

PreSonus Worx Control

Control Software for CDL-series loudspeakers and WorxAudio PDA-series systems

Software Reference Manual



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1 Introduction



Thank you for purchasing a PreSonus CDL-series loudspeaker or Worx Audio® PDA-series system. These loudspeakers and amplifier systems offer a wealth of system-control and performance-monitoring features. The key to accessing these features is Worx Control, a speaker-management system and remote-control/monitoring software for macOS® and Windows®.

To use Worx Control, you simply create a local area network (LAN) using standard IT routers and switches connect each loudspeaker or amplifier to the network using the onboard locking Ethernet connection. Then connect your Mac or PC network (wired or wirelessly) and launch Worx Control to customize timing, dynamics, and EQ.

We encourage you to contact us with questions or comments regarding this product. PreSonus Audio Electronics, Inc., is committed to constant product improvement, and we value your suggestions highly. We believe the best way to achieve our goal of constant product improvement is by listening to the real experts: our valued customers. We appreciate the support you have shown us through the purchase of this product.

1.1 Summary of Worx Control Features

Worx Control provides remote control over:

- Factory and User presets
- High pass filter with selectable filter types
- Low pass filter with selectable filter types
- Variable Compressor
- Variable Limiter
- 8-band parametric EQ with selectable filters per-band
- Alignment delay
- Performance monitoring
- Group and Individual Speaker Management

2 Networking Your Loudspeaker

PreSonus CDL-series loudspeakers and WorxAudio PDA-series amplifiers can connect directly to a wireless router using an Ethernet cable. If you require more network connections, a standard Gigabit switch can be employed. Even if you are only connecting your loudspeaker to a network for control, it is recommended that you follow the best practices for Dante Networking to prevent networking issues.

If your loudspeaker is connected to a Dante network, there are some best practices to follow. While Dante is compatible with standard network hardware, there are a few basic requirements to keep in mind when choosing your network switch. The following recommendations are based on the needs of a high-channel-count system (more than 32 channels).

- Non-blocking layer-2 gigabit switch with a packet-forwarding rate of 1.488 Mpps per port. For example, if you purchase an 8-port switch, the packet-forwarding rate would have to be 11.904 Mpps (1.488 Mpps x 8).
- Energy Efficient Ethernet (EEE), also known as Green Ethernet or IEEE 802.3az, reduces power consumption when there isn't much traffic on the network. Unfortunately, this can lead to audio interruptions and can degrade clocking. If your switch provides this feature, make sure that you can and do disable it.
- Managed switches are required if you plan to use Worx Control on your computer connected wirelessly to remote control your loudspeaker. Managed switches can also help you create a more stable Dante network if you have a complicated setup.
- Most managed switches support Quality of Service (QoS). This allows you to choose Dante clock synchronization as the highest priority and audio data as the next-highest priority. This is especially important if you are transferring large amounts of data over your Dante network or if you are transferring non-Dante data over the same network.
- If you are using multiple switches on your Dante network, we recommend using the same make and model to simplify setup and guarantee compatibility.

2.1 Adding a Wireless Router to a Dante Network

Dante audio and routing cannot travel over a wireless network. You can still wirelessly remote control CDL-series loudspeakers and PDA-series amplifiers over a Dante network using Worx Control but you'll have to do a little more setup.

To connect a wireless router to your Dante network, you will need to purchase a managed switch and dive into its configuration settings. Select the port to which you've connected your wireless router and set Multicast Filtering to "On." This will stop the flow of Dante traffic to that port and allow it to be used for wireless remote control of your loudspeakers. Do not connect Dante devices to the ports on a wireless router. Please consult the documentation that came with your managed switch for instruction about enabling Multicast Filtering on a specific port.

Because your loudspeakers are hardwired to the switch, no additional setup is required to remote control them with Worx Control. Simply connect your device to the wireless router network and launch Worx Control.

2.2 Choosing the Right Cables

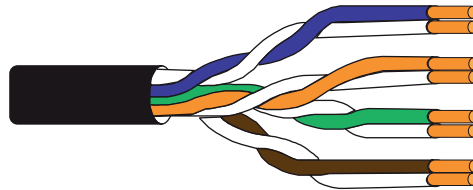
Whether used for control or for Dante audio, LAN networks rely on a set of standards for cabling infrastructure to ensure that network performance is both reliable and consistent. These standards include specifications for the cable construction itself, as well as specifications for the termination of cabling and physical connections to devices. Deviations from these specifications can result in reduced performance and even data loss, so it's important to use the right cable for the job, and to use good quality cable that meets the necessary specifications.

