unD32 BoB

32 Channel Dante Break Out Box

User Manual

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Revision 02

1315 Directors Row, Suite 107, Ft Wayne, IN 46808
Phone 260-496-9668 · Fax 260-496-9879
www.atterotech.com

614-00012

DECLARATION OF CONFORMITY

Attero Tech, LLC
1315 Directors Row
Fort Wayne, Indiana 46808

Equipment Description: **32 Channel Dante Audio Digital to Analog Converter**
Equipment Model Designation: **OutBox unD32**

Application of Council Directive: 73/23/EEC on the harmonization of the laws related to Member States relating to electrical equipment designed for use within certain voltage limits, as amended by: Council Directive 93/68/EEC and

Council Directive 89/336/EEC on the approximation of the laws related to Member States relating to electromagnetic compatibility, as amended by: Council Directive 93/68/EEC.

Referenced Safety Standards:	**Referenced EMC Standards:**
EN60950:	EN61000-6-3: 2001
	EN61000-6-1:2001
	EN55022 Class A
	EN61000-3-2
	EN61000-3-3
	EN61000-4-2
	EN61000-4-3
	EN61000-4-4
	EN61000-4-5
	EN61000-4-6
	EN61000-4-11

The equipment specified above conforms to the above Directive(s) and Standard(s)

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 his own expense.

Credits

Bonjour is a trademark of Apple Inc.

Dante is a trademark of Audinate Pty Ltd.

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1 – Overview

The unD32 is a 32 channel Dante break out box (BoB) and comes in a 19-inch 1RU rack mountable chassis that is approximately 7.5 inches deep. Its 32 analog output channels are fully balanced with grounding and shielding per AES48-2005 standards. Each output has the following features:

- Rear panel connectors using a 3 pin Phoenix style connector receptacle with a pin pitch of 3.81mm (150mils)
- Capable of a maximum output level of +20dBu before clipping
- Individually adjustable volume over a 60dB range using the unD32 internal volume controls
- Individual mute facility
- Can be assigned to any stream available on the Dante network the D32 is connected to

In additional to the volume and mute controls per channel, there is also a master volume and master mute. All the volume and mute controls can be accessed by using the unD32 unIFY control panel.

The unD32 includes front panel controls which consist of a 16x2 backlit character display and a 6 button keypad. These can be used to both assign named Dante audio flows to each of the 32 balanced outputs and control the output volume of each channel directly on the unit itself.

Figure 1 - unD32 Front

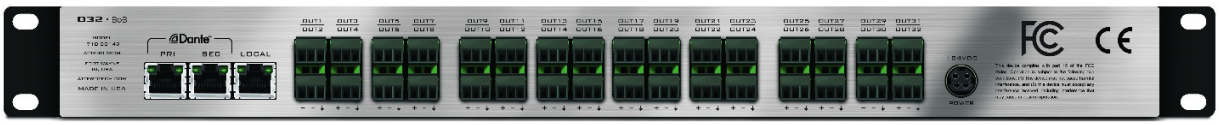


Figure 2 - unD32 Rear

The unD32 features both primary and secondary Gigabit Dante network connections as well as a third “local” Gigabit port. All three of these network interfaces are available via separate 8P8C modular connector receptacles (RJ-45) on the rear panel of the unit. The three ports allow the unD32 to be run in single network “Switch” mode or in dual network “Redundancy” mode.

The unit is powered using an external universal 24V DC power supply (100VAC - 240VAC, 50Hz - 60Hz). The specific part number used to order the unD32 determines what style of mains connector the supplied power cord comes with.

1.1 – What’s in the Box?

