

# unDUSB

## 2 channel PC / Dante™/AES67 Interface



## User Manual

Date 8/29/2018

Revision 01\_d

## IMPORTANT SAFETY INSTRUCTIONS

The symbols below are internationally accepted symbols that warn of potential hazards with electrical products.



This symbol, wherever it appears, alerts you to the presence of un-insulated dangerous voltage inside the enclosure -- voltage that may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and third grounding prong. The wider blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by Attero Tech
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus.
13. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
14. Unplug this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
16. This apparatus shall be connected to a mains socket outlet with a protective earthing connection.
17. When permanently connected, on all-pole mains switch with a contact separation of at least 3mm in each pole shall be incorporated in the electrical installation of the building.
18. If rack mounting, provide adequate ventilation. Equipment may be located above or below this apparatus but some equipment (like large power amplifiers) may cause an unacceptable amount of hum of may generate too much heat and degrade the performance of this apparatus,



TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

## LIMITED FIVE YEAR WARRANTY

The equipment is warranted for five years from date of purchase from Attero Tech, LLC against defects in materials or workmanship. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment. Should any defect develop, Attero Tech, LLC will, at our option, repair or replace any defective parts without charge for either parts or labor. If Attero Tech, LLC cannot correct the defect in the equipment, it will be replaced at no charge with a similar new item. Attero Tech, LLC will pay for the cost of returning your equipment to you. This warranty applies only to items returned to Attero Tech, LLC, shipping costs prepaid, within five years from the date of purchase. This Limited Warranty is governed by the laws of the State of Indiana. It states the entire liability of Attero Tech, LLC and the entire remedy of the purchaser for any breach of warranty as outlined above. NEITHER ATTERO TECH, LLC NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF ATTERO TECH, LLC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF ATTERO TECH, LLC EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules and EN55022. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.



This symbol means the product must not be discarded as household waste, and should be delivered to an appropriate collection facility for recycling. Proper disposal and recycling helps protect natural resources, human health and the environment. For more information on disposal and recycling of this product, contact your local municipality, disposal service, or the business where you bought this product.

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## 1 – Overview

The unDUSB is a small, cost-effective USB interface that bridges host USB devices like computers, directly to a Dante™/AES67 network keeping the audio signals in the digital domain in the process. The unDUSB enumerates as a standard stereo sound card and provides two audio channels from the Dante network to the host device and two channels from the host device to the Dante™/AES67 Network. Since the unDUSB uses USB audio drivers that are built-in to Windows and OSX, no additional drivers need to be installed. Using an unDUSB, any computer program that can make use of a stereo sound card can instantly have input and output access to audio signals on a Dante™/AES67 network. Music, presentation audio and even audio from collaboration applications like Skype can be used in a Dante™/AES67 system.

*\*Note: Units shipped before firmware 4.6.0 require an additional USB codec update described in the firmware update section for proper operation in conferencing application such as Skype.*



Figure 1 - unDUSB front and rear views

The unDUSB features a full size type-B USB connector for connection to a USB port on the host device and RJ45 for connection to the Dante network.

The unDUSB can be powered by 802.3af-compliant PoE device such as a switch or midspan injector. Alternately, it can take power from an external DC supply between 9V and 24V, or from the Power Link output connector of other Atterotech devices that support Power Link feature such as the unD41.

### 1.1 – What’s in the Box

The unDUSB comes supplied with the following:

- unDUSB device
- 3ft USB cable

### 1.2- Optional Extras

All of the following are available as options for the unDUSB that may be ordered separately:

- A 12 V DC power supply is available if PoE power is not required or available

## 2 – Device Installation



1	Power LED
2	Dante™/AES67 status LEDs
3	Factory reset switch access
4	USB interface connector
5	Dante™/AES67 Ethernet interface connector and indicators
6	Power Socket - Use with optional 12 V DC wall wart only
7	Power Link Input - For use when powered from another Power Link supported device

**\*Note:** The unDUSB has a label on one of the mounting flanges that shows the last 6 digits of the MAC address. This is important for initial device identification as these digits make up part of the devices default network name that is shown when the device is detected by Dante™ Controller. The full MAC address is also given on the bottom of the unit.