Cabling that is out of spec can result in dropped packets and intermittent connections. For simple data networks, such as those used to stream video or transfer files, it could just mean increased buffer times or transfer times. For live, real-time audio, it can mean audible dropouts in audio or loss of audio altogether.

2.2.1 Cat5e and Cat6

While Dante itself doesn't require Gigabit Ethernet, PreSonus recommends this speed because of the stream- and channel-counts involved. While this isn't a function of the cables themselves (Gigabit Ethernet is handled by the devices and managed switches), it is still an important consideration to keep in mind when building your Dante network because you must select Ethernet cable that is capable of supporting Gigabit speeds.

Copper-wire Ethernet networks generally use twisted-pair cable. Twisted pair cabling is a type of wiring in which two conductors of a single circuit are twisted together for the purposes of canceling out electromagnetic interference (EMI) from external sources, and reducing crosstalk between neighboring pairs.



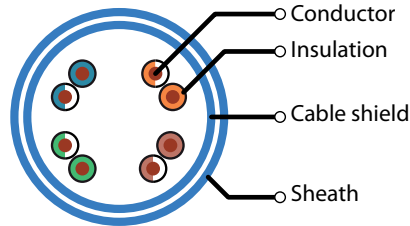
Dante networks require that the use of either CAT5e or CAT6 cables, both of which support Gigabit speeds at lengths up to 100 meters, as specified by the TIA/EIA-568 standard. CAT6 is actually designed to support speeds up to 10 Gb/s (10GBASE-T or 10 Gigabit Ethernet), but it is backwards compatible with CAT5e. The primary differences between CAT5e and CAT6 cable are the wire gauge of the conductors and the number of twists per inch in each wire pair. CAT6 cable uses heavier gauge wire and more twists per inch, providing lower crosstalk, higher signal-to-noise ratio, and an overall better performance rating than the CAT5e equivalent.

Which type of cable you choose for your application depends on a number of factors. Network design, installation type (fixed or mobile), budget, and considerations for future applications should all be taken into consideration when selecting the type of cable you will use. CAT5e cable is usually slightly more cost effective, may be easier to work with, and still fully supports Gigabit speeds, but Cat6 is generally a better choice and is well worth the additional investment, especially when taking future use into consideration, given its capacity for faster speeds.

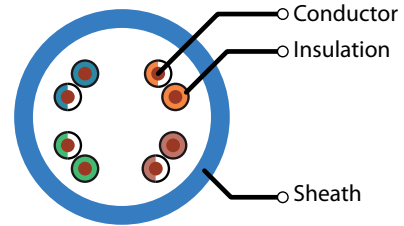
Power User Tip: Always source your cable from a reputable vendor to ensure you are purchasing a high-quality product that meets the industry and engineering specifications it claims by its Category label (CAT5e or CAT6). Never purchase cables labeled CCA (Copper Clad Aluminum), as it does not meet the TIA/EIA specifications for Cat5e and Cat6 cabling.

2.2.2 Shielded vs. Unshielded

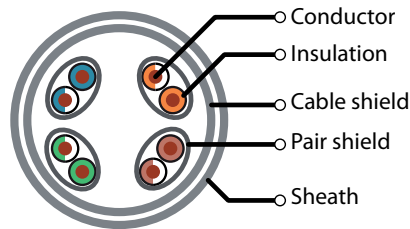
Foiled Unshielded Twisted Pair (UTP)



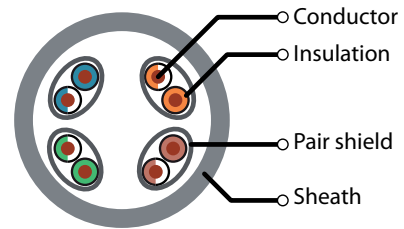
Unshielded Twisted Pair (UTP)



Shielded and Foiled Twisted Pair (STP)



Shielded Twisted Pair (STP)



Whether you use CAT5e or CAT6 cable, you will have the option to use Shielded or Unshielded cable. Both cable types can be used for Dante and control networking and have advantages, depending on the type of installation you are designing.

