

CommandHub

unIFY Proxy device for control and routing



User Manual

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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. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. 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.
15. 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.

LIMITED TWO YEAR WARRANTY

The equipment is warranted for two year 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.

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 unIFY CommandHub is a versatile tool for integrating 3rd party control systems with Dante audio networks. The CommandHub provides a simplified interface to control systems, allowing the programmer to interact with Attero Tech endpoint devices for parameter control using a name-based protocol and eliminating the need to communicate directly to endpoint devices using specific IP addresses. Additionally, the CommandHub provides control system access to Dante routing and device monitoring functions for any Dante compatible hardware available on the Dante network.

Dual network ports allow for easy separation of the control system network from the Dante audio network and a simple web server configuration page is available for the CommandHub's network and control system interface settings.

Features and benefits:

- 3rd party control proxy for Attero Tech endpoint products
- Provides access to Dante routing and monitoring functions for 3rd party control systems
- Allows complete separation of Dante network and control network
- Simplifies control system programming for management of Dante devices
- Web server based setup

1.1 – What's in the Box?

The CommandHub comes supplied with the following:

- CommandHub device
- Mains adapter
- Figure-8 power adapter
- Figure-8 style mains cable
- DC power cable
- Two blanking plates (1 PSU, 1 main unit)
- Ethernet cable

2 – Installation

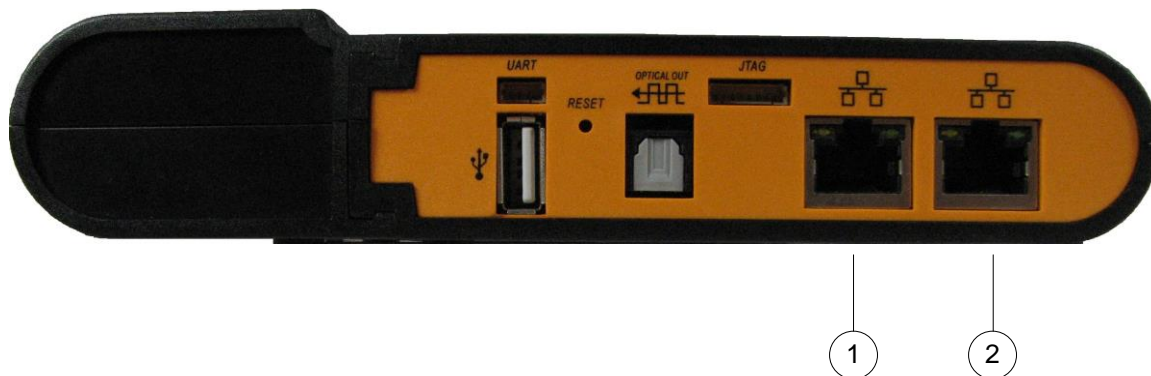


Figure 1 – CommandHub Connectors and Indicators

①	Dante network Ethernet port
②	Control network Ethernet port

***Note:** The CommandHub has many other ports than listed above but only the two Ethernet ports are required. The other ports and connections can safely be ignored.

The CommandHub can be mounted in several locations. The unit can sit on top of a table or shelf. There are also mounting holes on the underside allowing the CommandHub to be permanently mounted on virtually any surface and in any orientation. The unit can even be simply hung off a spare power outlet!

***Note:** All wiring connections to the CommandHub should be completed before applying power to it.

2.1 – Supplying Power

The CommandHub comes with a power module that can be detached. The CommandHub can either run with the power module attached or the power module can be separated and used as a separate power supply.

To power the CommandHub with the power module attached to the main module, fit the figure-8 power adapter to the power module and use the figure-8 mains cable from the mains outlet to the CommandHub.

Further power options are provided if the power module is separated from the main module, with a DC power cable (supplied) then used to connect the two modules together. The power module can then either be used as a wall wart by attaching the mains adapter to it and plugging it directly into a mains outlet, or as a brick-type supply by attaching the figure-8 power adapter and using the figure-8 power cable to connect to the mains outlet.

***Note:** The CommandHub also includes blanking plates to cover the unused connections if the power and main module are separated.

