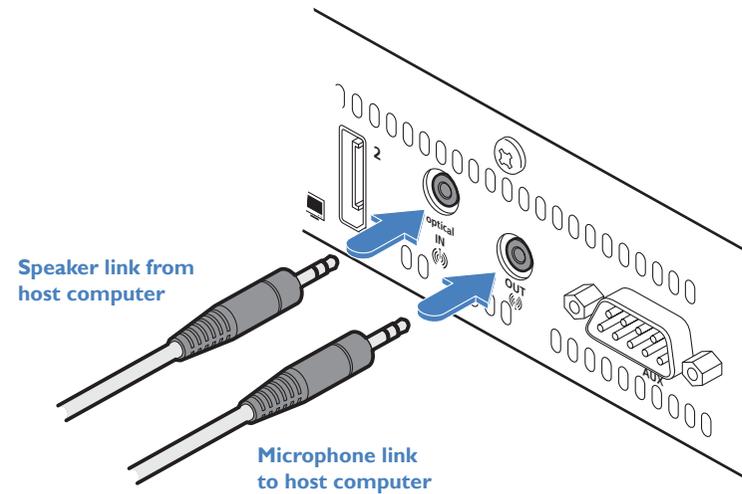
- 1 Connect your digital video link cable(s) to the display port socket(s) on the TX unit rear panel:



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

To make audio links

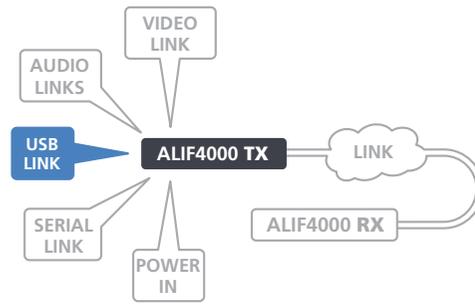
- 1 Connect an audio link cable between the **optical IN** socket on the TX unit rear panel and the speaker output socket of the host computer.



- 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.

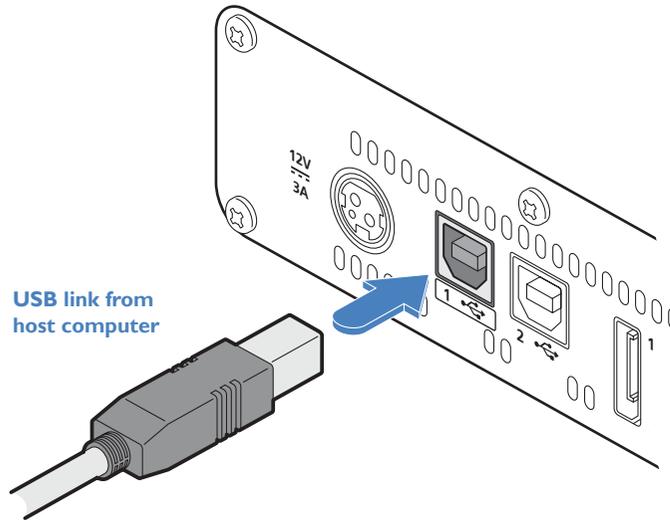
TX USB links

The TX unit has two USB type B sockets on the rear panel. Socket 2 is reserved for future use.



To make a USB link

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

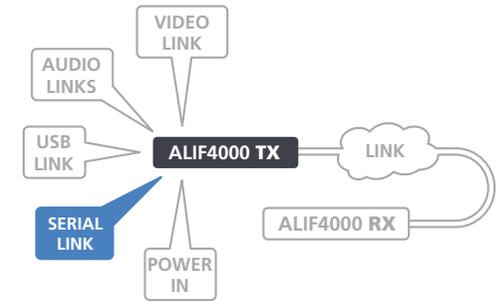


- 2 Connect the type A connector of the cable to USB socket 1 on the host computer.

Note: USB socket 2 is reserved for future use.

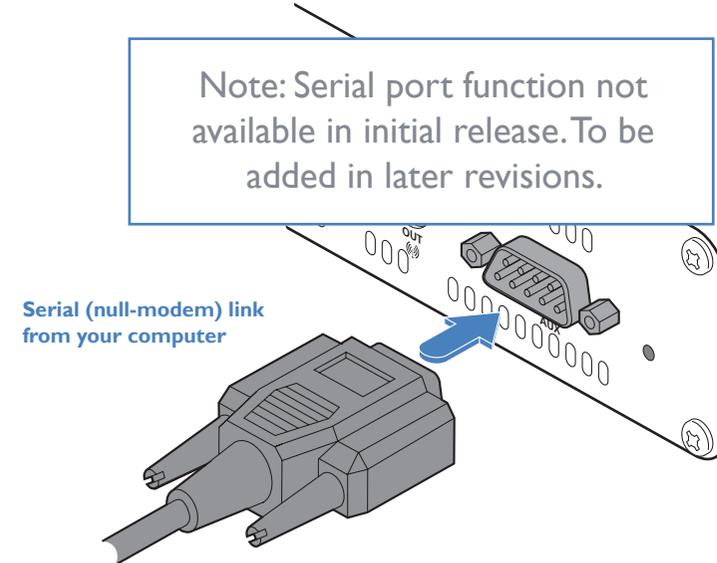
TX AUX (serial) port

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.



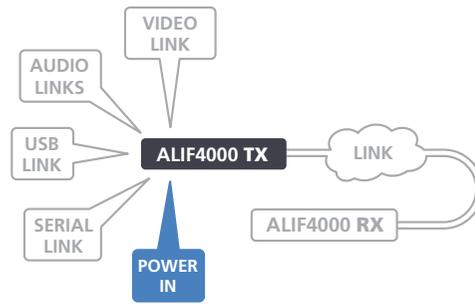
To connect the AUX port

- 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.



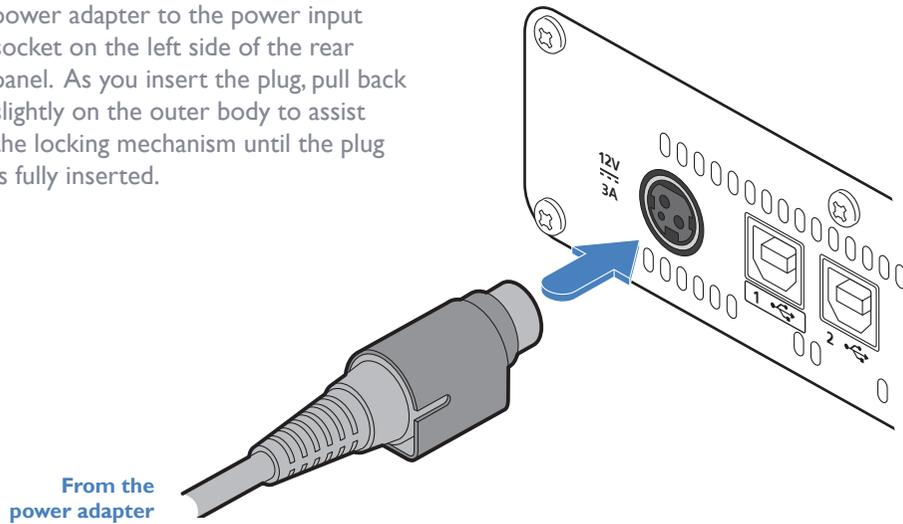
TX power in

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.

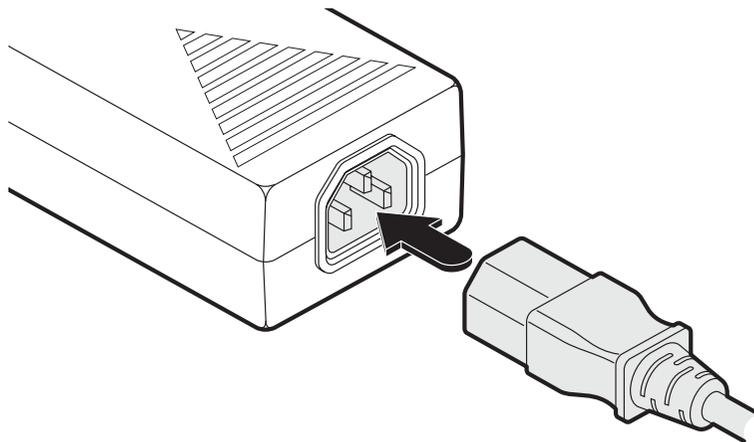


To connect the power adapter

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.



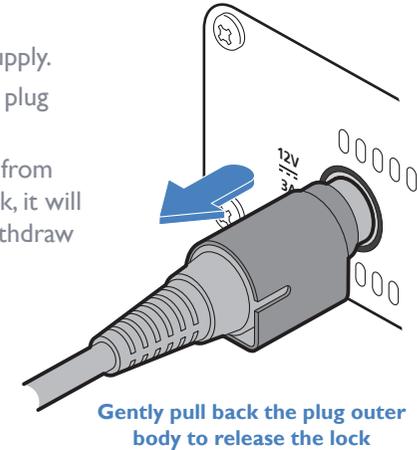
2 Insert the IEC connector of the supplied country-specific power cord to the socket of the power adapter.