Shielded twisted-pair (STP) cables provide a barrier to help interference, especially electromagnetic interference (EMI). STP cable is constructed with additional electrical shielding along the length of the cable as well as specially constructed plugs that electrically connect and properly ground the cable shielding to the device connected at each end. Originally developed for industrial applications, shielded cable is ideal for fixed installations where Ethernet cable must be run near power, fluorescent lighting, etc.

Like a balanced analog cable, STP cables have to be grounded, so you'll need to use STP-compatible RJ45 connectors. Most XLR-style locking Ethernet connections you will find used on Pro Audio equipment, like the CDL-series loudspeakers and PDA-series amplifiers, are designed to be able to support both shielded and unshielded cable connections.

There are some specific use cases which might call for shielded Ethernet cable to prevent electromagnetic interference (EMI) or radio-frequency interference (RFI) from affecting the performance of the cable. It should be noted that if shielded cable is used but not implemented properly, it can actually introduce problems and actually make things worse than using unshielded cable would have been to begin with. As with everything in audio, if you are not experienced in installation or design, it's well worth the investment to consult a professional who is.

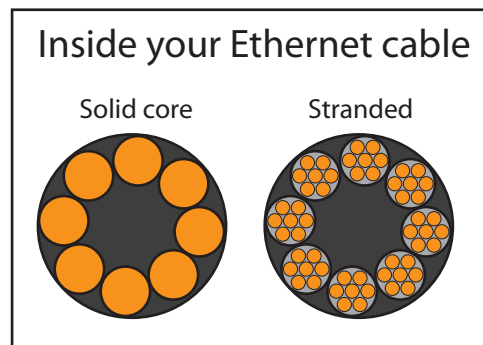
There are several different acronyms commonly used to describe shielded cables where the twisted pairs are not themselves individually shielded. These cable types rely on an overall shield or screen to filter out external noise. And while you may find them used synonymously, there are important differences to note:

- **SF/UTP.** This cable features a braided screen (S) and a foil shield (F) that surrounds unshielded twisted pairs (UTP). Cables with an overall braided screen are great for applications that need extra protection from EMI.
- **S/UTP.** This cable features a braided screen (S) surrounding unshielded twisted pairs (UTP).
- **F/UTP (FTP).** This cable uses an overall foil shield (F) to protect the unshielded twisted pairs (UTP) and is essentially very similar to a simple UTP cable, offering very little protection.

- **S/FTP.** This cable features an overall braided screen (S) encasing foilscreened twisted pairs (FTP). In this design, each twisted pair is protected by its own foil screen to limit the amount of crosstalk between them.
- **F/FTP.** In this design, an overall foil screen (F) protects individually wrapped foil-screen twisted pairs (FTP).
- **U/FTP.** This design removes the overall screen and relies only on the individual foil-wrapped twisted pairs (FTP) to limit interference.

Unshielded twisted pair (UTP) and its cousins, U/FTP and F/UTP are lighter weight and more flexible. These cable types have the benefit of being easier to terminate and much more flexible than their shielded counterparts. What type of cable you select depends largely on your application and the amount of environmental interference you anticipate encountering.

2.2.3 Solid-core vs. Stranded



Another thing to keep in mind when selecting Ethernet cable is whether it is solid- or stranded-core. In a solid-core cable, each of the conductors is a single copper wire, which is a better fit for installations and long cable runs (more than 70m). Stranded-core cables use multiple, thinner copper wires for each conductor, making them more flexible and easier to handle. This makes stranded-core cable a better fit for touring and shorter cable runs.

Most Ethernet cable is solid-core, constructed using solid insulated bare copper conductors for each of the eight wires in the four twisted pairs of the cable. These cables are meant to be used in permanent and semipermanent installations, and are designed for longer distance horizontal and backbone cable runs. All CAT5e and CAT6 solid UTP cables are designated with a minimum bend radius for performance standards. The bend radius is the minimum radius a cable can be bent without kinking it, which can lead to damage and shorten its life. The minimum bend radius for Category 5, 5e, and 6 cable is four times the cable diameter, or about one inch. Proper cable installation is essential in order to maximize the performance of the cable.

In the case of a mobile live sound operation, with frequent setup and teardown, solid-core Ethernet cable probably isn't the best choice, as it's generally stiffer and not conducive to easy layout and flat deployment runs. Solid-core cables should not be over-flexed, bent, or twisted beyond the cable's recommended specifications, as you risk damaging the cable, causing it to underperform or even fail.