## 2.1 – Mounting

Installation of the unDUSB is very straight forward. It is recommended that the unit be secured to a flat surface with a screw through each mounting flange. Dimensions for mounting are shown in the Figure 2 below. Use a No. 6 screw of a type and length that is applicable to the surface to which the unDUSB will be attached.

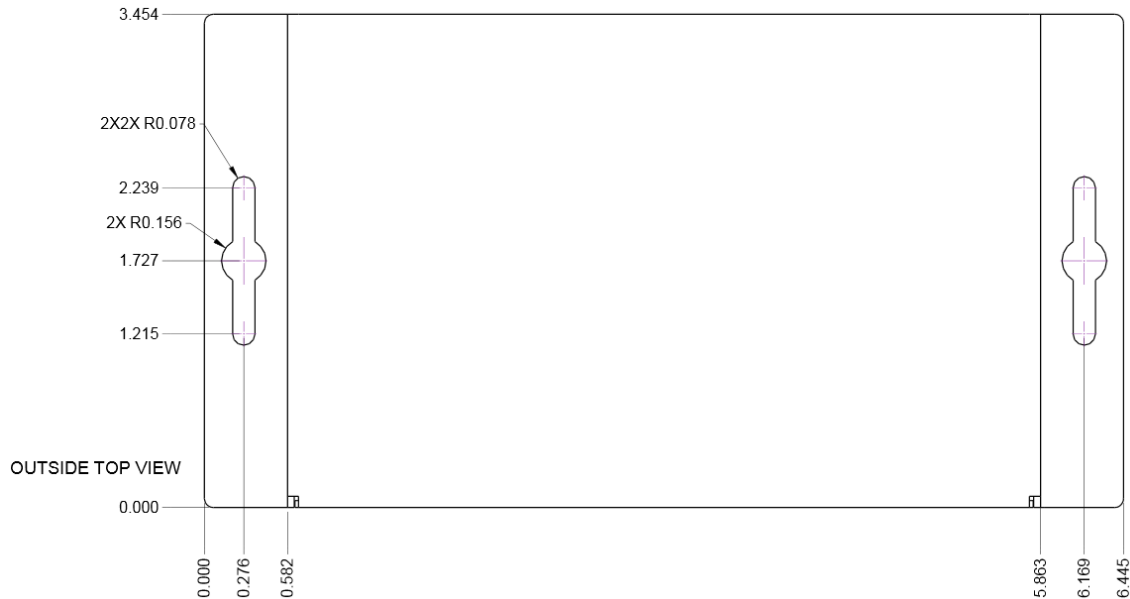


Figure 2 - Mounting Information

When powering using PoE:

- Attach the Dante™/AES67/PoE port to a spare PoE-enabled port on a PoE switch using a CAT-5 cable. If a midspan injector is being used, connect a spare input port to the Dante™/AES67 network switch using a CAT-5 cable, and then connect the corresponding output port to the Dante™/AES67 I/F of the unDUSB.

**\*Note:** All Attero Tech products are tested using UTP cabling and it is recommended that UTP cabling be used when installing them. STP cabling can be used for installation though care must be taken not introduce grounding issues into the system by doing so.

When powering using an optional external supply:

- Attach the Dante™/AES67/PoE port to a spare port on the Dante™/AES67 network switch using a CAT-5 cable.
- Attach the power supply to the power input jack and then power up the external supply.

When powering using a Power Link connection from another Attero Tech device:

- Power down the device that will be sourcing power to the unDUSB.
- Attach a cable to the Power Link output of the source device.
- Attach the other end of that cable to the Power Link input on the unDUSB.
- Power up the source device, which in turn will power the unDUSB.

If powered correctly, the power light on the front should be lit.

## 2.2 – Status LEDs

The front panel LED's show the Dante™/AES67 diagnostic status. If network or audio problems persist, these LED's may assist in resolving the issue.