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.



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.

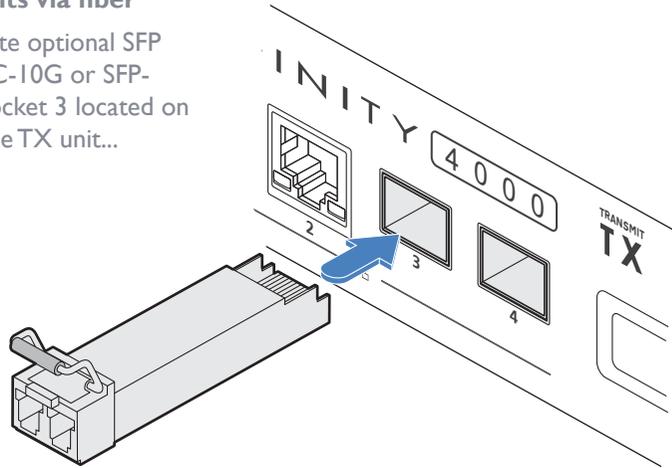
Note: The unit and the power adapter generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40 degrees Centigrade. Do not place the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

TX/RX high speed links

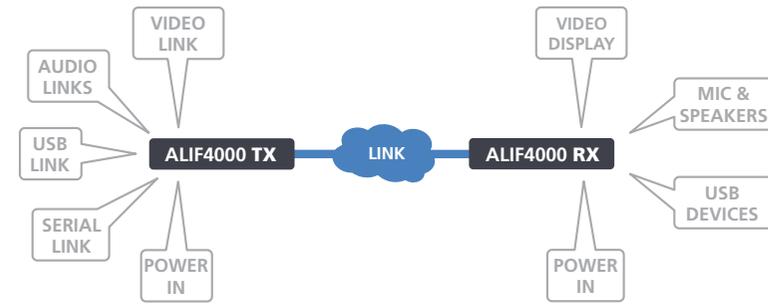
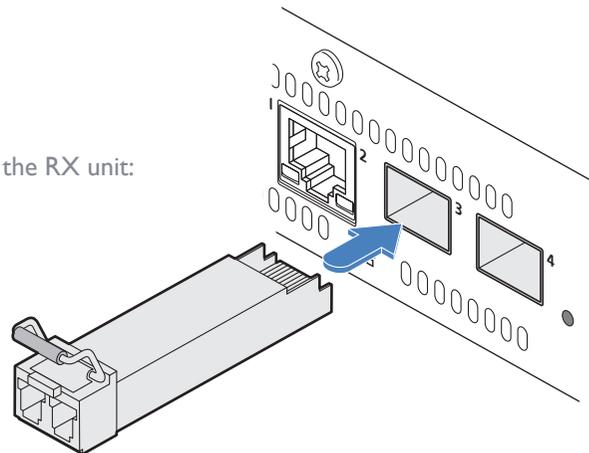
ALIF4000 units can be either connected directly to each other or via a high speed (10GB) network. Currently, the connections must be Fiber Channel over Ethernet (FCoE). A single fiber link (using SFP port 3) is sufficient to provide full 4K operation between ALIF4000 units. Where required, a second fiber link can be used (via SFP port 4) to provide link redundancy.

To link ALIF4000 units via fiber

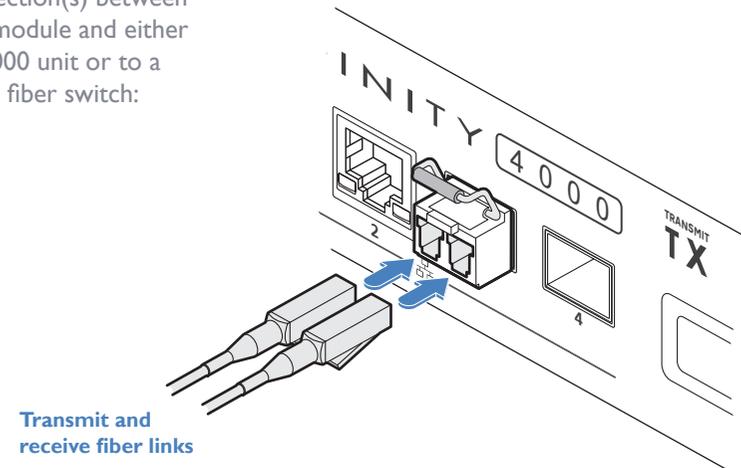
- 1 Insert the appropriate optional SFP module (SFP-MM-LC-10G or SFP-SM-LC-10G) into socket 3 located on the front panel of the TX unit...



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



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

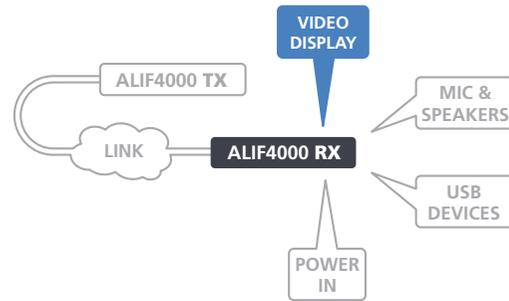


Connect the transmit and receive fiber optic links to the sockets on the Fiber Channel SFP module. Then close the latch over the link connectors to lock them into place.

*Note: SFP-SM-LC-10G modules require OS1 or OS2 single mode fiber.
SFP-MM-LC-10G modules require OM1, OM2, OM3 or OM4 multi-mode fiber.*

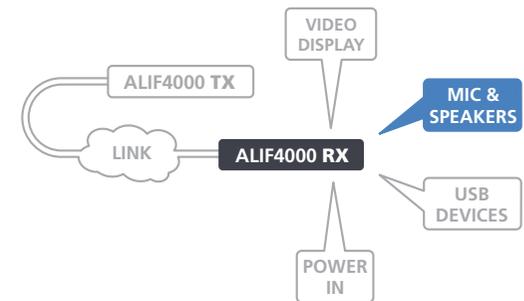
RX video display

The RX unit supports two video displays, each up to 4K UHD (3840 x 2160) or DCI (4096 x 2160), with refresh rates up to 60Hz.



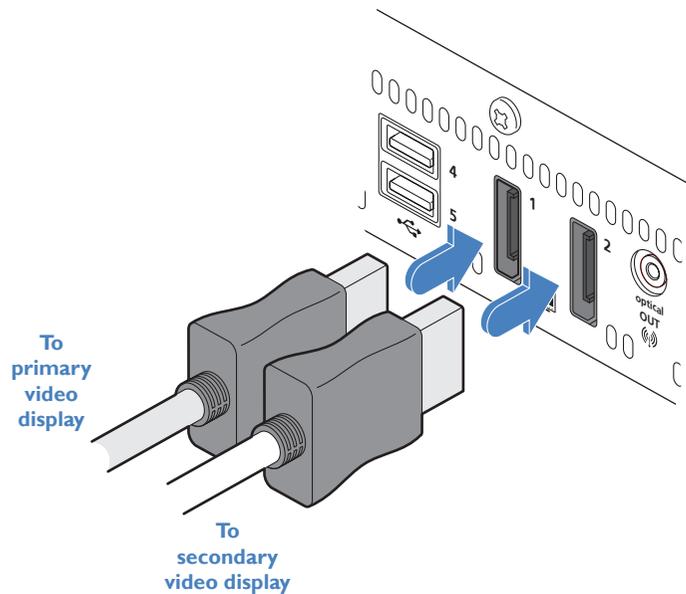
RX microphone & speakers

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.



To connect video displays

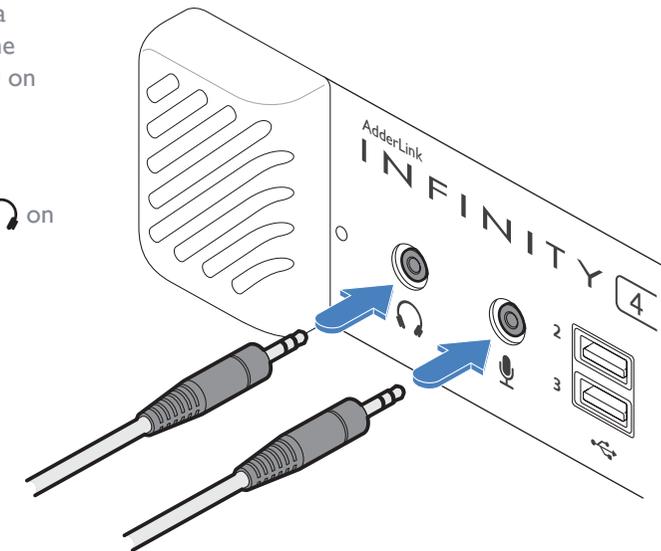
- 1 Connect the lead from the primary video display to the display port socket marked '1' on the RX unit rear panel:



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

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.