Stranded Ethernet cables have multiple strands (typically 7 strands per conductor) of insulated bare copper conductors. These cables are typically used for patch cords/ cables connecting devices to the network, but because these cables are more flexible than solid conductors, they are an excellent choice for portable uses and applications where repeated flexing is common, such as frequent setup and teardown of a live sound PA system.

A Quick Note About Tactical Ethernet Cable

When you need Ethernet cable that is intended specifically for harsh environments with repeated deployment, a special type of cable should be considered. Tactical cable generally uses stranded-wire construction for flexibility and durability, as well as employing a heavy, often rubberized outer jacket in addition to the lightweight PVC jacket (sometimes referred to as “up-jacketed”). Tactical Ethernet cable has very similar feel and handling characteristics to balanced audio cable, and is much more rugged than common solid-core cable used for in-wall building installation, making it ideal for Pro Audio and Live Sound applications.

2.2.4 Plug Termination

Making your own Ethernet cables can be a great way to save money, and allows you to create cables to fit your needs and specifications exactly. If you choose to make your own Ethernet cables, it’s important to be aware of some possible pitfalls and follow some important general guidelines.

As mentioned previously, Ethernet cables can be of the solid-core or stranded variety, and just as it’s important to choose the right type of cable for the job, you should also take care to choose the right type of plug for the cable. Most RJ-45 connectors are designed to be used with either solid-core or stranded cable, however, you should always confirm the connector’s compatibility to the type of cable you are deploying. Using a plug designed for one type of cable with the wrong cable type can produce unreliable results.

The same is true for CAT5e and CAT6 cable connectors. Most RJ-45 connections are only meant to be used specifically with one or the other. Additionally, some connectors are designed for specific wire gauges and cable diameters, so, again, you should always confirm your connector’s compatibility with the specific cable you are using.

***Power User Tip:** Just like sourcing cable, it’s important to source quality connector from a reputable vendor. The connector itself is one of the most crucial pieces in the equation. Even the highest quality cable is only as good as the connections terminating each end.*

2.2.5 T568A or T568B

There are two wiring pinouts defined by TIA/EIA standards: T568A and T568B. Currently, T568B is used almost universally in the U.S. - a legacy of analog telephone compatibility - while T568A is more common worldwide. Either is perfectly acceptable as long as you are consistent. If you’re doing a new wiring install, it’s best to just choose one or the other and stick with it throughout your network. If you’re making new cabling and not sure about an existing wiring install, don’t worry, it’s even okay to intermingle the two standards for the most part. The most important consideration and the only rule you absolutely must follow is that for a given cable or run, you must use the same wiring standard on both ends.

2.2.6 Twisted Pair Tips

When building your own twisted-pair Ethernet cable, it is crucial that the twists are maintained as close as possible to the contact termination within the plug as possible. You’ll also want to make sure that the wire pairs running to adjacent pins are parallel inside the plug body all the way to the pin. You don’t want different pairs wrapped around each other or have wires bunched up inside the plug and pressed against each other.

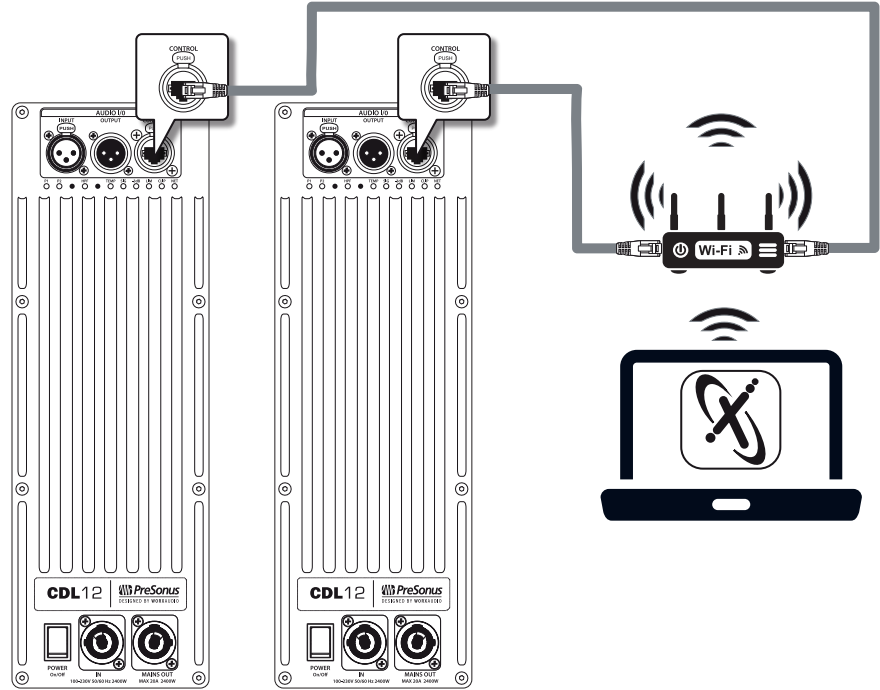
Trimming the wire pairs to the proper length is also crucial, as you want to make sure that the back-crimp of the plug is clamping down on the cable jacket, not the wires themselves.