The three LED's are SYS, SYNC and ERR and the color of each LED has different meanings. The tables below show the combination and what each combination means.



Color	Description
Red	System booting
Green	System ready

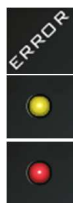


Identify (SYS, SYNC and ERR LED's flashing)

(Activated through the Identify function of Dante™ Controller)



Color	Description
Yellow	PTP currently syncing
Red	PTP error / no PTP sync / PTP disabled
Green	PTP Slave, with PTP sync
Flashing Green	PTP master



Color	Description
Yellow	Capability is corrupted
Red	Memory stack overflow



## 2.3 – Daisy Chaining and Power Linking

A unique feature of the unDUSB is its support of daisy chaining. This allows an unDUSB unit in close proximity to other devices that support daisy chaining to utilize a single home run of Ethernet cable back to the switch thus saving on installation costs. Daisy chaining simply requires the unDUSB be connected to the spare Ethernet port of the last device in the current chain. Not only can the Ethernet connection be daisy chained, power can also be daisy chained too by connecting the power link power output on the last active device to the power link input on the new device. This works even if the initial device in the chain is powered by PoE!

*\*Note: As the unDUSB only has one Ethernet port, it must be the last device in a chain and no other devices may be chained from it.*

The number of devices that can be daisy chained is limited. The maximum that can ever be daisy chained is 6 devices in a single chain. Beyond that the number of switch hops may cause audio problems due to excessive latency and increased clock jitter. The other limitation is the power supply if power is also being daisy chained from device to device.

- PoE -If power is supplied to the first device via PoE, the daisy chain limit is restricted to the initial device plus two others (trying to do more will cause the POE to over current).
- Standalone - If power is supplied to the first device via a standalone supply, the supplies maximum power output determines the number of devices it can support (assume 4W @ 24V DC per device).

To daisy chain an unDUSB, connect an Ethernet cable from the data only port of the last device in the chain to the Ethernet port of the unDUSB to supply the network information. To chain the power, connect the “Link out” connector of the last unit in the chain to the “Link in” connector on the unDUSB.

**Network Configuration Note:** *If the devices are installed in a networked daisy-chain topology, it is highly recommended to only configure unicast flows from each of the devices' Dante transmitters in the chain. The addition of multicast flows along the daisy chain can overwhelm the switches in the chain with unnecessary multicast audio traffic resulting in potential latency and network clock synchronization issues, especially on the units installed at the end of the daisy-chain network segment.*

Additionally, if there are a significant number multicast audio flows configured on the Dante network, it is recommended that the core network switches that interface to the daisy-chained network segments be configured with the appropriate IGMP settings to shield the daisy chain from unnecessary multicast audio traffic. The example shown in Figure 3 highlights how an IGMP enabled switch can eliminate unnecessary multicast audio traffic from the unD41 daisy chain segment. The red connections show devices that are configured for multicast audio flows and the green are unicast flows and each show the network segments that are traversed by the associated audio traffic.