2.2 – Network Connections

In order to operate, the CommandHub requires that the control network and the Dante network are completely separate. The CommandHub acts as a bridge between them passing only control system packets meant for audio device control to the audio network and returning any subsequent responses.

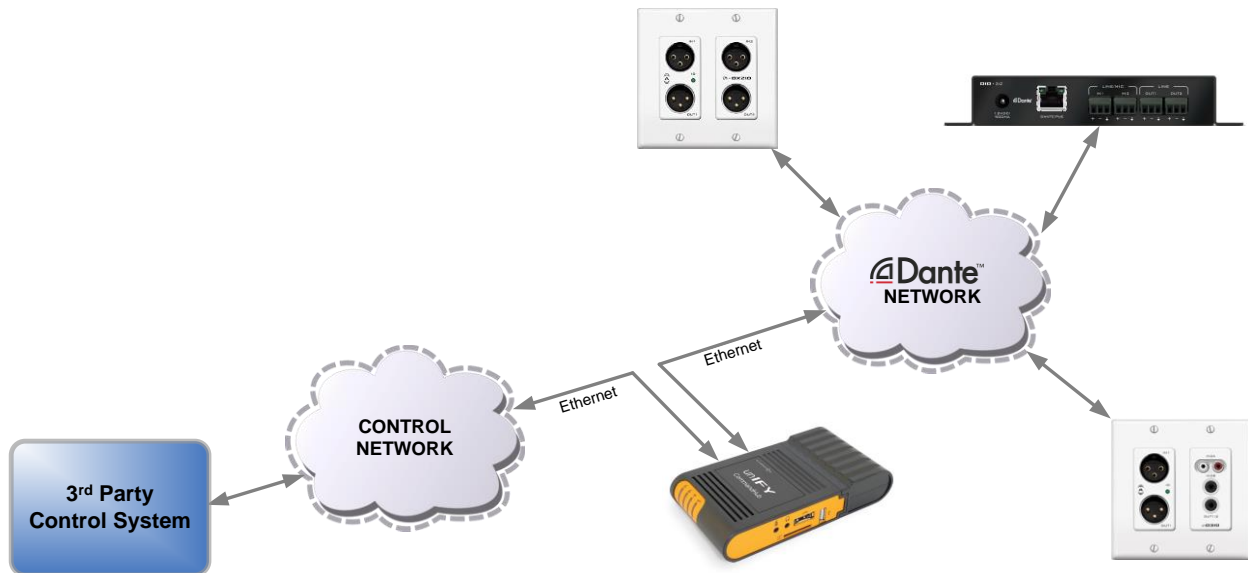


Figure 2 - CommandHub Application Diagram

***Note:** The CommandHub can't be used if the control system uses the same network as the Dante network as it does not support this mode of operation. The control network must be separate network with a different set of IP addresses to the Dante network.

There are several advantages to this approach the most obvious being regarding the use of wireless devices for control. Dante itself does not support the use of WiFi and wireless devices. With a separate control network, WiFi and wireless devices can be used which in turn allows devices tablets and smart phones can be used as control surfaces. This would not be possible with a single combined Dante and control network.

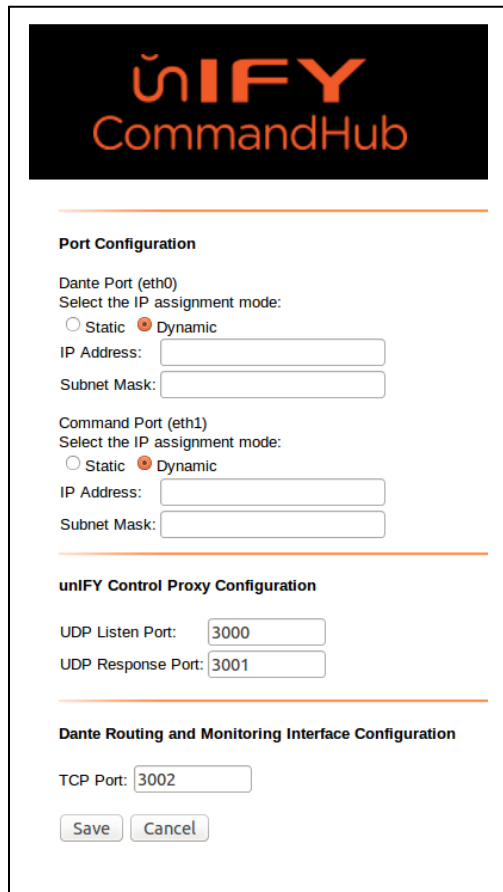
***Note:** The Dante network and Control network must be separate physical networks each using a different address range. However, this does not mean there needs to be separate infrastructure and the two networks can reside on the same switch providing the necessary VLAN's have been set up.