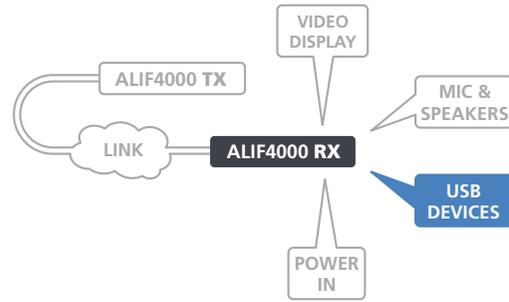


RX USB devices

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

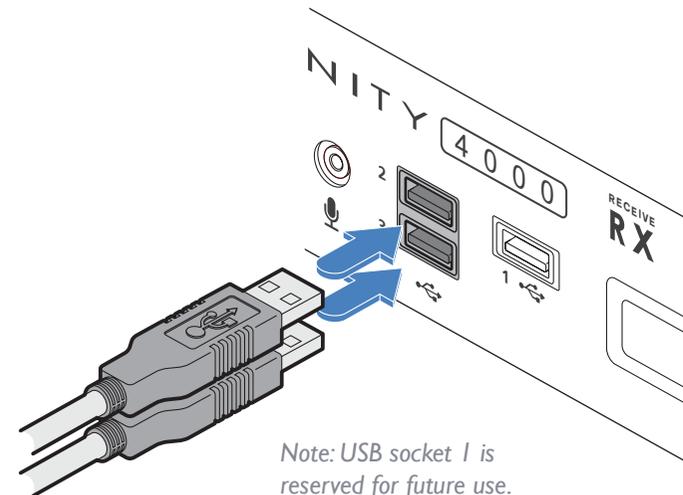
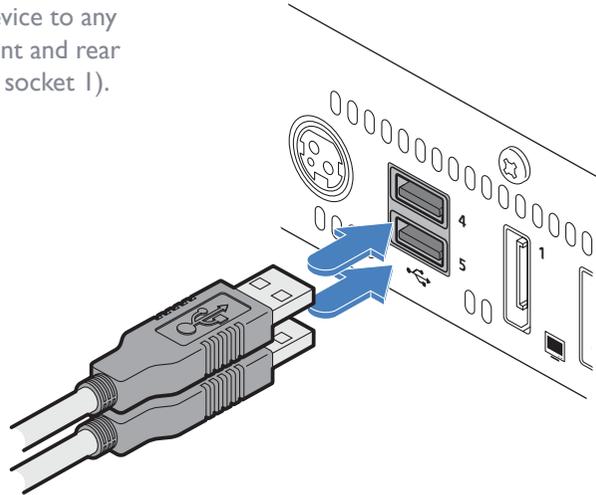
Note: USB socket 1 on the front panel is reserved for future use.

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



To connect USB devices

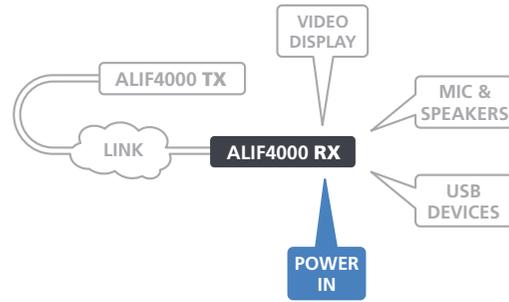
- 1 Connect the lead from the device to any of the USB sockets on the front and rear panels of the RX unit (except socket 1).



Note: USB socket 1 is reserved for future use.

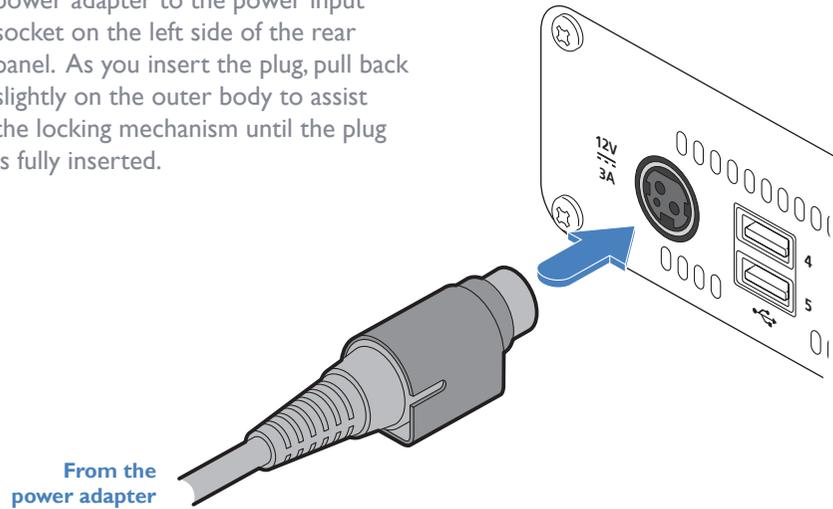
RX power in

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.

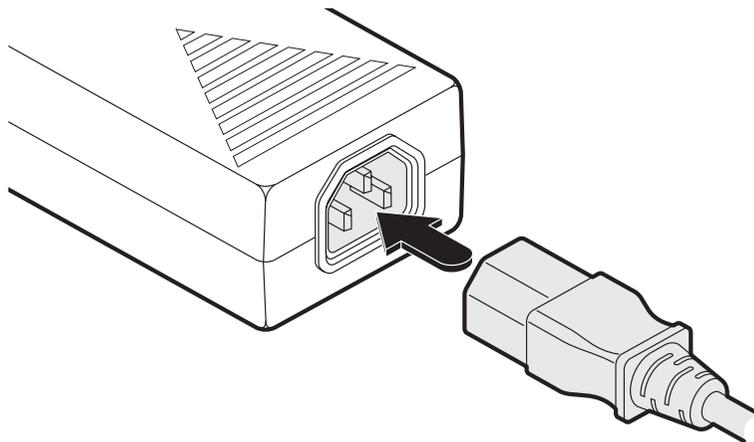


To connect the power adapter

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.



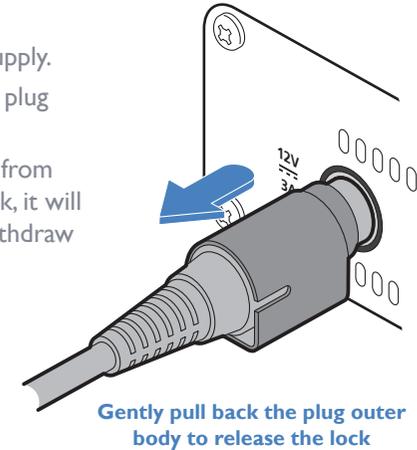
2 Insert the IEC connector of the supplied country-specific power cord to the socket of the power adapter.



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.



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 40 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 40 degrees Centigrade.

ALIF4000 CONFIGURATION VIA WEB PAGES

Each ALIF4000 unit hosts its own internal set of web pages which contain all configuration details and settings. 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**.

To configure ALIF4000 units via their web pages

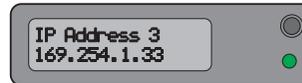
Run a web browser on your computer and enter the IP address of the required ALIF4000 unit:

The default addresses (when using SFP port 3) are **TX:** 169.254.1.33
RX: 169.254.1.32

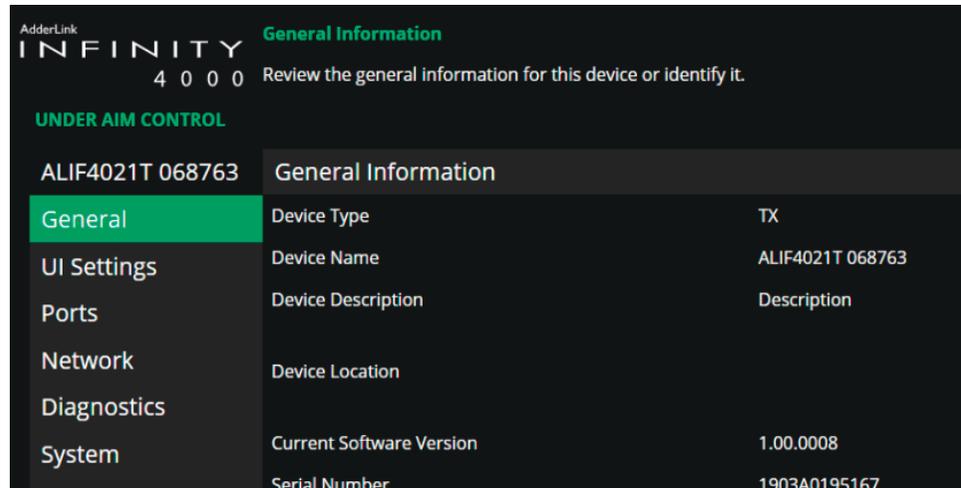
The default addresses (if using SFP port 4) are **TX:** 169.254.1.43
RX: 169.254.1.42

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:



The screenshot shows the web interface for an ALIF4000 unit. At the top, it says 'AdderLink INFINITY 4000' and 'General Information'. Below that, it says 'Review the general information for this device or identify it.' There is a section 'UNDER AIM CONTROL' with a list of menu items: 'General', 'UI Settings', 'Ports', 'Network', 'Diagnostics', and 'System'. The 'General' menu item is highlighted in green. To the right of the menu is a table of general information:

| General Information | |
|--------------------------|------------------|
| Device Type | TX |
| Device Name | ALIF4021T 068763 |
| Device Description | Description |
| Device Location | |
| Current Software Version | 1.00.0008 |
| Serial Number | 1903A0195167 |

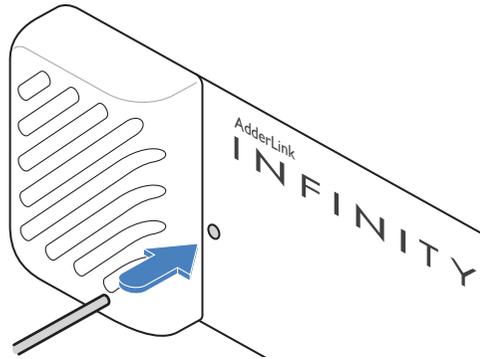
For explanations of the options within each page, please see [Appendix A](#).