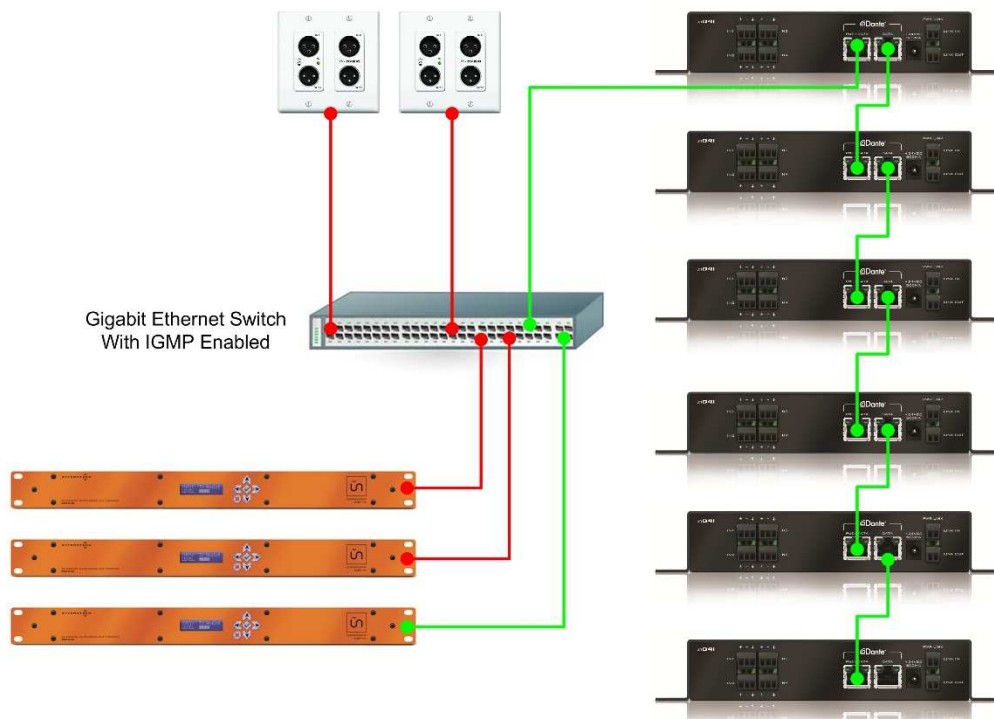


Figure 3 - Network Configuration Example

## 2.4 – Factory Reset

The unDUSB has a factory reset option. Using it will reset all the devices parameters back to their factory defaults including all the Dante settings such as device name, channel names as well as the device settings such as input select. The devices IP address mode is also reset back to getting a dynamic IP.

Access to the factory reset button is through a small circular hole on the front of the unit, next to the power LED.

To use the factory reset, insert a small screwdriver or paperclip into the hole to activate the factory reset switch. There should be a noticeable “click” when it’s activated. Hold the switch in and then apply power to the unDUSB. If the factory reset was successful, after a few seconds, the power LED’s will be green, while the Sys, Error and Sync LED’s will be orange. To complete the reset, cycle power normally WITHOUT the factory reset button being pressed.

## 2.5 – Firmware Updates

The unDUSB has the ability to be updated. Updates are applied via the network using Attero Tech unIFY Control Panel’s Smart Firmware update facility. Both unIFY and the latest unDUSB .SFU file are available from the Attero Tech customer portal (<https://portal.atterotech.com/home>).

### 2.5.1 – USB Codec Update

Devices shipped before release of firmware 4.6.0 will need the USB Codec updated to allow Volume/Mute functions to work properly on the host PC for applications such as Skype.

The following steps cover the update procedure:

1. Download unDUSB\_USB\_Programming\_v4.6.zip from the Attero Tech [Knowledge Base](#) and extract files.
2. Plug in USB cable directly to the unDUSB to a PC or laptop with the Update tool installed. Be sure the unDUSB is powered up.
3. Locate and run *UpgradeFirmware-1.0.30.0.exe*. Click Browse to select the *unDUSB\_no\_telephony.ptc* file included in this package.
4. Click Upgrade, the process should take about ~15 seconds to complete and indicate upgrade success.
5. After applying firmware and power cycling the unit, it might be a good idea to remove any previous association in the OS for the unDUSB. This can be done by opening the Windows Device Manager, finding the unDUSB device entry and uninstalling it. Then simply plug/unplug the unDUSB.

With the applied changes, volume and mute control should now work in the software conferencing applications.

## 3 – Device Configuration

The unDUSB has no internal parameters so the only setup required is to configure the routing of the audio over the Dante network. This has to be done over the Dante™/AES67 network and cannot be configured through the USB connection.

Certain 3rd party manufacturers provide audio routing functionality from within their own configuration application. Check the applications manual/help or contact the manufacturer in question to see if this is supported. If not supported by a 3<sup>rd</sup> party tool, the audio routing may be carried out using Audinate’s Dante™ Controller. Dante™ Controller can be obtained from the Audinate website ([www.Audinate.com](http://www.Audinate.com)) and is available for both Mac and PC. Instructions on how to use this application and about setting up routes on a Dante™ network can also be found on Audinate’s website.