3 – Configuration

Configuration of the CommandHub is done by accessing its internal web interface using any device with a web browser. The web interface is available on any of three different IP addresses depending on which port the browser is accessing the web interface through:

- 1) The IP address of the Dante Ethernet port if using the Dante Network port.
- 2) The IP address of the Command Ethernet port if using the Command Network port.
- 3) A static IP of 192.168.0.1 through the command port.

***Note:** The command port has an alias IP of 192.168.0.1 that is fixed and cannot be changed. Care should therefore be taken to ensure there are no other devices on the control network that use this IP. This includes the IP address of management interfaces on other hardware.



3.1 – Port Configuration

The port configuration sets the network configuration for each of the two Ethernet interfaces. Either port can be set to use a dynamic IP address or a static one. If set to “Dynamic” but no DHCP server is found, the interface will default to using a local-link address.

***** **IMPORTANT** *****

It is recommended that the control port be set to a static IP address. Using a dynamic address could result in the IP address of the CommandHub changing which, unless the control system has some way to detect what the new IP address of the CommandHub is, will result in the control system being unable to communicate with the CommandHub or the devices on the Dante network.

3.2 – Control Proxy Configuration

The CommandHub can be used as a proxy to relay UDP commands for configuration and monitoring of Attero devices from the control network to devices on the Dante network.

The “Listen Port” is the port number used by the command interface to listen for UDP command messages meant for Attero Tech devices on the Dante network. This must have a different port number to the routing and monitoring TCP port.

The “Response Port” is the port that any response from the Attero Device will be sent back to on the device that sent the original command.

Information on what commands each device support can be found in the 3rd Party Software API document available from the Log-In section of the Attero Tech website.

3.3 – Routing Interface Configuration

The Routing Interface configuration is separate from the proxy interface configuration as the routing and monitoring commands are dealt with directly by the CommandHub itself and not passed through to other devices for processing. In addition, it also uses a TCP/IP socket connection rather than UDP.

The TCP port is the port number the control device should connect a socket to when using the routing interface. This port number must be different to the Control Proxy’s UDP listen port.

4 – Message Format Specification

The CommandHub can be used for two types of control. It can be used to send device-specific control commands to Attero Tech unIFY devices on the Dante network. It can also be used to send network routing and more general control and monitoring commands.

4.1 – Device Control

Control of unIFY devices is achieved by sending UDP messages to the UDP listen port (by default, port 3000) of the CommandHub on the control network side. These commands are converted and then passed on to the device via the CommandHub's Dante interface using a Dante proprietary protocol. Any responses from the device are delivered back to the CommandHub which in turn, sends them to the UDP Response port at the source IP address of the original command message.

****Note:** Any unIFY device being used with a Command Hub ****MUST**** be setup to use the Dante proprietary interface. For new devices to be used with a CommandHub, the order number should include a "-C" suffix. For existing devices, they must be product version V1.x or be identified using unIFY Control Panel of having Direct UDP set to "No".*

Each device uses the same message structure but has a unique command set based on the devices own features. The commands a particular device supports can be found in the unIFY 3rd party software API, available from the documents area of the registered users section of the website (use the "Log-in" button on the Attero Tech website).

As these commands are being processed by the CommandHub, the CommandHub will need to know which device the command is intended for. As a result, messages send to the CommandHub for device control must have the devices name and a space prefixed to the actual control command. For example, a message to the CommandHub for an unD3IO would look like this:

```
unD3IO-000000 IG 1 0.0<CR>
```

This command sets the input 1 to line level for device unD3IO-000000.