The unD32 comes supplied with the following:

- unD32 unit (710-00149-01)
- 24V DC Power Supply
- AC Power Cord (mains connector type determined by part number used to order the unD32)
- 32 Phoenix-style connector plugs (RIA 31369103)

1.2 – unD32 Unit Block Diagram

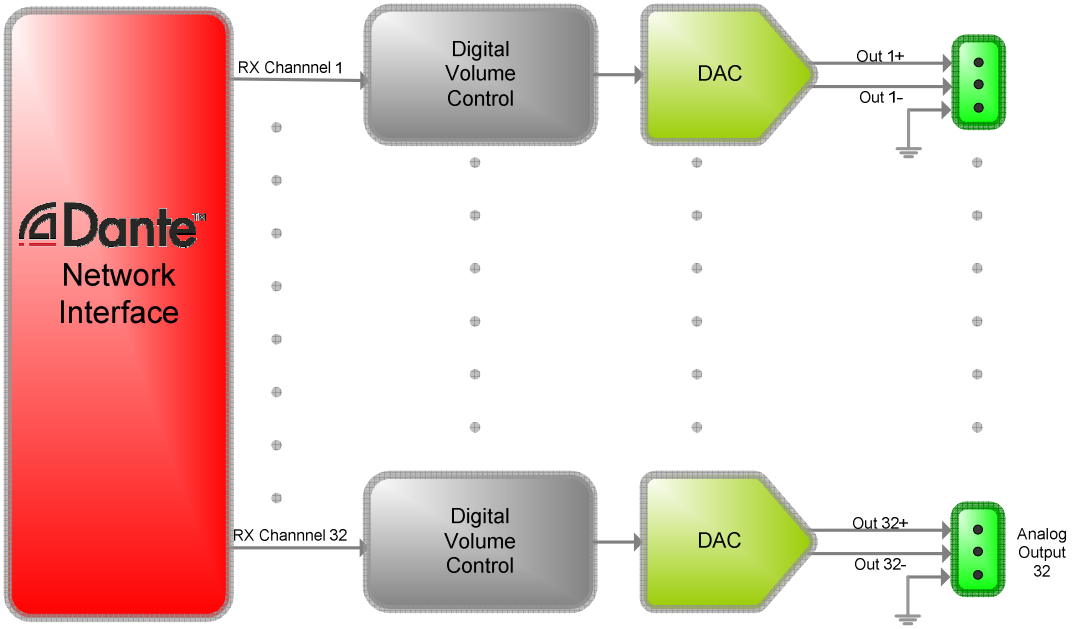


Figure 3 - unD32 Block Diagram

2 – Installation

The unD32 comes ready to be mounted into a standard 1RU rack. The rack mount tabs are built in to the front panel of the unit (rack screws are not supplied).

2.1 – Power Connection

Attach the provided power supply to power connector on the back of the unD32. The use the provided AC power cable to connect the power supply to standard AC outlet. There is no "on" switch so the unit will power up as soon as the power connection is made.

**Note: It is recommended to attach the power supply to the unD32 first, then connect the power cord to the power supply and finally, plug the cable into the AC outlet.*

2.2 – Network Connections

There are two configurations for network connectivity. Each is listed below. Select the configuration that best fits your application.

2.2.1 – Single Network Connection

This type of network connection is probably the most common and uses a single Ethernet cable connecting the unD32 to the Ethernet switch that is providing the Dante network to the area of the facility where the unD32 is installed. The Ethernet cable can be plugged into any of the three ports on the unD32.

**Note: This is the default configuration and the unD32 should require no configuration changes to work in this mode. However, if problems occur when using this type of network topology, make sure the unD32 is configured for switch mode (refer to Dante Controller User's Guide for information on how to do this).*

The unused ports of the unD32 may be used to connect other devices to the Dante network if required. However, as the unD32 acts as a switch, devices connected in this must count the unD32 as a switch hop.

2.2.2 – Redundant Network Connection

This type of network connection relies on the Dante network in the area of the facility where the unD32 is to be installed being provided by two completely separate networks. This type of network topology provides redundancy through duplication to each of the devices units connected to the network. To use the unD32 in such a system, connect the primary port to a switch on the primary network and then connect the secondary port to a switch on the secondary network. When using this type of network topology please make sure the unD32 is configured for redundant mode (refer to Dante Controller User's Guide for information on how to do this).

**Note: It is recommended before using redundancy mode that the Audinate documentation on redundancy be reviewed to ensure the full implication of its use on both the network design and the system design are understood. Problems will result when redundancy mode is enabled on the unD32 if the audio networks are not designed and setup correctly to work in this manner.*

In this mode, the local port can be used as a control port as it can access the device regardless of whether the unD32 is operating on its primary or secondary interface (only one of which will be active for audio transfers at any one time).