You might be surprised at how easy it is to create a poor termination and how narrow the window is between a working cable and a failing cable. The crosstalk performance and EMI rejection capabilities of Ethernet cable, which ensure it will function up to its rated specification, are entirely dependent on maintaining these relationships of the wires within the cable and the plug termination. A little attention to detail goes a long way in this respect. Again, if you are unfamiliar with proper termination techniques, PreSonus recommends consulting with a professional.

2.3 Connecting your Network

When hardwiring your loudspeakers to your wireless router with Ethernet cables, simply connect the speakers to your wireless router. You can connect your computer wirelessly or wired. No other network setup is required.

For information on setting up a Dante Network, *please see Section 6.*



3 Software Installation

3.1 Install Worx Control

3.1.1 macOS

Installing Worx Control on macOS machines is as simple as drag-and-drop:

1. Double-click on the Worx Control .dmg file.
2. Drag the Worx Control icon to the Applications folder on your computer.
3. Once Worx Control has been copied to your hard drive, it is ready to use. Simply double-click on its icon in your Applications folder.

3.1.2 Windows

The Windows installer for Worx Control provides easy-to-follow onscreen instructions to make the installation process quick and simple.

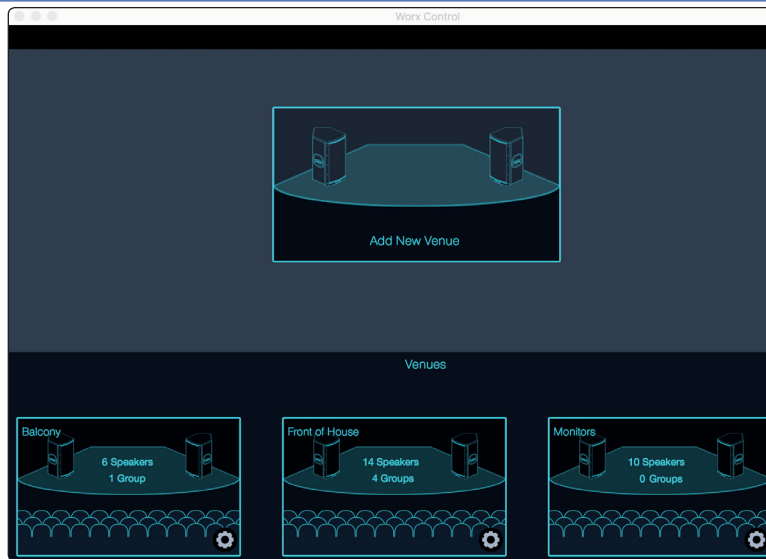
1. When you launch the **Worx Control .exe** file, a Welcome screen will launch. By default, Worx Control will install in the Program Files folder on your computer.
2. We highly recommend that you do not change this default location. Click "Install."
3. Once Worx Control has been successfully installed on your computer, click "Finish" to exit the install wizard.

3.2 Connecting Your Loudspeakers



Once you have networked your loudspeakers and computer, launch Worx Control. Click the Rescan button to verify that all the amplifiers have successfully joined your network. If your speakers do not appear within 30 seconds, power cycle them, and click the Rescan button again.