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 remain **blue** for a short while (less than ten seconds) while ALIF4000 unit configures itself and should then change to **green** if all connections are correct; or **orange** if one or more of the video, USB and/or network links are missing.



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.

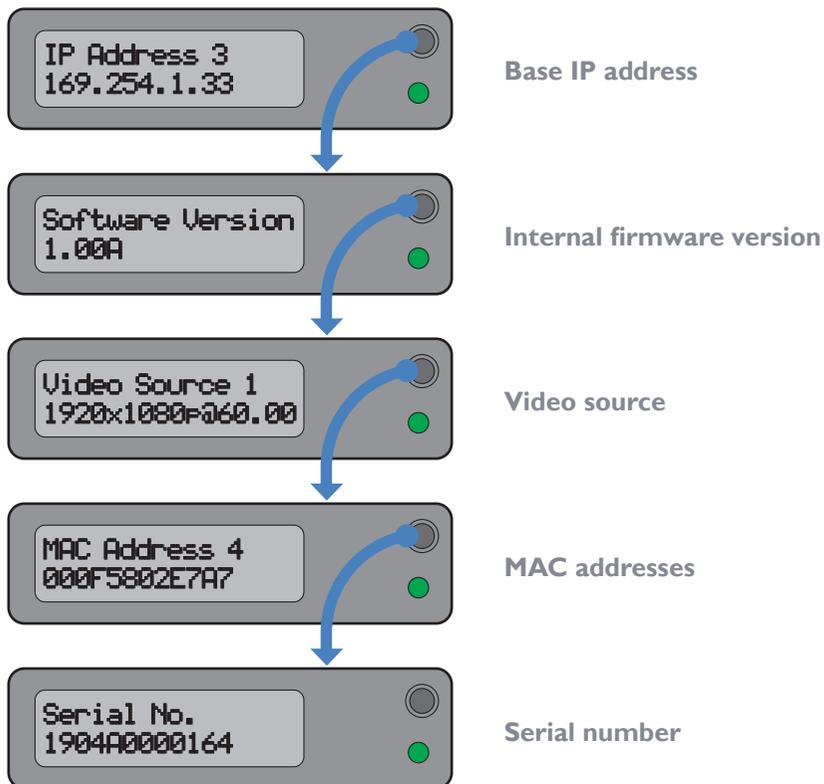
In operation, many ALIF4000 installations require no intervention once configured. The TX and RX units take care of all connection control behind the scenes so that you can continue to work unhindered.

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:



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. |
| Red/blue flash | Upgrade mode active. |
| Fast green flash | Identify mode active. |

Further information



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

- Getting assistance - see right
- [Appendix A](#) - Configuration pages
- [Appendix B](#) - Tips for success when networking ALIF units
- [Appendix C](#) - Troubleshooting
- [Appendix D](#) - Glossary
- [Appendix E](#) - RS232 'null-modem' cable pinout
- [Appendix F](#) - Fiber modules and cables
- [Appendix G](#) - Using the optional ALIF4000 rack shelf
- [Appendix H](#) - 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

INSTALLATION

CONFIGURATION

OPERATION

FURTHER
INFORMATION

INDEX

APPENDIX A - Configuration pages

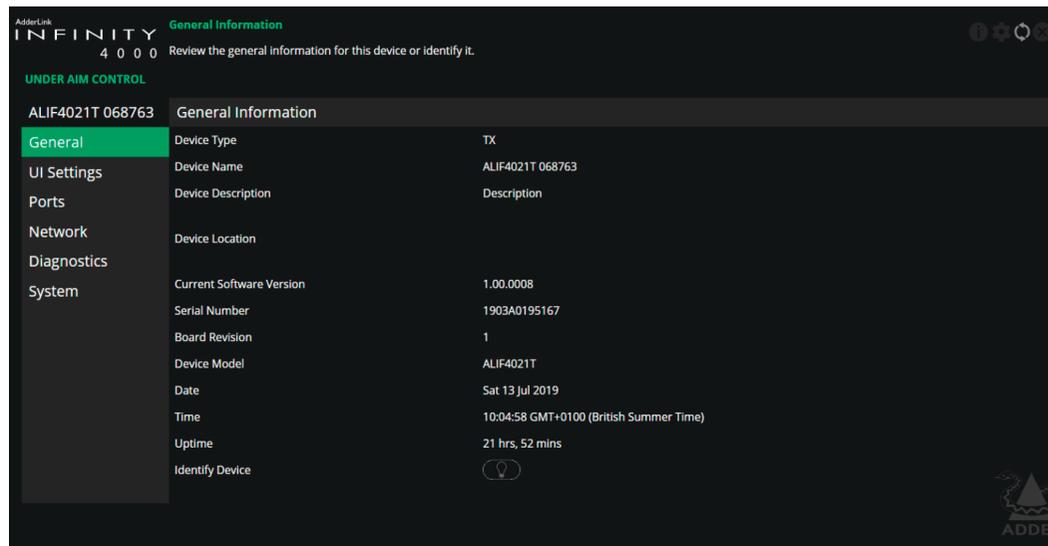
This section covers the web page configuration for the ALIF4000 units:

- [TX - General Information](#)
- [TX - UI Settings](#)
- [TX - Ports](#)
- [TX - Network](#)
- [TX - Diagnostics and Statistics](#)
- [TX - System](#)
- [RX - General Information](#)
- [RX - UI Settings](#)
- [RX - Presets](#)
- [RX - Ports](#)
- [RX - Network](#)
- [RX - Diagnostics and Statistics](#)
- [RX - System](#)

TX - General Information

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 Information** link.



General Information

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

Device Name - Name details that you can alter to distinguish this unit from all others. The name entered here will be read by AIM servers (if used) for administration purposes.

Device Description - Allows you to optionally add a description of the device. Useful when many ALIF units are being used.

Device Location - Allows you to optionally add a description of the device's location. Useful when many ALIF units are being used.

Current Software Version - Displays the version number of the currently installed 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.

Device Model - Displays the model number of the device.

Date and Time - Displays the current date and time used by the device.

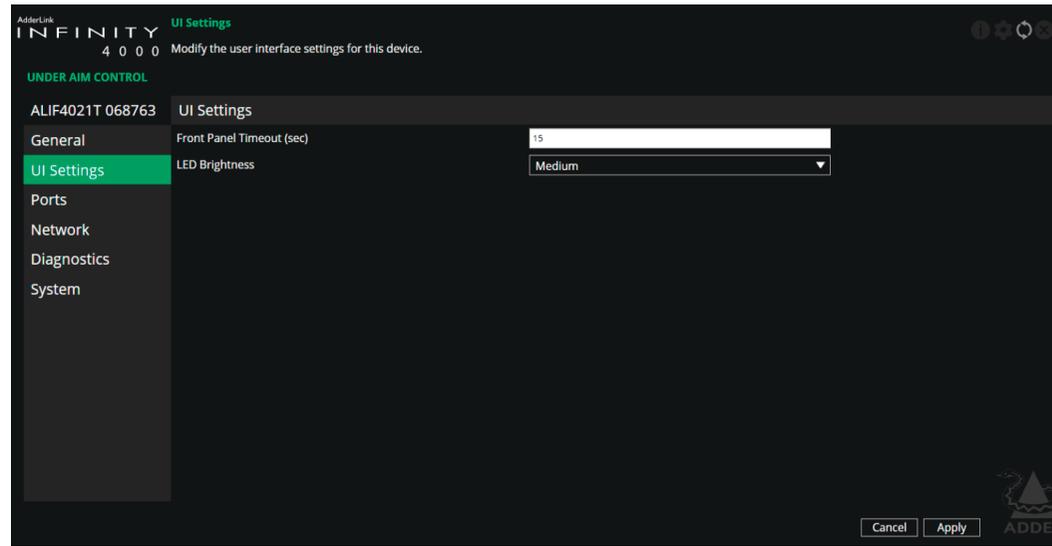
Uptime - Shows the time period for which the device has currently been running.

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).

