unDIO2x2
2-in/2-out Dante Interface

User Manual

Date 9/23/2015

Revision 05

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 or 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.

Error! Not a valid filename.

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.

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1 – Overview

The unDIO2x2 is a 2-in/2-out audio interface utilizing Audinate's Dante protocol. It's ideal for adding 2 channels of Dante audio I/O in a small, unobtrusive form factor. The two inputs use 3-pin depluggable connectors for balanced or unbalanced I/O connectivity and support either mic or line level signals. Each input also features a 24V phantom power option. The two outputs also use 3-pin depluggable connectors and each provides a balanced line level output. Each output also has an optional +10dB analog boost.

Connection to the Dante network is provided by a single Ethernet RJ45 connector on the back of the unit.

The unDIO2x2 can be powered by a 12V DC wall wart (ordered separately) but it also supports the use of PoE instead. This allows the unDIO2x2 to be powered over the network cable from a suitable PoE source (IEEE802.3af). The PoE power option is particularly useful if the unDIO2x2 is mounted in a remote location where access to a mains outlet is limited or indeed, non existent.

The unit comes in a small form factor with integrated mounting bracket allowing it to be mounted discretely in small spaces (such as under desks) close to the sources or sinks thus reducing the amount of analog cabling that may be required.

Figure 1 - unDIO2x2 front and back

Audinate's Dante Controller or other 3rd party manufacturer's Dante routing software can be used to control the audio routing configuration of the device while the Attero Tech unIFY Control Panel application can be used to configure the device-specific features.

The unDIO2x2 also supports control by third party systems allowing external configuration of its settings such as phantom power and input gain in real time. Further information on 3rd party control can be found later in this document in section 4.

1.1 – What's in the Box

The unDIO2x2 comes supplied with the following
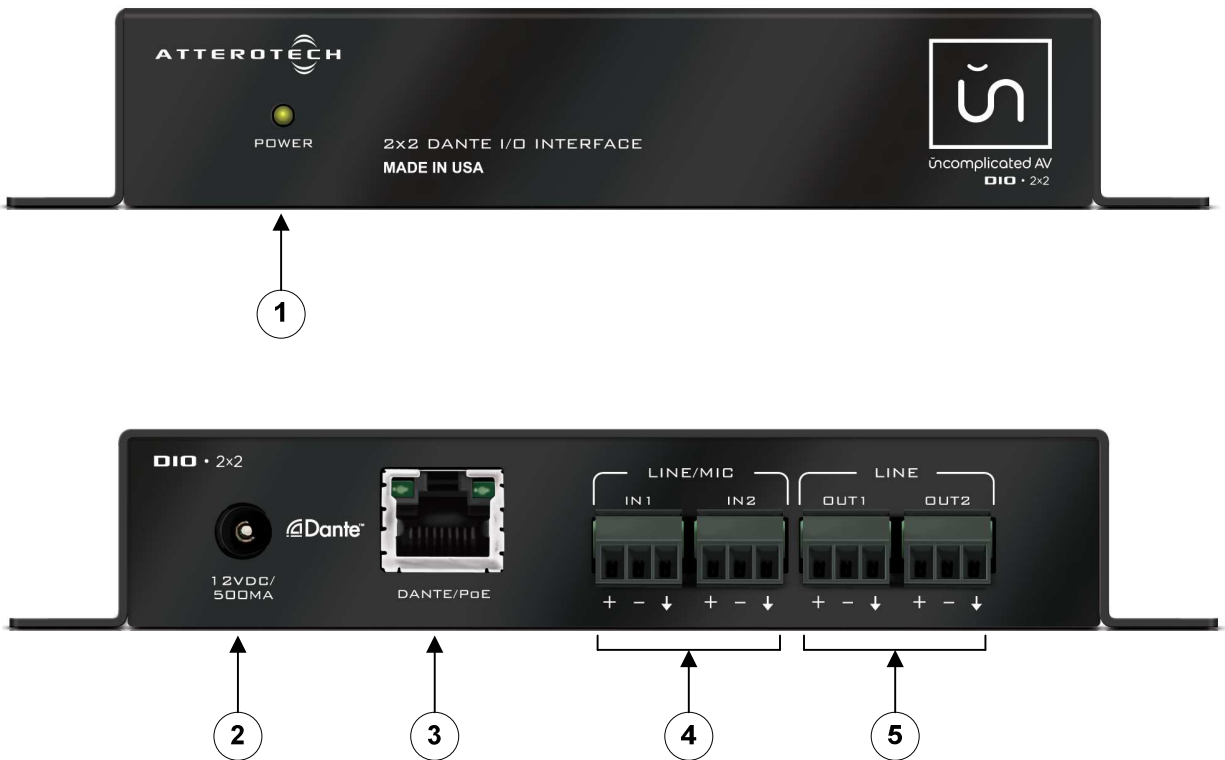 o   unDIO2x2 device