****NOTE:** The devices name is case sensitive and must match exactly the device name as shown in Dante Controller. Any inaccuracies in the case for characters contained within the name will give indeterminate results.*

4.2 – Routing and Monitoring

The following 3rd party Dante routing and monitoring commands are available for the CommandHub.

Description	Command
Get Dante Device List	GDDL
Get Dante Device's TX Channels	GDTX
Get Dante Device's RX Channels	GDRX
Get Assigned Dante Channels	GADC
Get Network State	GNST
Set Dante Route	SDRT
Get Version	GVER
Network State Changed	NSTC
Get Clock Status	GCLK
Configure Network State Status	CSTS

4.2.1 - Get Dante Device List

This command will retrieve a list of Dante devices detected on the Dante network by the CommandHub.

Start Character	Command (ASCII)	Stop Character
0x02	GDDL	0x03 0x07 0x04

Table 1 - GDDL Command Format

Start Character	Command (4 ASCII)	Number of Devices (4 ASCII characters pre-pended with '0')	Device Name 1 (ASCII) + <CR>	...	Device Name 'n' (ASCII) + <CR>	Stop Character
0x02	RDDL	0002	"unDX2IO-010203"	...	"unD32-020304"	0x03 0x07 0x04

Table 2 - GDDL Response Format

**Note: Spaces in the examples are for clarity only.*

Example command:

```
<START> GDDL <STOP>
```

Example response:

```
<START> RDDL 0002 unD32-010203 <CR> unDX2IO-0a0b0c <CR> <STOP>
```

4.2.2 - Get Dante Device TX Channel List

This command will retrieve a list of the transmit channel names of a specific Dante device.

Start Character	Command (ASCII)	Device Name (ASCII) + <CR>	Stop Character
0x02	GDTX	"Device Name"	0x03 0x07 0x04

Table 3 - GDTX Command Format

Start Character	Command (4 ASCII)	Device Name (ASCII) + <CR>	Number of Channels (4 ASCII characters pre-pended with '0')	Channel Name 1 (ASCII) + <CR>	...	Channel Name 'n' (ASCII) + <CR>	Stop Character
0x02	RDTX	"Device Name"	0004	"IN 1"	...	"IN 4"	0x03 0x07 0x04

Table 4 - GDTX Response Format

**Note: Spaces in the examples are for clarity only.*

Example command:

```
<START> GDTX unDX2IO-010203 <CR> <STOP>
```

Example response:

```
<START> RDTX unDX2IO-010203 <CR> 0002 Analog In 1 <CR> Analog In 2 <CR> <STOP>
```

Example error response: [device not present]

```
<START> RDTX unDX2IO-010203 <CR> 0001 [NA] Device Not Present <CR> <STOP>
```

4.2.3 – Get Dante Device RX Channel List

This command will retrieve a list of the transmit channel names of a specific Dante device.

Start Character	Command (ASCII)	Device Name (ASCII) + <CR>	Stop Character
0x02	GDRX	"Device Name"	0x03 0x07 0x04

Table 5 - GDRX Command Format

Start Character	Command (4 ASCII)	Device Name (ASCII) + <CR>	Number of Channels (4 ASCII characters pre-pended with '0')	Channel Name 1 (ASCII) + <CR>	...	Channel Name 'n' (ASCII) + <CR>	Stop Character
0x02	RDRX	"Device Name"	0004	"OUT 1"	...	"OUT 4"	0x03 0x07 0x04

Table 6 - GDRX Response Format

**Note: Spaces in the examples are for clarity only.*

Example command:

```
<START> GDRX unDX2IO-010203 <CR> <STOP>
```

Example response:

```
<START> RDRX unDX2IO-010203 <CR> 0002 Analog Out 1 <CR> Analog Out 2 <CR> <STOP>
```

Example error response: [device not present]

```
<START> RDRX unDX2IO-010203 <CR> 0001 [NA] Device Not Present <CR> <STOP>
```

4.2.4 - Get Assigned Dante Channel List

This command will retrieve a list of receive channel assignments for a given Dante device. The command requires supplying the devices name. The response, will indicate which specific Dante device if any, is providing audio to each a particular receive channel. If a receive channel on the desired device is receiving audio, the transmitting device's name and it's specific Dante output channel that's providing the audio will be indicated.