TX - UI Settings

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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

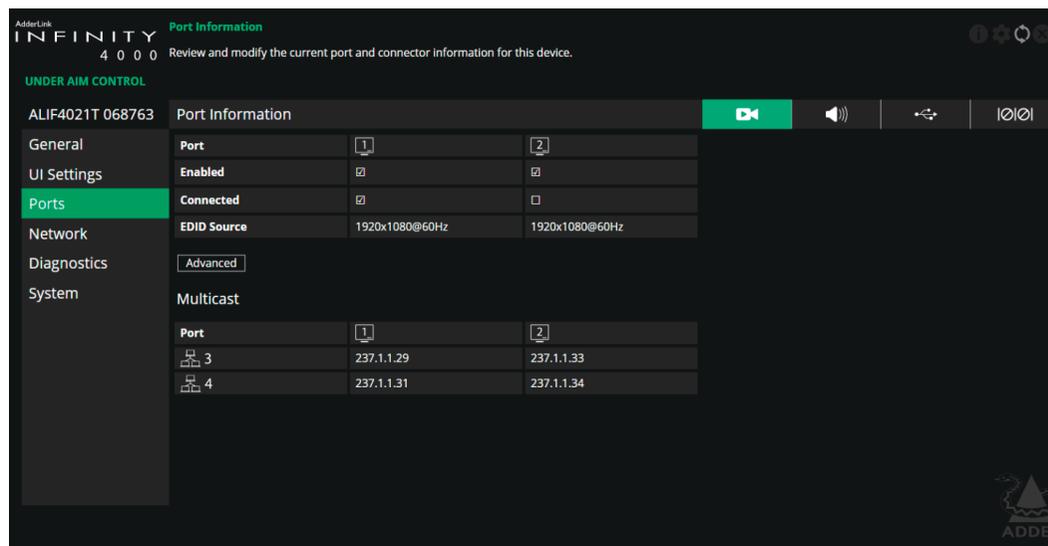
Front Panel Timeout - Determines the period of inactivity that should elapse before the front panel display should return to a blank state.

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

TX - Ports

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 used by the two video inputs.

Advanced - Click the Advanced button to show a popup for the two video feeds. Details listed include: *Compression, Bits per Colour, Frame Skipping, Background Refresh and whether the Magic Eye option is enable or disabled.*

Multicast - This section lists all video multicast IP addresses that have been configured, in this case, by the AIM server.



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.

Quality Mode - Provides a measure of the audio quality or resolution, this value is currently set to *Auto*.

Multicast - This section lists all audio multicast IP addresses that have been configured, in this case, by the AIM server.



USB Ports

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

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

Connected - Confirms whether valid device are connected to either USB port.

Transparent USB Enabled - Offers a different implementation of USB support from emulated USB. It allows additional devices to be used which would not function with emulated USB.

Speed - Indicates the USB speed mode currently in use, as determined by the host computer's USB port. Settings are *High* or *Full*.

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.



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.

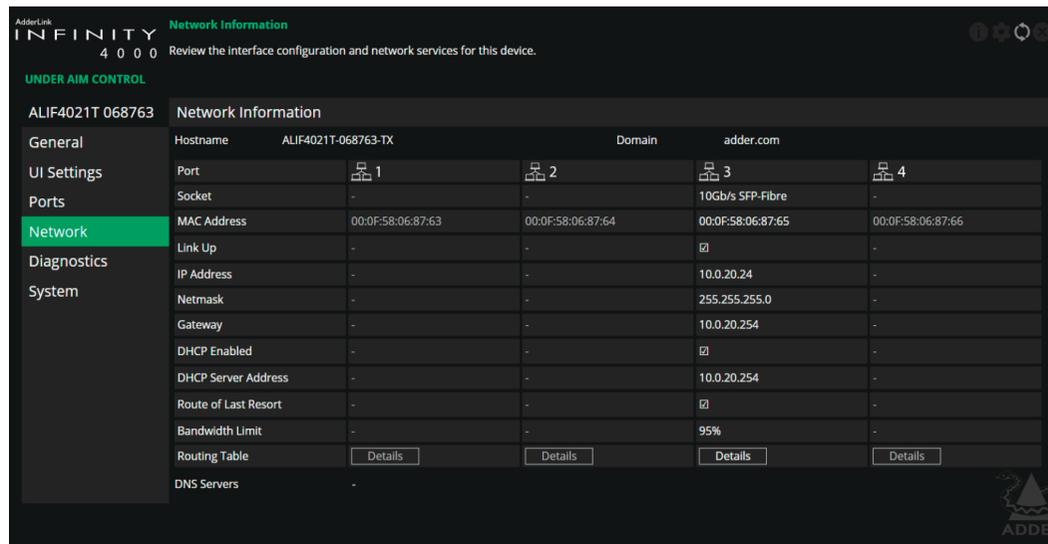
Data Bits - The number of data bits to be used (5, 6, 7, or 8).

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

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

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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.



Network Information

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 - The IP address of this network interface. This is not configurable, the device can function in a network zero-config state which does not require the setting of a static IP address.

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

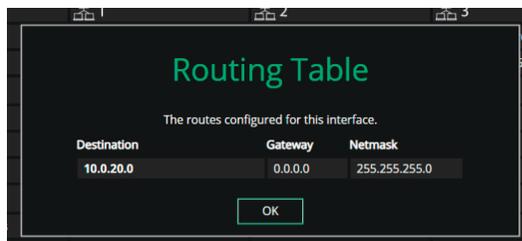
Gateway - The gateway address of this network interface. This is not configurable, the device can function in a network zero-config state which does not require the setting of a static gateway.

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 - Lists the address of a valid DHCP server (which can be the AIM server) to be used when the DHCP Enabled checkbox above is ticked.

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. This is determined via the AIM server.

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.



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

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

NTP Servers - Lists NTP server addresses obtained via DHCP.

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.

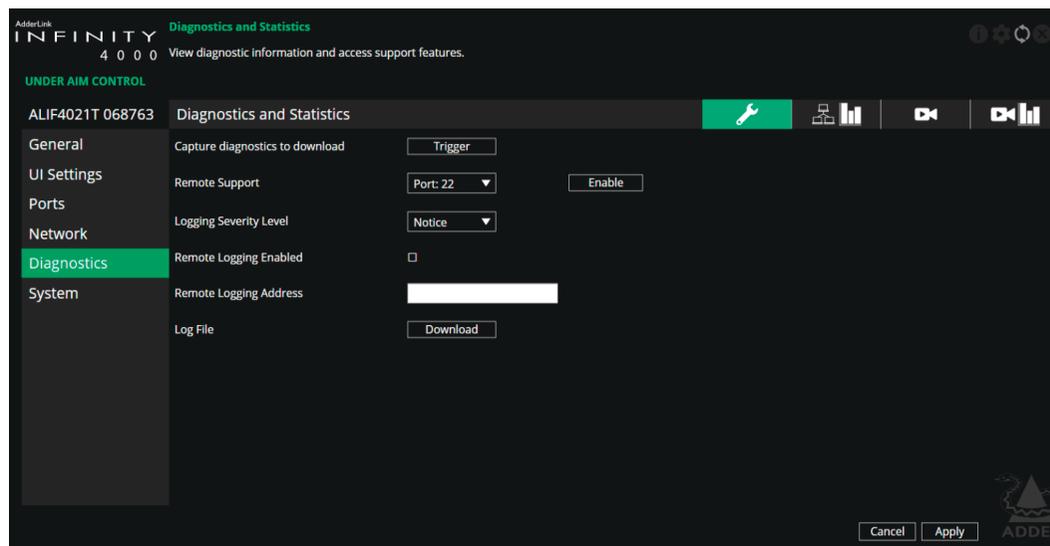
AIM Enabled - Indicates whether server management is enabled for this device.

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

TX - Diagnostics and Statistics

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 - 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.

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 - Click to download the log file to the host computer's browser.



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

This page lists key settings related to the physical video ports, the signal encoding employed and the data transmitted through them.

Port: Shows the display port sink interface status for each video port.

Connected – Is there a device connected to this video port?

Powered – Is the device connected powered on or not?

Hot-Plug Asserted – Is the TX asserting HotPlug to the device to indicate the presence of a display to the host computer on this video port?

Link Rate - Data rate speed negotiated with the host computer on this video port.

Timing Mode – Video signal timing details detected by the TX from the PC connected on this video port.

Timing Period – Video signal frame period in uSecs.

Pixel Clock – Video pixel clock for the video signal on this port.

Horizontal Resolution – As stated.

Horizontal Sync Start & End – For future use.

Horizontal Frame Length – As stated.

Vertical Resolution – As stated.

Vertical Sync Start & End – For future use.

Vertical Frame Length – As stated.

Timing flags – States the timing method, e.g. *Progressive* or *Interlaced*.

Encoding - Shows the video processor status for each video port.

Enabled – Is the video processor running or not?

High Res Single Head mode – Is the video processor running in high-res single head mode (ie. both processors used to do greater than 4k resolutions). For future implementation.

Pixel Buffer Full - If ticked, a fault has occurred in processing.

Segments per line... to Segment Compare Enabled - Video processor encoding setup status for diagnostics purposes only.