1.2 – Optional Extras

All of the following are available as options for the unDIO2x2 that may be ordered separately:
  o   A 12 V DC power supply is available if PoE power is not required or available

2 – Device Installation

1	Power LED
2	Power Socket – Use with optional 12 V DC wall wart only
3	Dante® Ethernet interface connector and indicators
4	2 x Balanced audio inputs
5	2 x Balanced Audio outputs

Note: The unDIO2x2 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 unDIO2x2 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 show in the Figure 2 below. Use a No. 6 screw of a type and size that is applicable to the surface to which the unDIO2x2 will be attached.
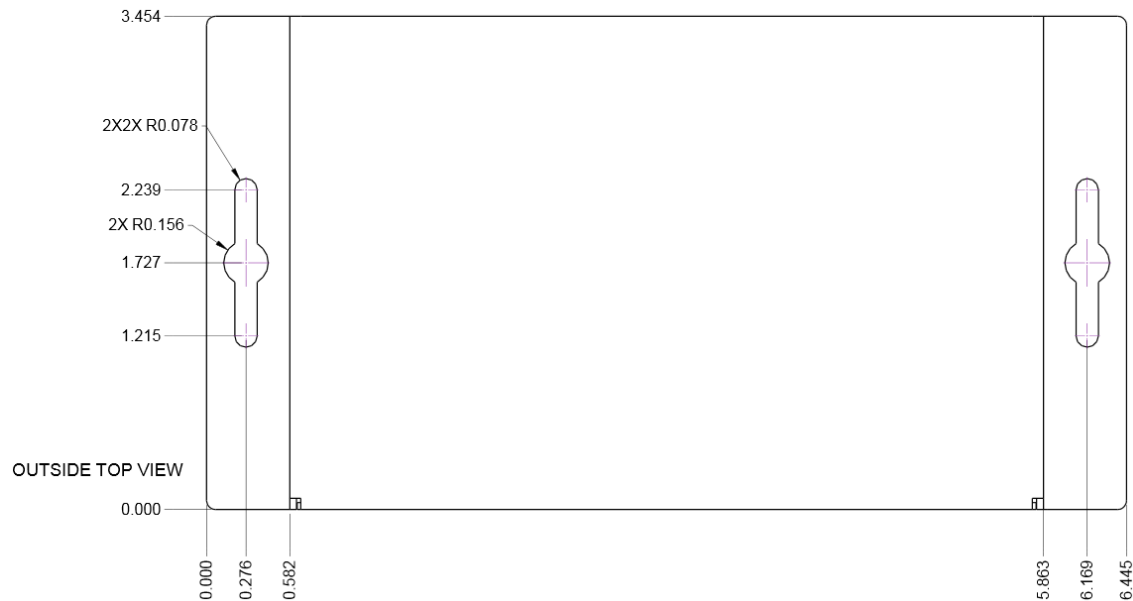

Figure 2 - Mounting Information

All connections to the unDIO2x2 should be made before the power is applied.
- o Attach any audio sources that will be used to the inputs. The inputs are balanced so be sure to check what output type the source to be connected uses in order to find how to connect it correctly (see Hardware Connections section).
- o Attach the outputs to the required audio devices. The outputs are balanced so be sure to check what input type the device to be connected requires in order to find how to connect it correctly (see Hardware Connections section 2.2 for further details).

When powering using PoE:
- o Attach the Dante I/F 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 network switch using a CAT-5 cable, and then connect the corresponding output port to the Dante I/F of the unDIO2x2.