2.3 – Audio Connections

The unD32 unit comes shipped with 32 Phoenix style, screw down, connectors pre-installed into the 32 audio output connector ports.

2.3.1 – Balanced Destination

To connect a balanced input on a destination device to an unD32 output, connect the positive and negative connections of both the unD32 output and the destination devices input respectively. Use the shield of the cable to connect the two GND pins together. If the cable does not have a shield, use a free internal core instead.

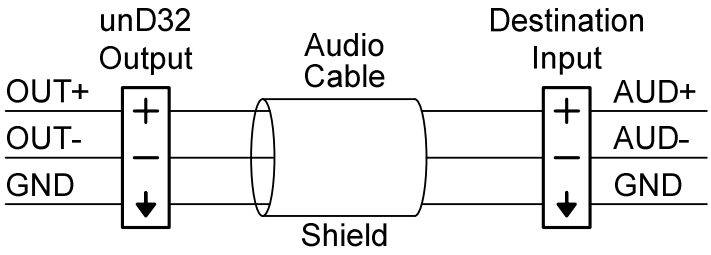


Figure 4 - unD32 Output to Balanced Destination

2.3.2 – Single Ended Destination

To connect a 2-wire unbalanced input to an unD32 output, connect the positive input of the destination device to the positive output of the unD32. Connect the GNDs together through the cable shield. If the cable does not have a shield, use a free core instead. Leave the unD32 negative output floating.

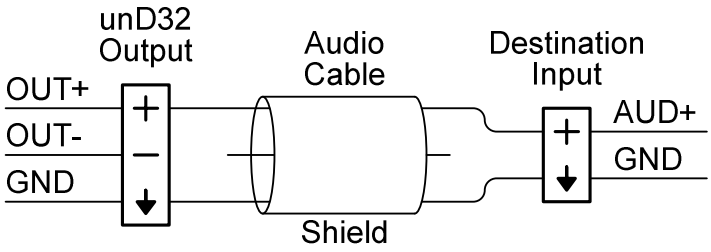


Figure 5 - unD32 Output to Single Ended Destination

3 – Front Panel Operation

The front panel allows the user to:

- View and select which of the available Dante audio channels is mapped to each of the unD32 audio outputs
- Adjust the signal level of each analog audio output from +20dB down to -60dB
- Mute an output.

3.1 – Front Panel

The front panel contains a 16-character by 2-line LCD screen and a six button keypad. A depiction of the front panel is shown in Figure 6.

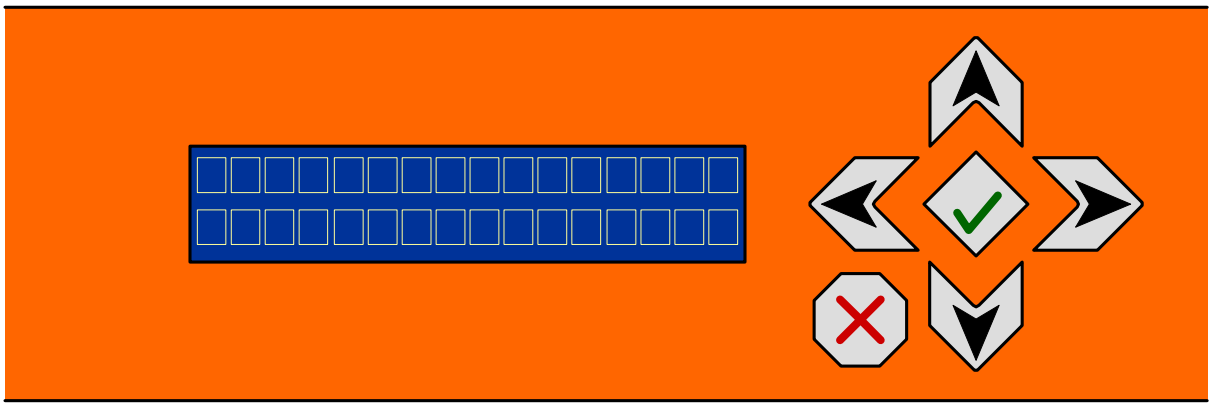


Figure 6 - unD32 Keypad & LCD

The six button keypad allows the user to traverse the various control screens. Four keys provide the ability to move the cursor Up, Down, Left, and Right. The key in the center with a check mark is the Enter key. The key marked with a red "X" at the bottom left is the Cancel Key.