Maximum Segment Compare Level – Equivalent to *Magic Eye* setting on AIM server. 0 = Off, 1 = Magic Eye on.

Segment Refresh Enabled – Equivalent to *Background Refresh* on AIM server. *Background refresh* enabled (ie. 32, 64, etc) then *Segment Refresh Enabled* = On.

Segment Refresh Period = Equivalent to *Background Refresh* on AIM server when set to a value.

Transmission - Lists various settings relating to the data transmission used via each video port; such as network teaming, whether the data has stopped, whether interfaces are enabled and the source and destination addresses for each video stream.



Video Port Statistics

This page provides frame and packet counts for both video ports.

Dropped Frames - The number of frames dropped before transmission on each video port.

Transmitted Packets - The total number of packets output from the video processor on each video port.

Packets Transmitted - The breakdown of packets transmitted for each video stream on each video port.

TX - System

To get here

- 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: **http://169.254.1.33** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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

Review the software information for this device or perform system operations.

UNDER AIM CONTROL

ALIF4021T 068763

| | | | | |
|-------------|----------------------------|-----------|-----------------------------|-----------|
| General | Preferred Software Version | 1.00.0008 | Recovery Software Version | 1.00.0008 |
| UI Settings | Alternate Software Version | 1.00.0002 | Bootloader Software Version | 1.00.0008 |

Ports

Network

Diagnostics

System

Reboot Device

Restore Default Settings

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.

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**.

2 If necessary, click the **General Information** 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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *IP Address 4*) and use that address.

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

| Device Information | Value |
|--------------------------|---|
| Device Type | RX |
| Device Name | ALIF4021R 0688F7 |
| Device Description | Description |
| Device Location | Device Location |
| Current Software Version | 1.00.0008 |
| Serial Number | 1903A0195479 |
| Board Revision | 1 |
| Device Model | ALIF4021R |
| Date | Sat 13 Jul 2019 |
| Time | 10:12:37 GMT+0100 (British Summer Time) |
| Uptime | 22 hrs, 1 min |
| Identify Device | |

General Information

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

Device Name - Name details that you can alter to distinguish this unit from all others. The name entered here will be read by AIM servers (if used) for administration purposes.

Device Description - Allows you to optionally add a description of the device. Useful when many ALIF units are being used.

Device Location - Allows you to optionally add a description of the device's location. Useful when many ALIF units are being used.

Current Software Version - Displays the version number of the currently installed 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.

Device Model - Displays the model number of the device.

Date and Time - Displays the current date and time used by the device.

Uptime - Shows the time period for which the device has currently been running.

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**.

2 Click the **UI Settings** link.

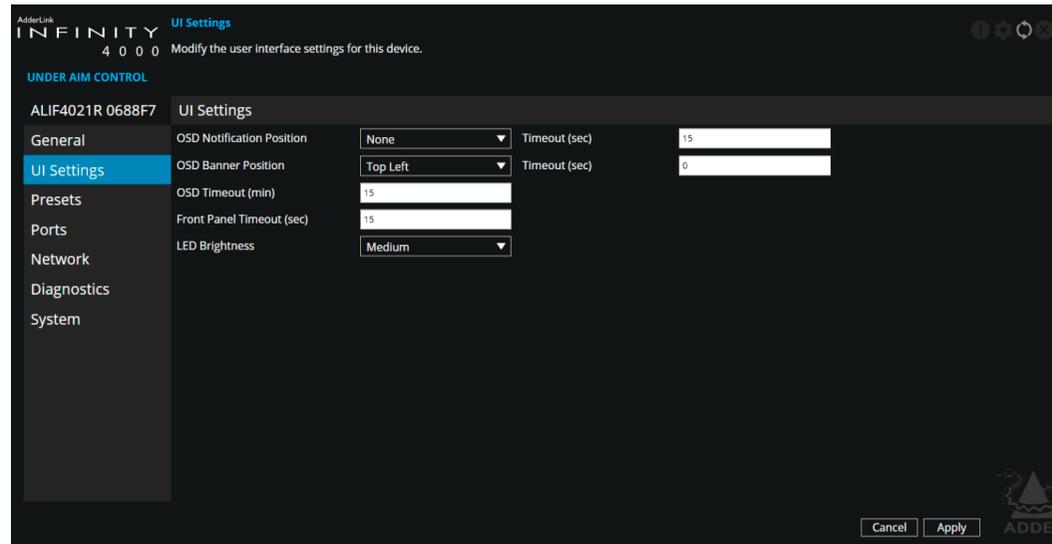
OR

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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *IP Address 4*) 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 displayed on users' screens.

OSD Timeout - Determines the period of inactivity that should elapse before the OSD menu is closed from user's screens.

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.

RX - Presets

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**.

2 Click the **Presets** 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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 IP Address 4)* and use that address.

3 Click the **Presets** link.

INFINITY 4000 Preset Information
Review the current preset and connection information for this device.

UNDER AIM CONTROL

ALIF4021R 0688F7 Presets

General Preset Name AIM Preset
UI Settings Preset Description Preset created by AIM

Presets Connections

| Type | RX Port | TX Device | TX Port | Status |
|-------|---------|------------------|---------|--------|
| Video | | Static TX device | | |
| Audio | | Static TX device | | |
| USB | | Static TX device | | |

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.

The icon in the rightmost column indicates the status (ie, connected, no source, etc) of this connection.

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**.

2 Click the **Ports** link.

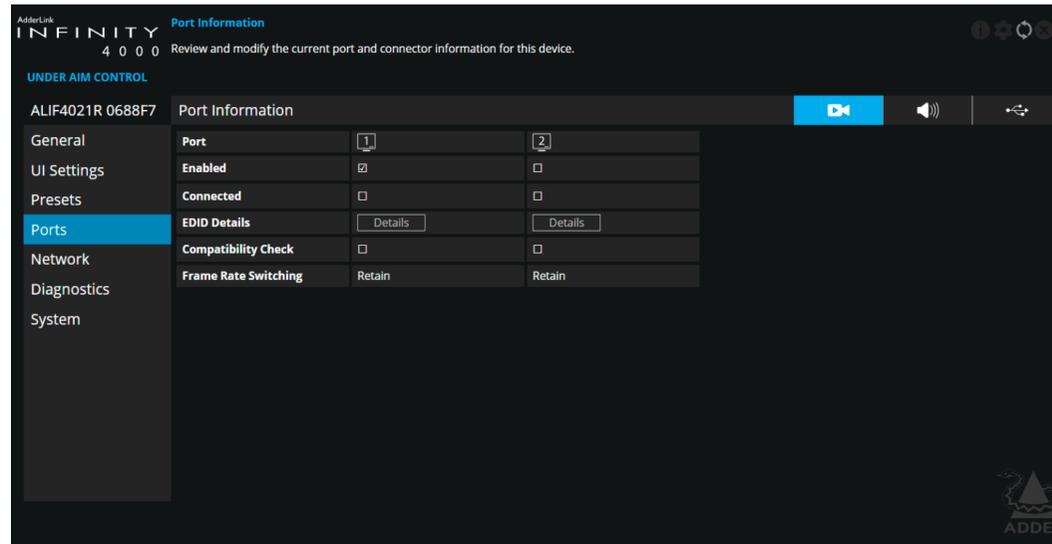
OR

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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *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 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.

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.*

Compatibility Check - Confirms whether video compatibility between source and display device is checked. When ticked it prevents displaying resolutions the monitor doesn't support or, when unticked, always sends resolutions to the monitor regardless of monitor's declared capabilities.

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.

Retain - When switching to a different 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 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 - Determines the microphone gain/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.



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.

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

Enable Isochronous Devices - When ticked, a dedicated portion of USB bandwidth is reserved for real time data transfers which must be sent at a constant rate.

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.

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**.

2 Click the **Network** link.

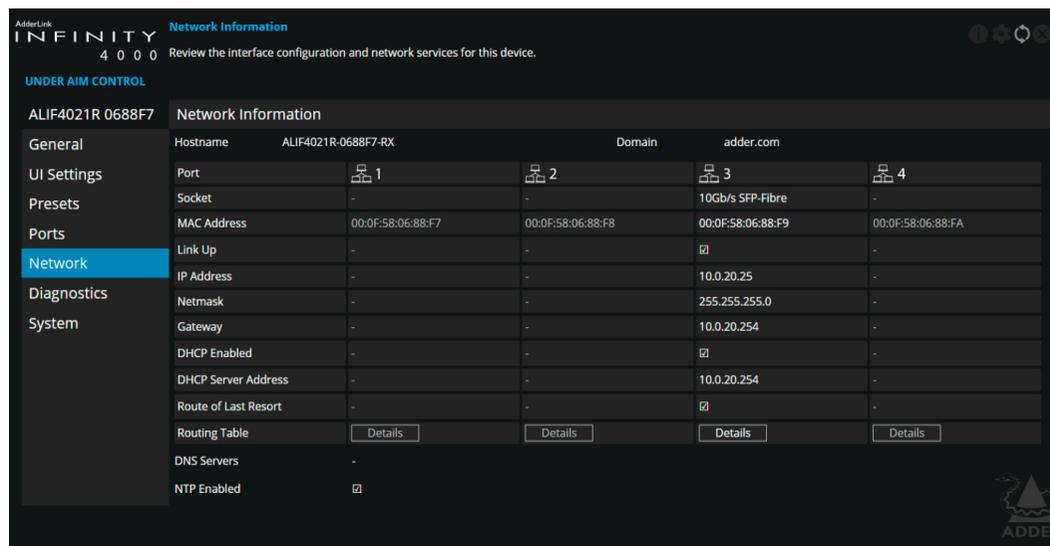
OR

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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *IP Address 4*) and use that address.