When powering using an optional external supply:
- o Attach the Dante I/F port to a spare port on the Dante network switch using a CAT-5 cable.
- o Attach the power supply to the power input jack and then power up the external supply.

If all steps are performed correctly, the power light on the front should be lit.

There may also be some activity on the unDIO2x2 Dante I/F LED indicators. With no Dante network, both LEDs will remain off. If an active connection is made both LEDs will come on and if there is network activity, the yellow LED will then flash.

2.2 – Hardware Connections

The UnDIO2x2 accepts and drives either unbalanced or balanced audio devices. Refer to the following diagrams and instructions for connecting different types of audio devices. Professional grade audio cabling is recommended to achieve the best audio performance throughout the system.

2.2.1 – Input from an Unbalanced Source

To connect a 2-wire unbalanced source to the unDIO2x2, connect the positive output of the unbalanced source to the positive input of the unDIO2x2. Connect both the source and unDIO2x2 input grounds together, and short the negative input of the unDIO2x2 to ground at the input of the unDIO2x2.
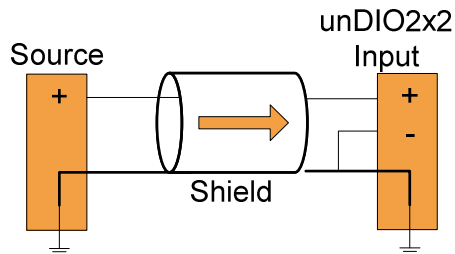
Figure 3 - 2-Wire Unbalanced Source Connection

To connect unbalanced sources with a 3-wire connection, short the negative conductor to the shield at the source connection.
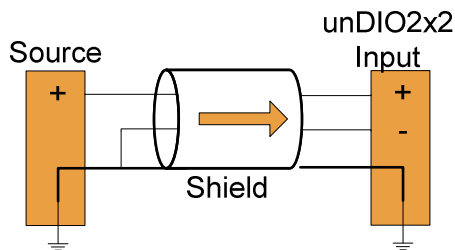
Figure 4 - 3-Wire Unbalanced Source Connection

2.2.2 – Input from a Balanced Source

To connect balanced sources to the unDIO2x2, connect positive output to positive input, negative output to negative input, and connect the grounds together through the cable shield.
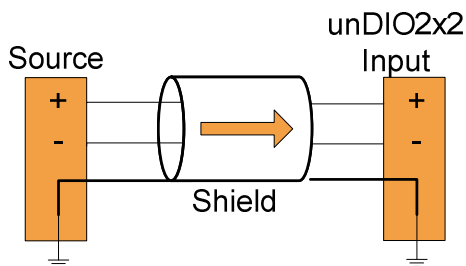
Figure 5 - Balanced Source Connection

2.2.3 – Output to a Balanced Destination

To connect to a balanced input on a destination device, connect the positive, negative, and ground connections of both the unDIO2x2 output to the destination input respectively.
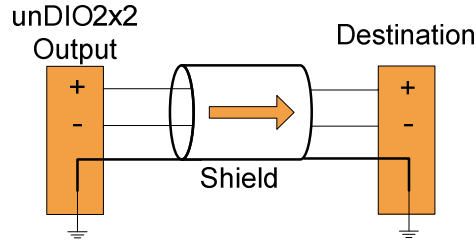

Figure 6 - Output to Balanced Destination Connection

2.2.4 – Output to an Unbalanced Destination

To connect the unDIO2x2 outputs to a 2-wire unbalanced input, connect the positive output to the destination's positive input and connect the grounds together through the cable shield. Leave the unDIO2x2 negative output floating.
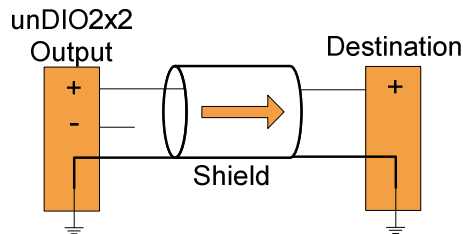

Figure 7 – Output to Unbalanced Destination

3 – Device Configuration

There are two parts of the device that require software to setup. First the audio routing, and second the configurable features of the device itself.