3.2 – Cursor

The LCD will always display a cursor during operation of the unD32. The cursor is shown as a blinking block at the first character of a field. The cursor indicates the field that is currently selected. The cursor will initially be in the first character of the unD32 Output Channel field in the Channel Select screen.

3.3 – Transition between Screens

Each channel has two screens associated with it: the Channel Select screen and the Volume Select screen. These screens are described in subsequent sections of this user's manual.

A single press of either the Up or Down button will cause the screen to transition to the Volume Select screen for the current channel. Another press of the Up or Down button will cause the screen to transition to the Channel Select screen for the next higher or next lower Output Channel respectively.

**Note:* *The channel number wraps from 32 to 1 in the Up direction and 1 to 32 in the down direction.*

3.4 – Channel Select Screen

The Channel Select screen provides the user a method to select which available audio stream on a Dante network for each individual output. This is also the initial screen the unD32 will show after power up. Figure 7 below shows a representative of it.

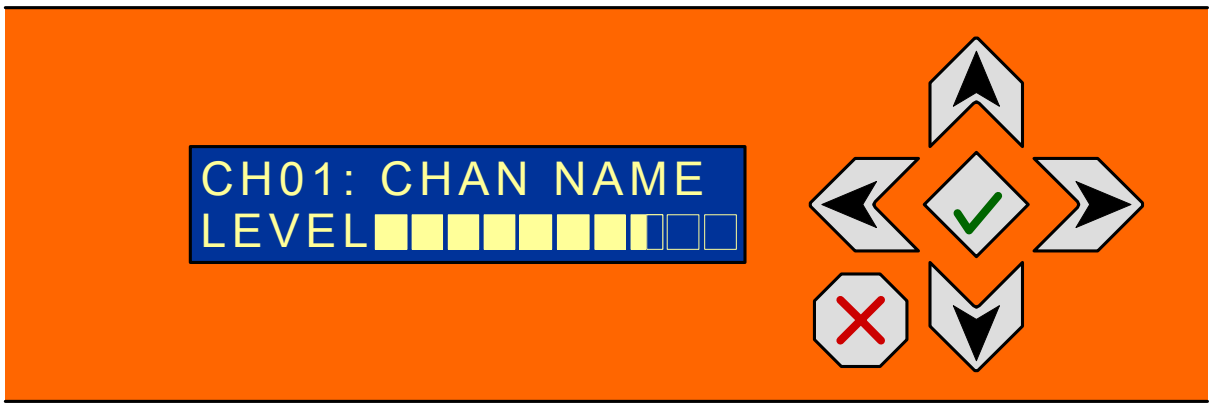


Figure 7 – Channel Select Screen

The top line shows the selected channel number (1 – 32) and name of the audio stream that the selected channel is currently receiving from the Dante audio network. The channel number is always shown as two digits so channels less than 10 will have a preceding '0'. Only the first 10 characters of the stream name will be visible. If no assignment has been made, "NONE" is shown in this field.

The bottom line shows the signal level of the selected audio channel. The level meter provides an approximate analog output level and is displayed as an extending horizontal bar. If no bar is shown, the output level is -40dB or below, while a bar that extends up to the right-hand edge of the screen represents +20dB full scale output and possibly clipping.

While in the Channel Select screen, pressing either the Left or the Right button will cause the cursor to move between the first position of the channel number and channel name fields. To select a Dante audio channel the cursor should be moved to the first position of the channel name field.

Once in the Channel Name field, the Up or Down buttons can be used to cycle through all the available audio channels in the Dante network that can be received by the unD32. Once the desired channel to receive has been found, the channel selection can be finalized by pressing the Enter button while the desired audio channel is displayed. No channel is selected until the Enter button is pressed. The "None" option may also be selected to select no audio for a channel.