4 The Venue Page



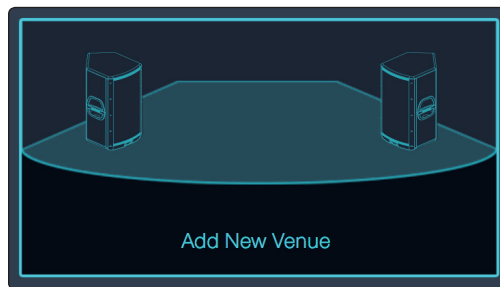
When you first launch Worx Control, you will be taken to the Venue page. This page allows you to manage multiple loudspeaker systems with a single Venue preset. For example, your front-of-house (FOH) system might be one speaker group, your stage setup may be a second group, the balcony delays may be a third, and so on. Every group can be easily navigated between and monitored by storing them in the same Venue preset.



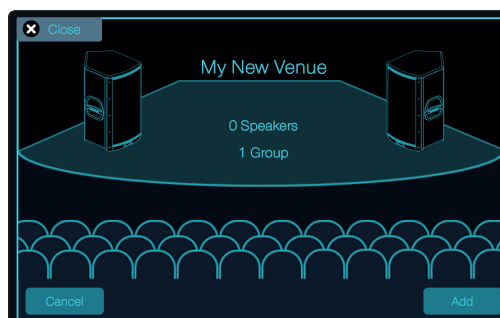
You can access the Venue page at any time by clicking or pressing the “Home” button from any page in Worx Control.

4.1 Creating a New Venue Preset

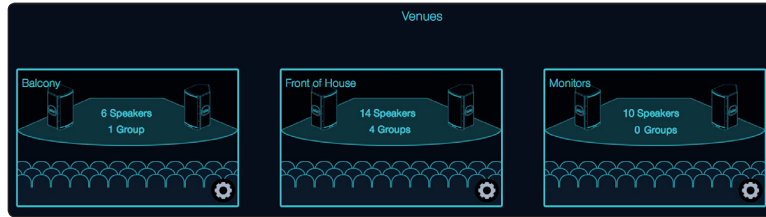
1. Click the “Add New Venue” button.



2. Name your Venue preset by clicking on the default name (“My New Venue”) and click on the Add button to begin configuring your new Venue preset.



4.2 Loading, Editing, and Deleting Venue Presets



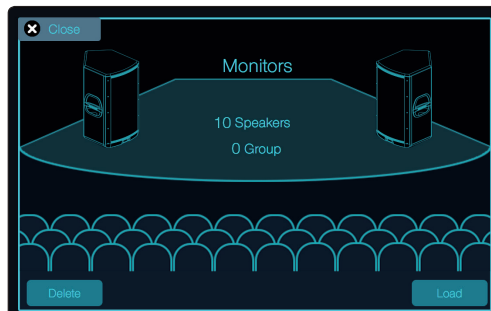
As you create Venue presets, Worx Control will automatically store them, and they will be displayed across the bottom of the Venue page. Each preset thumbnail will display the number of groups and the number of speakers used in the Venue preset. To load a Venue preset, simply click the thumbnail.

To scroll through your preset history use a horizontal swipe on your trackpad or use the scroll wheel on your mouse.

To edit or delete a stored Venue preset, click on the gear inside its thumbnail.



This will take you to Venue Edit page:



- To edit the name, click it.
- To load a preset, click the Load button.
- To delete a preset, click the Delete button.
- To return to the Venue page, click the Close button.

5 Customizing Speaker Settings

Inside a Venue preset, you have the option to manage speakers individually or as groups. It is important to note that once a speaker is added to a group, all individual settings are reset and the grouped speakers are all changed simultaneously.

5.1 Speaker Net Browser



Once you've created a new Venue preset, you will be taken to the Speaker Net browser. From this page you can view all speakers on your network, give them custom names, edit each speakers' EQ and dynamics, and begin designing your group.

If you do not see all the speakers on your network, click the Rescan button.

Power User Tip: You do not have to create a speaker group for any or all of your speakers. Any loudspeaker in the Speaker Net browser can be edited, monitored, and controlled from the browser.

5.1.1 Performance Monitoring

Each loudspeaker icon features several performance-monitoring indicators:

Metering



Input. This meter displays the level of the incoming signal to your loudspeaker.

Clip. The right-most indicator will illuminate red when the signal going to the analog-to-digital converter (ADC) on the loudspeaker exceeds 0 dB. At this level, the signal will begin to overload the converter and exhibit signs of clipping, an undesirable type of distortion.