*\*Note: The unDUSB will be shown using a default device name of unDUSB-##### where ‘#####’ is the last six characters of the devices MAC address.*

### 3.1 – IP Address Setup

\*\*\*\*\* IMPORTANT \*\*\*\*\*

Failure to correctly configure IP addresses will not allow an unDUSB device to correctly authenticate in the unIFY Control Panel software and while it will show up in Dante™ Controller, the input and output channels won’t be visible and routing of audio to and from the device will not be possible.

\*\*\*\*\*

In order to configure audio routing on an unDUSB, the PC will need to be able to communicate with the devices over the network. While all Dante™/AES67 devices will be discovered regardless of the IP address setup on the PC, communication can only occur if the PC and the device have compatible IP addresses.

By default, the unDUSB is set to get a dynamic IP address. As with all Dante™/AES67 devices, if the unDUSB does not find a DHCP server to retrieve an IP address from, it will give itself an local link address sometimes also known as an automatic private IP address (APIPA) instead. A local link IP address is always in the range 169.254.x.y.

To ensure communication, the PC can either be set to get a dynamic IP address, or be given a static IP address in the range 169.254.x.y y with a subnet mask of 255.255.0.0. The PC may require a restart if its IP address is changed for the change to take effect.

In some applications, IP addresses of devices may need to be set to something specific and that can be done once initial communication has been established. Bear in mind however that if a static IP address is assigned to a device and that static IP address is in a different range to the IP it was previously using to communicate with the PC, the PC will lose communication with the device until such time as the PC’s IP address is also changed to an IP in range of the devices new IP address.

Further information on IP setup for an audio system using Dante™ Controller can be found in the FAQ’s on the Audinate website (<https://www.audinate.com/resources/faqs>).

## **ARCHITECTS & ENGINEERS SPECIFICATION**

The Dante™/AES67 to USB Bridge shall provide 2 channels bidirectional bridging of USB and Dante™/AES67.

The unit shall provide a Power/ID LED, a Sys, LED, a Sync LED and an Err LED on the front panel to indicate system status.

The unit shall provide a type-B USB connector on the rear panel for connection to a PC or Mac.

A rear panel Dante™/AES67 interface shall receive power over the Ethernet cable from an 802.af PoE compliant switch, an external +9VDC to +24VDC power supply, or another Power Link capable device.

The unit shall support 44.1kHz and 48kHz USB sample rates over USB and 48kHz Dante™/AES67 sample rates, with 16-bit audio samples.

The unit shall provide fully asynchronous and bidirectional sample rate conversion between USB audio and Dante™/AES67 audio.

The Dante interface shall be compliant with the RoHS directive.

The Dante™/AES67 interface unit shall be compliant with the EMI/EMC requirements of FCC and CE.

The Dante™/AES67 interface unit shall be the Attero Tech unDUSB.

## Device Specifications

<b>USB</b>		<b>Dante Network</b>	
Connector	Type B	Physical Level:	Standard Ethernet
Audio connectivity	USB Audio 1.1, Compatible with Windows 7, 8, and OSX V10.7 or newer	Connector:	Single RJ-45
<b>Audio Performance:</b>		Cable Quality:	CAT-5
Audio Channels	2 channels USB to Dante network 2 channels Dante network to USB	Transmission Speed:	100 Mbps
Sample Rates	44.1kHz or 48kHz audio via USB 48kHz over Dante™/AES67	<b>Power Requirements</b>	Class 0 802.3af PoE PD compliant
Bit Depth:	16-bit	<b>Power Consumption</b>	<4 W
THD:	<0.01%	<b>Dimensions</b>	6.45" W x 1.06" H x 3.45" D
		<b>Weight</b>	≈0.74 lbs
		<b>Compliance</b>	FCC Part 15 Class B CE (EN 55022 Class A)