To transition to another channel or to the Volume Select screen the cursor needs to be in the first character of the Output Channel field. Pressing either the Left or Right buttons will accomplish this.

3.5 – Volume Select Screen

The Volume Select screen provides the user a method to trim the output levels of the unD32 from the front panel and the figure below shows a representative of it.

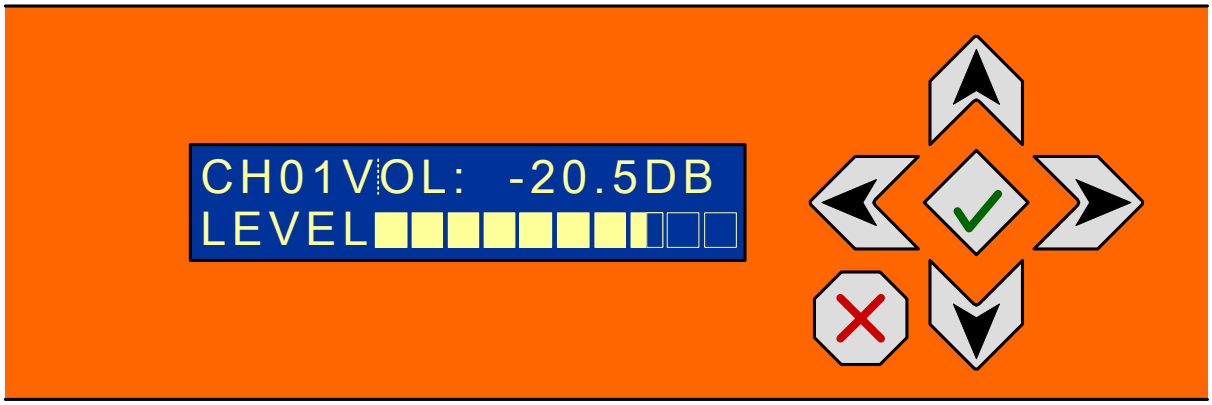


Figure 8 – Volume Select Screen

The top line on the Volume Select screen shows the channel number that is currently selected and the current volume level.

The bottom line shows the signal level of the selected audio channel. The level meter provides an approximate analog output level and is displayed as an extending horizontal bar. If no bar is shown, the output level is -40dB or below while a full bar up to the right edge of the screen represents +20dB full scale output or clipping.

While in the Volume Select menu, pressing the Right/Left button will cause the cursor to move between the first position of the Channel Volume and the Volume Select fields. To change the volume on an unD32 Output Channel, the cursor should be moved to the first position of the Volume Select field.

Once in the Volume Select field, the Up and Down buttons will raise or lower the volume setting respectively. The Up/Down buttons can be held down for greater than a half a second and the function will be auto-incremented to enable fast changes of the volume. The volume can be adjusted between +20dB and -60dB. One press of the down button when the volume setting is at -60dB will cause the channel to be muted and show "MUTE" on the display.

To transition back to the Channel Menu, the cursor needs to be moved to the first character of the Channel Volume field.

3.6 – LCD Sleep

After five minutes of inactivity, the LCD will go into "Sleep" mode where the backlight for the LCD and buttons is turned off. Sleep mode only affects the backlight and all other unD32 operations including audio transfers will continue as normal. Pushing any button will cause the LCD to "wake up" and the LCD and button backlights to illuminate again.

**Note: While changes to settings using the front panel are active immediately, they are only saved to non-volatile memory when the LCD goes to "sleep". If changes have been made to the unD32 settings using the front panel and the unit is then powered down before the LCD has gone to "sleep", any changes will be lost.*

4 – Configuration using a GUI

There are two parts of the device that can be configured using a GUI: audio routing and device specific parameters such as mater volume, master mute and channel volumes and mutes.

The audio routing can be carried out using Audinate's Dante Controller. This application is obtained from the Audinate website (www.Audiante.com). Instructions on how to use this software and about setting up routes on a Dante network can also be found on their website.

**Note: When using Dante controller, the unD32 will be shown using a default device name of unD32-###### where '######' is the last six characters of the devices MAC address.*

Configuration of the unD32 specific features is carried out using the Attero Tech unIFY unD32 Control Panel application. This application is available from the Attero Tech website (http://www.atterotech.com/). It should be used to examine and modify the device specific features such as channel volume and mute settings and master volume and master mute.