The audio routing should be carried out using any application that supports Dante audio routing. This could be from a 3rd party manufacturer or be Audinate's own Dante Controller. Dante Controller can be obtained from the Audinate website (www.Audinate.com). Instructions on how to use this software and about setting up routes on a Dante network can also be found on Audinate's website.

Note: When using Dante controller, the unDIO2x2 will be shown using a default device name of unDIO2x2###### *where '######' is the last six characters of the devices MAC address.*

Configuration of the unDIO2x2 specific features is carried out using the Attero Tech uniFY Control Panel application. This application is available from the Attero Tech website (www.atterotech.com). It should be used to examine and modify the device specific features such as mic/line gain settings, phantom power, and output boost options.

3.1 – IP Address Setup
** **IMPORTANT** **
Failure to correctly configure IP addresses will not allow an unDIO2x2 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 unDIO2x2 will not be possible.
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In order to configure an unDIO2x2 both to set up its internal parameters and also setup audio routing, the PC will need to be able to communicate with it over the network. While all Dante 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, unDIO2x2 is set to get a dynamic IP address. As with all Dante devices, if the unDIO2x2 device does not find a DHCP server to retrieve an IP address from, it will give itself an automatic private IP address (APIPA) instead. An APIPA 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. The PC may require a restart for the changes to take affect.

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

3.2 – Software Installation

After downloading the application, run the .exe and the first screen to appear will be the license agreement and options screen.

The software will install to a default location of c:\program Files (x86)\Attero Tech\unIFY Control Panel. Clicking the "Options" button allows the user to change the installation location if required though it's not necessary to change it.

To select a new installation location, either type in a new path in the edit box, or click on the "Browse" button to browse the folder tree for the desired installation location. Once complete, click the OK button to return to the previous screen.

To continue the install, read the license agreement and check the "I agree…" check box. Doing so enables the "Install" button. Click the now enabled "Install" button to start the installation of the files.

On Windows Vista or later if the PC has the UAC enabled, a warning pop up will now appear saying the installer is about to make changes to your PC. This needs to be accepted for the installation to complete successfully.

The installer will show a progress screen and will now being transferring files to your PC.

Once the files are transferred, the installer will show a completion message show whether the installation was successful or not.

If the installation was unsuccessful for any reason, the final screen will show an error message.

Once the required software is installed, click on the unIFY Control Panel icon in the programs list under Attero Tech. This will start the application.
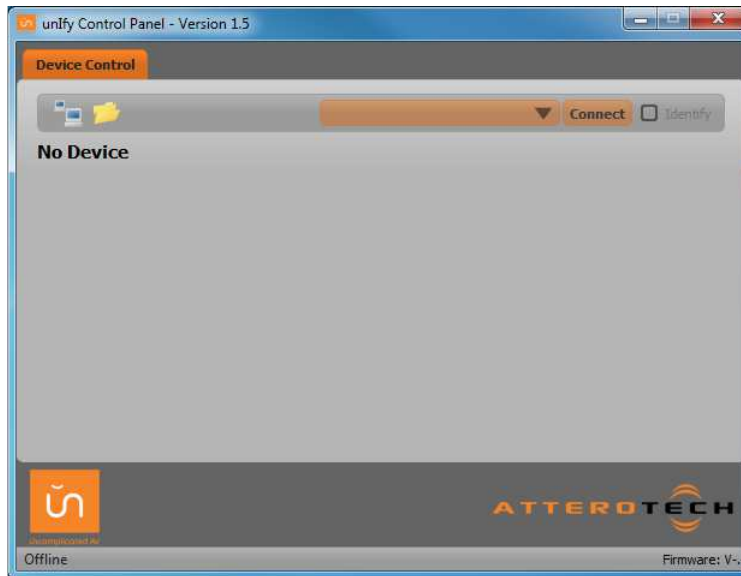

Figure 8 – Device Configuration Window

3.3 – Selecting a Network Adapter

In order to connect to a device the application needs to know what network adapter it should use to contact devices.

Clicking on the networked PC icon [icon] will show a list of all possible adapters.

Note: Only network adapters that are deemed as being compatible with Dante will be shown in the list.