3 Click the **Network** link.



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.



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

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

NTP Servers - Lists NTP server addresses obtained via DHCP.

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.

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

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

Network Information

This page provides numerous network details for each of the installed ports on the RX 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 - The IP address of this network interface. This is not configurable, the device can function in a network zero-config state which does not require the setting of a static IP address.

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

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 - Lists the address of a valid DHCP server (which can be the AIM server) to be used when the DHCP Enabled checkbox above is ticked.

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. This is determined via the AIM server.

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**.

2 Click the **Diagnostics** link.

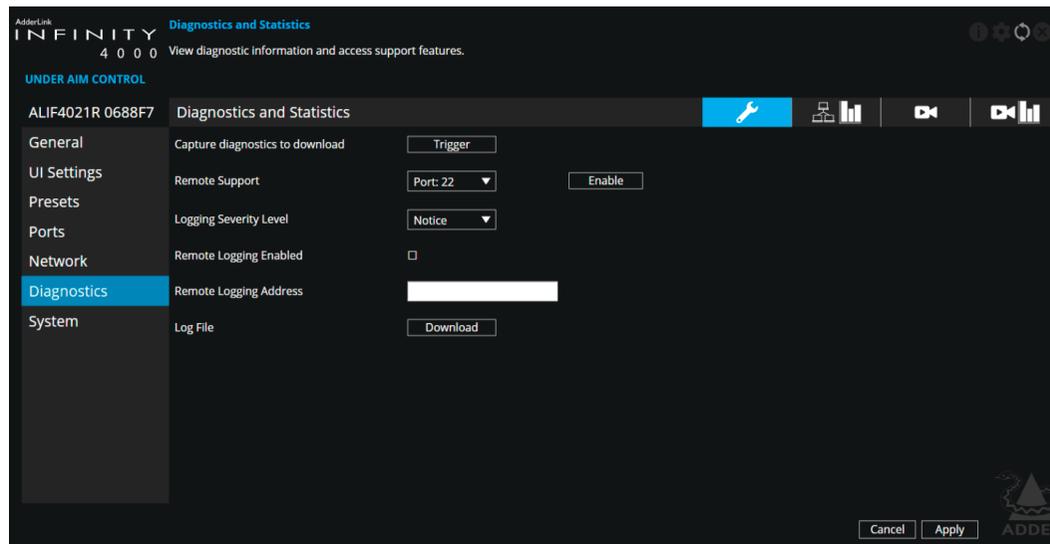
OR

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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *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 - 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. *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 - Click to download the log file to the host computer's browser.



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

This page lists key settings related to the physical video ports, the signal encoding employed and the data transmitted through them.

Port: Shows the display port source interface status for each video port.

Connected - Is there a monitor connected to this video port?

Powered - Is the connected monitor powered on or not?

Hot-Plug Asserted - Is the monitor asserting HotPlug to the RX to indicate the presence of a display on this video port?

Link Rate - Data rate speed negotiated with the host computer on this video port. Currently unsupported - will always report 0.

Timing Mode - Video signal timing details detected by the TX from the PC connected on this video port.

Timing Period - Video signal frame period in uSecs.

Pixel Clock - Video pixel clock for the video signal on this port.

Horizontal Resolution - As stated.

Horizontal Sync Start & End - For future use.

Horizontal Frame Length - As stated.

Vertical Resolution - As stated.

Vertical Sync Start & End - For future use.

Vertical Frame Length - As stated.

Timing flags - States the timing method, e.g. *Progressive* or *Interlaced*.

Encoding - Shows the video processor status for each video port.

Image hidden - Is the video image currently hidden or not (if a valid image from a TX has not yet been received it will be hidden)?

Overlay Enabled - Is GFX UI output supported on this video port?

OSD Enabled - Are UI and notification banners active on this particular video port?

Mirroring Enabled - Is this video processor mirroring the video image of the other video processor?

High Res Single Head mode - Is the video processor running in high-res single head mode (ie. both processors used to do greater than 4k resolutions). For future implementation?

Width - Horizontal resolution of the video image decode in the video processor.

Height - Vertical resolution of the video image decode in the video processor.

Period - Frame period in uSecs of the video image decode in the video processor.

Segments per line... onwards - Video processor decoding setup status for diagnostics purposes only.

RX - Diagnostics and Statistics (cont.)

Reception - Lists various settings relating to the data received on each video port; such as whether the data has stopped, whether video processing is locked to the received video packets, whether interfaces are enabled and the source and destination addresses for each video stream.

Teaming – Is network interface teaming currently possible on this video port (TX teaming state will determine if teaming is actually being used or not).

Stopped – Is the video processor decoding for this port stopped or not?

Locked – (currently not used)

Frame Store Filter Enabled – For support use only.

Frame Store Number – For support use only.

Lock Mode – (currently not used – will always be 1 currently)

Stream 1 and/or 2 – Which network interface(s) are enabled and what network addresses, etc. are being used as the source of video data for the video processor for this video port.



Video Port Statistics

This page provides frame and packet counts for both video ports.

Frame Period - The latest period measurement between the last two received frames, the inverse of the video frame rate.

Frames Received - The total number of video frames received on the video port (since the connection was established or last changed).

Packets Received - The total number of video packets received on the video port (since the connection was established or last changed).

Expected Packets - The total number of packets that were expected to be received on the video port (since the connection was established or last changed).

Stream Packets Received - Breakdown of packets received on each interface for each video port for each video stream.

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**.
- 2 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: **http://169.254.1.32** (this is the default address when using SFP port 3). If you are using SFP port 4 then the default address will be **http://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 *IP Address 4*) and use that address.
- 3 Click the **System** link.

Software and System Operations

Review the software information for this device or perform system operations.

UNDER AIM CONTROL

ALIF4021R 0688F7

| | | | | |
|-------------|----------------------------|-----------|-----------------------------|-----------|
| General | Preferred Software Version | 1.00.0008 | Recovery Software Version | 1.00.0008 |
| UI Settings | Alternate Software Version | 1.00.0002 | Bootloader Software Version | 1.00.0008 |

Presets

Ports

Network

Reboot Device

Diagnostics

Restore Default Settings

System

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.

APPENDIX B - 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](#).

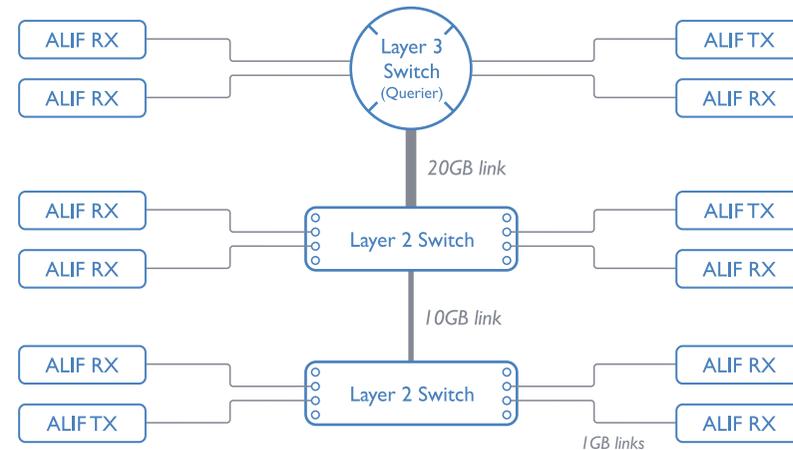
Creating an efficient network layout

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 display port converters, instead replace VGA video cards in older systems with suitable display port 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 C - Troubleshooting

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

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

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

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

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

Remedies:

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

continued

Problem:The 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.