4.1 – Application Pre-requisites

The unD32 Control Panel application requires several pre-requisites. The hardware pre-requisites are shown below:

- PC running Windows Vista or later
- Must be fitted with a wired Ethernet adapter

There are also several software support applications that need to be installed on the PC. These are shown below:

- Dante Controller Version 3.4.0 or later (for audio routing)
  - Download the latest version from the Audinate website (http://www.audinate.com).
  - Run the installation following the instructions provided

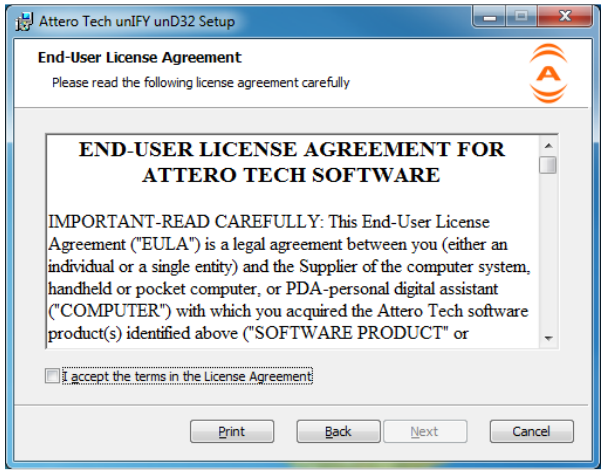
- Apples Bonjour service (for device discovery)
  - Download the latest version from the Apple website (http://support.apple.com/kb/dl999)
  - Run the installation following the instructions provided

4.2 – Installation of unD32 Control Panel

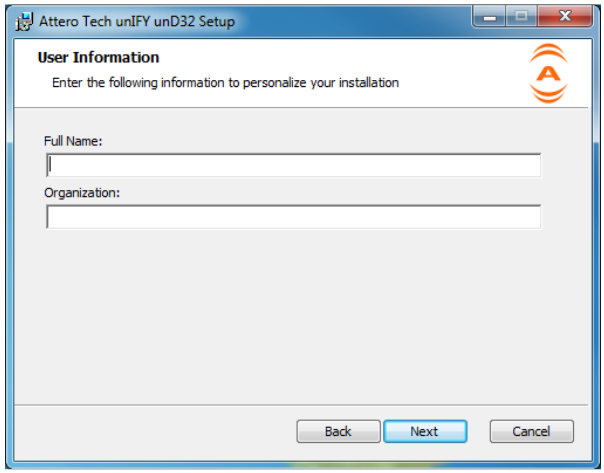
To install the Attero Tech unIFY unD32 Control Panel application, download the latest version from Attero Tech's website (www.atterotech.com).

Run the installer by double-clicking the "unIFY-D32.msi" file.