Start Character	Command (ASCII)	Device Name (ASCII) + <CR>	Stop Character
0x02	GADC	"Device Name"	0x03 0x07 0x04

Table 7 - GADC Command Format

Start Character	Command (4 ASCII)	Device Name (ASCII) + <CR>	Number of Devices (4 ASCII characters pre-pended with '0')	Assignment Name 1 (ASCII) + <CR>	...	Assignment Name 'n' (ASCII) + <CR>	Stop Character
0x02	RADC	"Device Name"	0002	"IN1@unDIO2X2-010203"	...	"IN2@unDIO2X2-010203"	0x03 0x07 0x04

Table 8 - GADC Response Format

**Note: Spaces in the examples are for clarity only.*

Example command:

```
<START> GADC unDX2IO-010203 <CR> <STOP>
```

Example response:

```
<START> RADC unDX2IO-010203 <CR> 0002 In1@unD3IO-010203 <CR> In2@unD3IO-010203 <CR> <STOP>
```

**Note: Channel assignments are reflected as assignments to a device's receive channel, similar to the "Connected To" status shown in Dante Controller.*

Example error response: [device not present]

```
<START> RADC unDX2IO-010203 <CR> 0001 [NA] Device Not Present <CR> <STOP>
```

4.2.5 - Set Dante Route

This command will allow the 3rd party controller to initiate a Dante route (channel assignment) using the information retrieved from the other command set. Note, all commands and parameter contents are case sensitive.

Start Character (Hex)	Command (ASCII)	Device Name (ASCII) + <CR>	RX Channel Name (ASCII) + <CR>	Assigned Channel (ASCII) + <CR>	Stop Characters
0x02	"SDRT"	"unDX2IO-010203" <CR>	"Analog Out 1" <CR>	"Analog In 1@unD3IO-020304" <CR>	0x03 0x07 0x04

Table 9 - SDRT Command Format

Start Character	Command (ASCII)	Status (4 ASCII) Represents value pre-pended with '0'	Stop Characters
0x02	RDRT	0000	0x03 0x07 0x04

Table 10 - SDRT Response Format

Status Byte Return Values:

- 0000 - Error in route set operation, check format and content of message
- 0001 - Set operation sent successfully to Dante API. This does not guarantee that the route was setup, merely the request was made successfully. To ensure the route has in fact been set up, the control application should test for a valid route using the GADC command after the SDRT command. This process is recommended due to the fact that Dante API provides no specifications on the time it takes for a route to be established.

**Note: Spaces in the examples are for clarity only. Spaces may occur in the message content as part of channel names but are never used as message delimiters.*

Example command:

```
<START> SDRT unDX2IO-010203<CR> Analog Out 1<CR> Analog In 1@unD3IO-020304<CR> <STOP>
```

Example response:

```
<START> RDRT 0000 <STOP>
```

4.2.6 - Get Version

This command will retrieve a current version of the CommandHub software.

Start Character	Command (ASCII)	Stop Characters
0x02	GVER	0x03 0x07 0x04

Table 11 - GVER Command Format

Start Character	Command (ASCII)	Version String (ASCII) + <CR>	Stop Characters
0x02	RVER	"v1.0"	0x03 0x07 0x04

Table 12 - GVER Response Format

**Note: Spaces in the examples are for clarity only.*

Example command:

```
<START> GVER <STOP>
```

Example response:

```
<START> RVER v1.0 <CR> <STOP>
```

4.2.7 – Configure Network State Status

Timer Mode:

This command is used to configure the asynchronous notification of the Dante network state. The command is used to enable/disable the asynchronous notifications, and the time interval in ms at which those notifications will be sent.

Immediate Mode:

Added additional functionality, the asynchronous notifications in addition to being controlled by a timer can now be configured to be sent similar to an interrupt. Each and every Dante notification that occurs will be sent immediately and only the one time when configured in this mode.

**Note: By default the asynchronous notifications are disabled upon initial configuration of the CommandHub and must be enabled via the CSTS command if desired. In addition, the asynchronous messages will be sent out continuously (if enabled) at the rate of the configured time interval until cleared by issuing the "GNST" command.*

Disabling the asynchronous notifications require that both parameters be sent.