3.4 – Connecting to a Device

A few seconds after selecting the adapter, the device list should start to populate with detected devices. The detected devices are listed by their device name. Select the device to be configured from the drop down list and then click the "Connect" button. The application will then attempt to establish a connection with the device. If successful, the status bar will show "Connected" and the controls will become active and their values will update to show the current state of the device.

Note: The label below each set of channel controls show that channels name as displayed in Dante Controller. The channel name cannot currently be set from within the unIFY application. To change the channel names, use Dante Controller.

This connected device is now treated as the active device and any changes to the controls will be set to this device and this device alone.

3.5 – Device Identification

The device identification feature allows the user to see which device is physically being configured. When the Identify feature is active, the power LED on the active device will flash. The Identify check box shows the state of the device identify feature. If the box is checked, the feature is active on the active unit. If the check box is clear, the identify feature is inactive. To change the state of the feature, simply click in the Identify check box to toggle its state from off to on or on to off. The identify function will continue to operate until the function is turned off via the user interface or the device is powered down.

Note: *The identify function of Dante Controller does not control the identify feature on the unDIO2x2. To identify a device use the unIFY Control Panel identify function instead.*
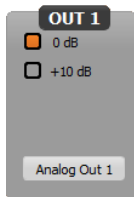
3.6 – Device Controls
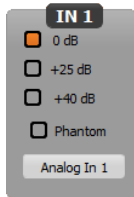
The unDIO2x2 inputs have two software configurable options. The mic/line gain control and the phantom power control.

The mic/line gain control gives the user three gain choices depending on the type of signal being provided to the input. For a line level signal, select the 0dB option. The remaining two options are for use if a microphone is to be connected directly to the input. If using a microphone as an input source, choose the gain value that best suits the microphones output signal.

The phantom power option is available for microphones that need it. The unDIO2x2 provides 24V phantom power. Check the box to turn phantom power on. Uncheck the box to turn it off.

The unDIO2x2 outputs also have a software configurable option. The analog boost control allows the user to add +10dB gain to the output signal in the analog domain.

Note: *Any changes to the controls are sent immediately to the device. However, they are not stored. The settings therefore have to be stored manually (see section 3.7).*

3.7 – Saving and Loading Settings

The unDIO2x2 device settings can be saved or loaded by clicking on the [icon] icon to bring up the preset form.

The unDIO2x2 supports 9 internal presets with one of those presets used as the power-up default. It also supports saving settings to, and loading settings from, a file.

3.7.1 – Internal Presets

Settings in a device can be saved to an internal preset which can then be recalled at a later date. There are 9 internal presets, one of which is the "Default" preset that is used to set device settings when the unDIO2x2 is first powered on.

Select a preset to use by using the drop down in the Device Preset section. Once a preset has been selected, the current settings of the device can be saved to the selected preset by clicking the "Save to Device" button. Alternately, the settings from the selected preset can be loaded and used as the current settings by clicking the "Recall from Device" button.

Note: *Loading a preset will overwrite all the current settings in the device with settings from the selected preset. The GUI will also update to show these new settings overwriting all of its settings also.*

3.7.2 – Preset Files

To allow settings to be transferred to others devices or for use as a backup, the current settings can also be saved to a file or loaded from a file. When the loading settings from a file, both the on-screen controls and the device settings will be modified to match the settings from the file. If the settings from the file need to be saved to a preset, then that will need to be done manually once the settings are loaded.

To save the current settings to a file, click the "Save to File" button and then enter an appropriate filename. To load settings from a file, click the "Load from File" button and select the appropriate file.

4 – 3rd Party Control

The unDIO2x2 supports 3rd party control allowing external system to manage the unDIO2x2's settings such as phantom power, mic/line gain options and control of presets.

There are two control interface types available for the unDIO2x2. The first type is a Dante proprietary interface which is typically used by devices already that have built-in support for Attero Tech devices. The second type supports a 3rd party UDP interface and is available to anyone to use with any device capable of sending and receiving UDP messages.

Information on the commands the unDIO2x2 supports as well as details of how to use the 3rd party UDP interface can be found in the unIFY 3rd party Software API document, available from the registered users section of the Attero Tech website (Go to www.atterotech.com and click on the log-in option).