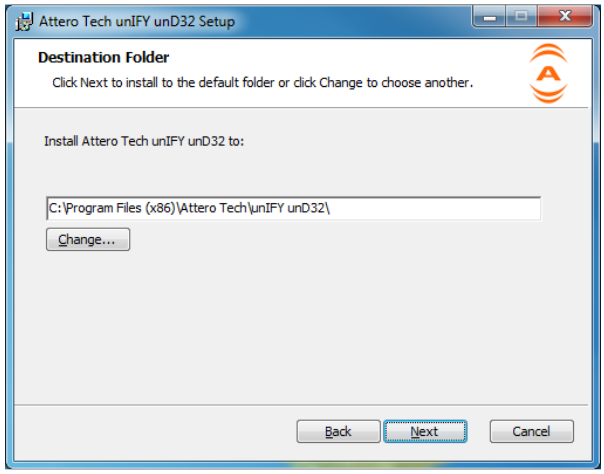
Click the "Next button to proceed



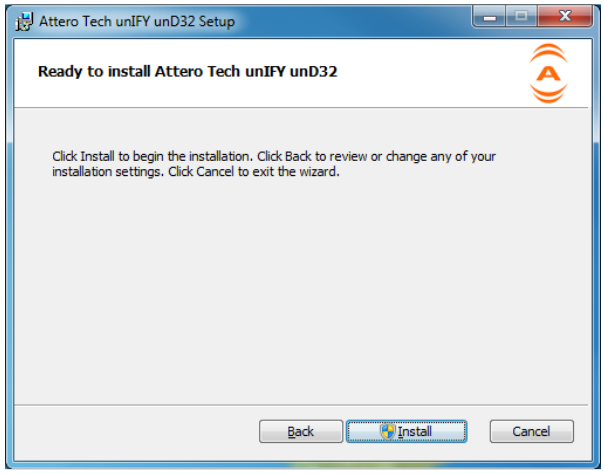
If you agree to the license agreement, click the "I Accept…" checkbox then click next



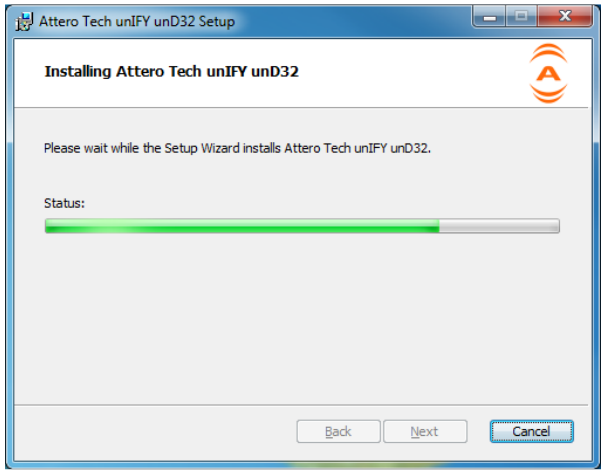
Enter the user name and Organization details. Then click the "Next" button.



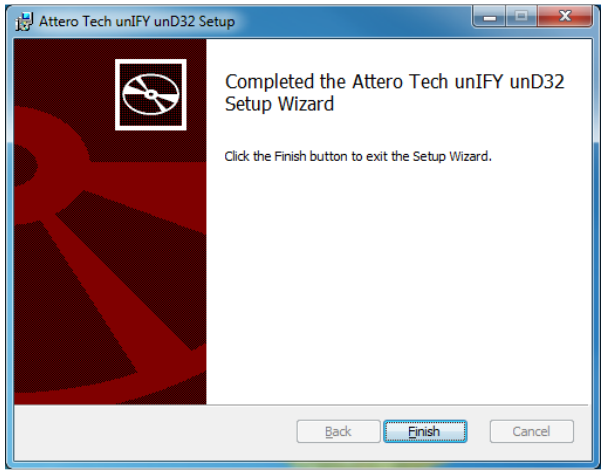
Next enter the installation folder. A default location is provided automatically. Click "Next" to continue.



At this point the installation is ready to go. Click the "Install" to begin installing the files to your PC.



The software will then being installing the files, showing a progress bar as it proceeds.



If the installation completes successfully, you will see the screen above. Click finish to conclude the installation.

4.3 – Running unD32 Control Panel

To run the GUI, click on the unIFY unD32 icon under Attero Tech in your programs list. When the GUI opens, the screen above will be presented. The application will start in the offline state, noted in the status bar at the bottom of the application window.

***Note:** There may be a brief pause when the application starts while it initializes during which time the application may appear unresponsive. This should only last a few seconds. Once initialized, the GUI will become responsive and show itself to be in "Offline" mode.*

4.4 – Connecting to a Device

All controls are enabled while in the offline state allowing the operator to create and work with preset configurations without being connected to an unD32 appliance. These settings can then be saved to a file using the "Save Preset" button and later loaded into a device once one is selected by using the "Load Preset" button.

The drop-down box on the main screen will be automatically populated with unD32 appliances that are discovered on your network. To connect to a device, simply select a device from this drop-down. Selecting "None" will put you back in the offline state.