APPENDIX D - 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:

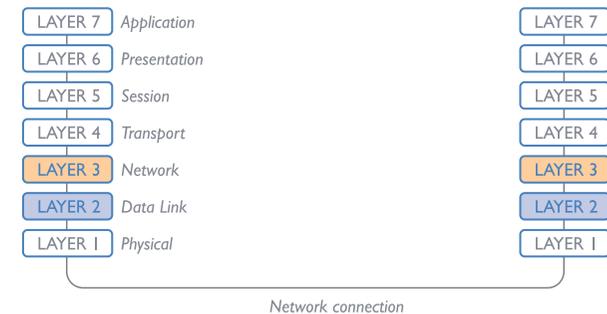
- **Store and forward** is the original method and requires the switch to save each entire data packet to buffer memory, run an error check and then forward if no error is found (or otherwise discard it).
- **Cut-through** was developed to address the latency issues suffered by some store and forward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

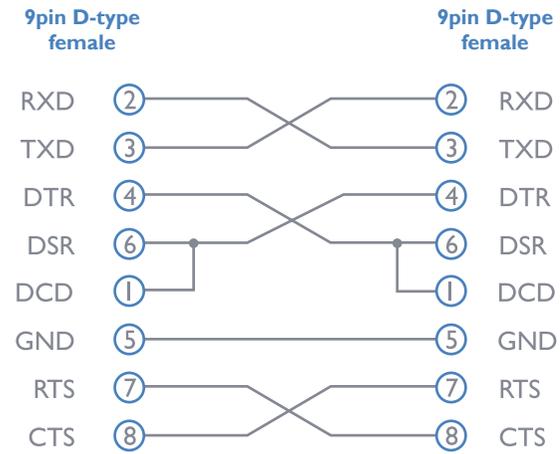
So why are Layer 2 and Layer 3 of particular importance when discussing ADDERLink™ INFINITY? Because the successful transmission of data relies upon fast and reliable passage through network switches – and most of these operate at either Layer 2 or Layer 3.

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.

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 E - Null modem cable pinout

RS232 'null-modem' cable pin-out



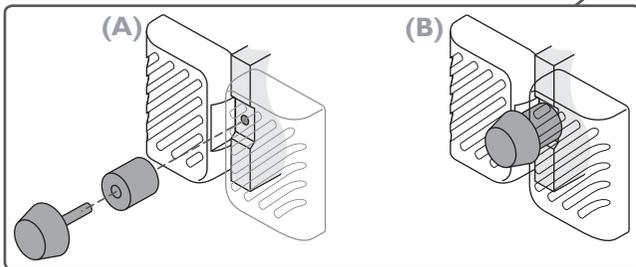
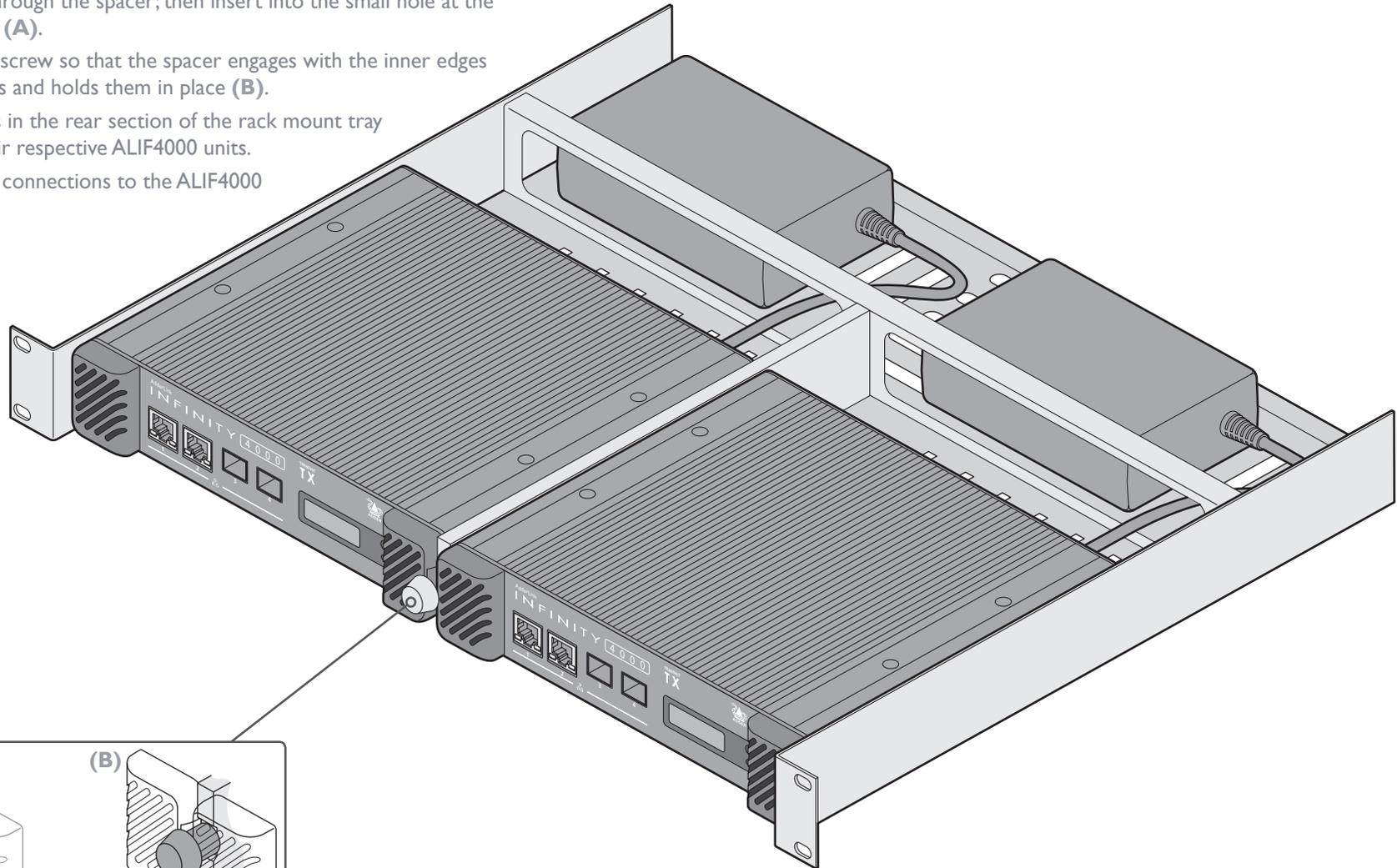
APPENDIX F - Fiber modules and cables

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

| Fiber Type | Fiber size | Fiber Type | Coding | | Distance at 10Gbps | Adder part number for SFP module |
|-------------|------------|--|---------------------|------------------------------|--------------------|----------------------------------|
| | | | Normal Applications | Suggested Print Nomenclature | | |
| OM1 | (62.5/125) | Multimode (TIA-492AAAA) | Orange | 62.5/125 | 2-26m | SFP-MM-LC-10G |
| OM2 | (50/125) | Multimode (TIA-492AAAB) | Orange | 50/125 | 2-26m | “ |
| OM3 | (50/125) | Multimode (850 nm Laser-optimized) (TIA-492AAAC) | Aqua | 850 LO 50 /125 | 2-82m | “ |
| OM4 | (50/125) | Multimode (850 nm Laser-optimized) (TIA-492AAAC) | Aqua | 850 LO 50 /125 | 2-300m | “ |
| OS1 and OS2 | (9/125) | Single-mode (TIA-492C000 / TIA-492E000) | Yellow | SM/NZDS, SM | 10Km | SFP-SM-LC-10G |

APPENDIX G - 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.



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- Module: openssl
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- Module: libevdev
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- Module: ntp
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5. [6] Michael Barone <michael,barone@lmco.com> GPSVME fixes
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14. [15] Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration
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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> ntpswep
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 comply with NTPv4 specification, ntpq saveconfig
30. [33] William L. Jones <jones@hermes.chpc.utexas.edu> RS/6000 AIX modifications, HPUX modifications
31. [34] Dave Katz <dkatz@cisco.com> RS/6000 AIX port
32. [35] Craig Leres <leres@ee.lbl.gov> 4.4BSD port, ppsclock, Magnavox GPS clock driver
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@gwdgvl.dnet.gwdg.de> VMS port
39. [42] Jeffrey Mogul <mogul@pa.dec.com> ntptrace utility
40. [43] Tom Moore <tmoore@fielvel.daytonoh.ncr.com> i386 svr4 port

- 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 Sánchez <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> Unixware I 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@pfc.com> GNU automake/autoconfigure makeover, various other bits (see the ChangeLog)
- 53. [57]Kenneth Stone <ken@sdd.hp.com> HP-UX port
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- 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

- Module: libxkbcommon

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-----  
-  
- Module: dropbear  
-  
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* curve25519-donna: Curve25519 elliptic curve, public key function

* <http://code.google.com/p/curve25519-donna/>

* Adam Langley <agl@imperialviolet.org>

* Derived from public domain C code by Daniel J. Bernstein <djb@cr.yp.to>

* More information about curve25519 can be found here

* <http://cr.yp.to/ecdh.html>

* djb's sample implementation of curve25519 is written in a special assembly language called qasm and uses the floating point registers.

* This is, almost, a clean room reimplementation from the curve25519 paper. It uses many of the tricks described therein. Only the crecip function is taken from the sample implementation.

*/

- Module: libcurl

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-
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```
-----
-
- Modules: kmod libdaemon avahi libgpg-error libgcrypt gnutls libjvt
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-
-----
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-
- Modules: libunistring gmp nettle

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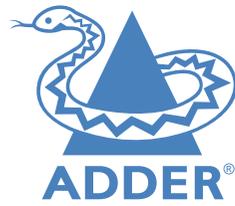
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