4.1 – Command Interface Type

The type of command interface a specific unDIO2x2 supports is defined by the Dante firmware it has been loaded with. There are two methods to determine which Dante firmware and thus which command interface that is:

1) Run unIFY Control Panel V1.5.1 or later and connect to a device. The interface type is shown on the status bar at the bottom of the application window as the "Direct UDP" setting. A "No" means the device is using the Dante Proprietary interface. A "Yes" means the device is using the 3rd party UDP interface.

2) Using Dante Controller, look at the devices "Product Version" on the "Device Info" tab. Alternately, double-click on the device in question, select the "Status" tab and look for the "Product Version" parameter. In either case, if the product version is V1.x.x then the device is using the Dante Proprietary interface. If it's V2.0.0 or later, then the device is using the 3rd party UDP control interface.

A device's command interface can be changed simply by updating the device's Dante firmware. Moreover, this can be done in the field in almost all cases. The tools and necessary firmware files for updating a device's command interface can be obtained from the registered users section of the Attero Tech website (Go to www.atterotech.com and click on the log-in option). The firmware files have an extension .DNT (otherwise known as "donut" files) and there is one for each command interface type. The firmware file with the lower of the two version numbers supports the Dante proprietary interface while the one with the higher version number supports the 3rd Party UDP interface.

Note: While all devices support the Dante proprietary interface, some of the early unDIO2x2's may not support the 3rd party UDP command interface. This is due to incompatible host processor firmware that the device may be using. Use the unIFY Control panel to connect to the device in question and, upon successful connection, the "Firmware Version" will be reported on the right hand side of the status bar at the bottom of the application window. If the firmware version reports V1.2 or later, the device will support the 3rd Party UDP interface, and may updated in the field. If not, contact Attero Tech technical support for further assistance.

4.2 – Using the Command interface

In order to make use of the command interface, regardless of type, the unDIO2x2 simply needs to be configured with an IP address that is compatible with the device doing the controlling. The control devices should then be able to converse with the unDIO2x2 without any further configuration necessary.

5 – ARCHITECTS & ENGINEERS SPECIFICATION

The Dante Break Out interface shall have two balanced mic/line analog inputs and two balanced line analog outputs. Each analog input shall be capable of driving a Dante audio flow, and each analog output shall be capable of being driven from a Dante audio flow.

Each input shall have +24V phantom power, selectable via software on a per channel basis. Each input channel shall have three gain levels: 0dB, +25dB and +40dB, selectable via software on a per channel basis.

Each output channel shall have two gain levels: 0dB and +10dB, selectable via software on a per channel basis.

All parameter changes saved to the default preset will be non-volatile and self restoring in the event of an AC or PoE power interruption.

The unit shall accept either +12V DC or IEEE802.3af standard PoE as power input. The unit shall be compliant with FCC Part15, CE and RoHS requirements.

The unit shall be the Attero Tech unDIO2x2 I/O interface.

5.1 – Device Specifications

Audio Inputs:	
Input Type:	Balanced and RF filtered 3-pin depluggable
Gain:	0dB, +25dB, +40dB, software selectable
Input Impedance:	>1.8K ohms at any gain setting
Maximum Input Levels:	+12dBu @ 0dB gain
	-13 dBu @ +25dB gain
	-29 dBu @ +40dB gain
Phantom Power:	+24V, software selectable

Audio Outputs:	
Output Type:	Balanced line level with automatic muting on loss of Dante signal
Output Gain	0dB, +10dB, software selectable
Maximum output level:	+9 dBu (0dB output gain)

Audio Performance:	
Noise:	<-90dBu @ 0dB gain
System THD:	<0.01% at any gain, input signal 3dB below maximum

Dante Network:	
Physical Level:	Standard Ethernet
Connector:	Single RJ-45
Cable Quality:	CAT-5
Transmission Speed:	100Mbps

Power Requirements	+12V DC or IEEE802.3af PoE
Power Consumption	Less than 3W
Dimensions	1.06"H x 6,45"W x 3.45"D
Operating Temperature:	0 ºC – 40 ºC
Compliance	FCC CFR 47 Parts 15B ICES-003 CE (EN55022 RoHS

APPENDIX A - Reference Documents

The following table lists the relevant reference documents.

Document Title	Location
unIFY 3rd Party Software API	Registered users area on website
Dante Firmware Update Quick Start	Registered users area on website