***Note:** Any changes made while to the controls in the offline state, including loading a preset configuration, will be lost when a connection is established with an unD32 appliance as the GUI will update the displayed settings to reflect the current state of the unD32 that is being connected, overwriting any previous values.*

While connecting to an unD32 appliance, the status bar at the bottom will read "connecting" and all controls will be disabled until the connection is established and complete. This is indicated in the status bar with "connected" and the bar will change colors to orange. Once connected the controls will be re-enabled and metering data will be present for those channels which have a Dante route established. Each channel has two meters, the left is the signal strength received while the right is the signal strength affected by the volumes and mutes.

***Note:** Any changes made using the GUI while connected to an unD32 will result in those changes being persisted on the unD32 appliance. However, the unD32 appliance does not persist those changes immediately. Since there is no indicator when the persistence values have actually been written, it is recommended to leave the appliance powered for up to 5 minutes after the last change to ensure the persistence has taken affect.*

4.5 – Third party Control

The unD32 allows direct access to its master and channel volume and mute settings. This is achieved by the control system sending system formatted UDP messages to a specific port of the unD32. The port to send this information to and the port to which the response is sent is set using the Command Port and Response Port values. To alter the port used, simply change the values in the respective fields and click the "Configure" button to apply the values to the unit.

Further information on the protocol and the precise message format that the UDP messages use can be found in the unIFY Software API document.

4.6 – Troubleshooting

Device not showing up in unIFY D32 Control Panel

1) Apple's Bonjour not installed
2) PC not connected to Dante network
3) If the PC has a firewall, ensure that it's configured to allow the unD32 Control Panel as access to the network.

Audio not being heard

1) Audio not routed to correct output or not routed to the unD32at all
2) Master volume set too low
3) Master mute active
4) Channel volume set too low
5) Channel mute active

The metering data is transferred across the network using multi-cast packets. However there are situations which will cause the application to not receive these packets. If you are not getting metering data and should, try the following.

1) If you have a firewall, ensure that it's configured to allow the unD32 Control Panel as access to the network. If the unD32 Control Panel software still does not work correctly, try disabling the firewall temporary while you use the application.
2) If Windows 7, enable "Reliable Multicast Protocol".
   ***Note:** This is enabled on the interface (network card) for the Dante audio, if your system has multiple network interfaces.*
   See the following link for instructions: http://www.itechtalk.com/thread11886.html
3) Check that the device and the PC's network card both have an IP address and they are both in the same network range.

5 – Device Specifications

5.1 – Architects and Engineering Spec

The Dante Break Out Interface shall have 32 balanced analog output channels. Each channel shall be capable of being driven from a unique Dante audio flow, such that a maximum of 32 different audio signals can be output simultaneously. The unit shall have a 16x2 character LED display and 6 buttons on the front panel which allow all parameters of the unit to be adjusted and monitored. All parameter changes will be nonvolatile and self-restoring in the event of AC power interruption. The unit's display shall show Dante audio flow name, volume setting in dB, and relative output level for each channel. The unit shall accept worldwide voltages from 100 - 240VAC, 50Hz/60Hz and have active PFC (power factor correction). The unit shall be compliant with FCC Part 15, CE, and UL requirements. Analog output grounding and shielding shall be compliant with AES48-2005 guidelines. The unit shall be the Attero Tech unD32 BoB.

5.2 – Device Specifications

Output Type:	Balanced with automatic muting upon loss of Dante signal
Output Impedance:	200 ohms balanced, 100 ohms unbalanced (i.e. either "+" or "-" output with respect to ground)
Output Noise:	< -90dBu @ 0dB gain
Dynamic Range:	> 110dB
Maximum Output Level:	+20dBu
System THD:	< 0.05% at any gain, input signal 3dB below maximum
Output Channels:	32
Audio Network	Dante
Network Ports	3
Power Consumption:	20 W maximum at 100V-240VAC
Certifications:	FCC Part 15 Class A, CE, UL. Compliant with AES48-2005 Grounding/EMI Guidelines
Dimensions:	1.75" H x 19" W x 6" D
Weight	5 lbs

6 – LIMITED TWO YEAR WARRANTY

The equipment is warranted for two 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 two year 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.

APPENDIX A – Reference Documents

The following table lists the relevant reference documents.

Document Title	Revision
DANTE Controller User's Guide	V1.0
unIFY Software API manual	V1.0