Start Character (Hex)	Command (ASCII)	Enable Flag (ASCII) + <CR>	Time Interval (ms) (ASCII) + <CR>	Stop Characters
0x02	"CSTS"	"1" <CR>	"500" <CR>	0x03 0x07 0x04

Table 13 - CSTS Command Format

Parameter Values:

Enable Flag:

- "0" – Disable Notifications
- "1" – Enable Notifications

Time Interval:

- Time in milliseconds.

**Note: Enabling the asynchronous with a time interval set to 0 will configure the notifications in the immediate mode.*

Example: "configure asynchronous notification" - enabling at 250ms notify rate.

```
<START> CSTS 1 <CR> 250 <CR> <STOP>
```

Example: "configure immediate mode asynchronous notification" - enabling.

```
<START> CSTS 1 <CR> 0 <CR> <STOP>
```

Example response: (The return value is always 0000 and is used as an "ACK" to the CSTS command)

```
<START> RSTS 0000 <STOP>
```


4.2.8 – Network State Changed (Asynchronous)

This command is used to asynchronously notify a 3rd party controller that the Dante network state has changed. This command can be used as a trigger for the 3rd party controller to query the CommandHub to get an updated status of devices. For example, if a Dante device goes off-line, the Network State Changed command will be asynchronously sent out each active TCP connection, if a controller is listening for the message they can then query for the updated device list to see which device has gone offline.

**Note: The CSTS command is used to enable and disable the NSTC command.*

Start Character	Command (ASCII)	Status (8 ASCII) Represents value pre-pended with '0'	Stop Characters
0x02	NSTC	00000000	0x03 0x07 0x04

Table 14 - NSTC Command Format

Change Status Byte Return Values:

This value is an integer value of a bitmask where the following represents the bits in the mask:

- 000 - change detected but unknown change
- 001 - device list changed
- 002 - channel routing changed
- 004 - device clocking status changed

Example asynchronous notification: (example – detected a device & routing has changed)

```
<START> NSTC 00000003 <STOP>
```

4.2.9 - Get Network State

This command is used request the Dante network status.

Start Character	Command (ASCII)	Stop Characters
0x02	GNST	0x03 0x07 0x04

Table 15 - GNST Command Format

Start Character	Command (ASCII)	Status (8 ASCII) Represents value pre-pended with '0'	Stop Characters
0x02	RNST	00000000	0x03 0x07 0x04

Table 16 - GNST Response Format

Change Status Byte Return Values:

This value is an integer value of a bitmask where the following represents the bits in the mask:

- 000 - change detected but unknown change
- 001 - device list changed
- 002 - channel routing changed
- 004 - device clocking status changed

Example command:

```
<START> GNST <STOP>
```

Example response: (example - detected a device & clock status has changed)

```
<START> RNST 00000005 <STOP>
```

4.2.10 – Get Clock State

This command is used request the clock status for a device.

Start Character	Command (ASCII)	Device Name (ASCII) + <CR>	Stop Character
0x02	GCLK	"Device Name"	0x03 0x07 0x04

Table 17 - GCLK Command Format

Start Character	Command (ASCII)	# of Interfaces (1 ASCII) + <CR>	{Interface, State, Preferred} ASCII + <CR>	{Interface, State, Preferred} [n] ASCII + <CR>	Stop Characters
0x02	RCLK	2	"Interface, State, Preferred"	"Interface, State, Preferred"	0x03 0x07 0x04

Table 18 - GCLK Response Format

Example command:

```
<START> GCLK unD32-010203 <STOP>
```

Example response:

```
<START> RCLK 2 <CR> Primary,Master,No <CR> Secondary,Slave,No <CR> <STOP>
```

If the interface is not supported, the response would be NA. (example)

Response:

```
<START> RCLK 2 <CR> Primary,Master,No <CR> NA <CR> <STOP>
```

Example error response: [device not present]

```
<START> RCLK 1 [NA] Device Not Present <CR> <STOP>
```

APPENDIX A – Reference Documents

The following table lists the relevant reference documents.

Document Title	Location
3 rd party Software API	Registered Login on website