Limit. The indicator to the left of the Clip light will illuminate yellow when your loudspeaker's protection limiter has been engaged.

Thermal



This indicator monitors the temperature of the amplifiers. It will not illuminate while the temperature is within normal operating limits (less than 147° F/63.9° C). It will illuminate yellow when the temperature rises to dangerous level (147 – 152° F/63.9 – 66.7° C). It will illuminate red when the temperature rises to a level where your loudspeaker will be severely damaged (over 153° F/67.2° C).

Note: If this indicator turns yellow or red, power off your loudspeaker immediately and let it cool down. Your loudspeaker should not exceed thermal limits during normal operation. If it does, you may need to contact PreSonus to arrange for a repair.

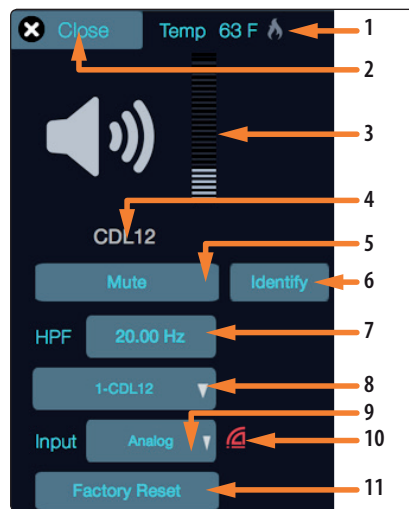
5.1.2 Speaker Edit Page



To edit the parameters of any loudspeaker on the network, click on the “gear” to the right of the icon meter from the Speaker Net Browser. This will access the Speaker Edit page for that speaker from anywhere in Worx Control.

Speaker Edit Controls

Besides Dynamics, EQ, Level, and Alignment Delay, the following controls are available.



1. **Temperature.** Displays the current temperature of the amplifiers. Temperature monitoring for your amplifier is available in real-time from the Speaker Edit page. This is especially useful when using your loudspeakers in elevated temperatures.
Note: Your loudspeaker should remain below 147° F (63.9° C). If it exceeds this temperature, power off your loudspeaker immediately.
2. **Close.** Click to close the Speaker Edit Page.
3. **Meter.** Displays the input signal level for your loudspeaker.
4. **Name.** Click to give your loudspeaker a custom name.
5. **Mute.** Mutes the loudspeaker amplifier.
6. **Identify (CDL-series only).** Clicking on this button will flash the hidden LED on the front of your CDL-series loudspeakers.

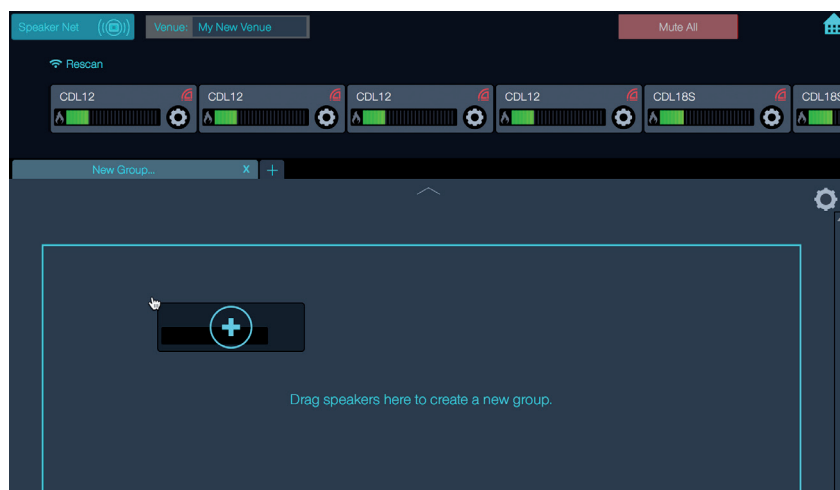
7. **High Pass Filter / Polarity.** This remotely enables the High Pass Filter or the Polarity depending on whether the loudspeaker is full-range or a subwoofer.
8. **Preset.** Selects applies a factory preset. *See Section 7 for preset functions for each supported loudspeaker model.*
9. **Input.** Switches the Source Input for the loudspeaker. Three input modes are provided:
 - **Dante Only.** This mode disables the analog inputs on your amplifier whether or not it is on the Dante network.
 - **Analog Only.** This mode disabled the Dante Receive channels to your amplifier whether or not it is connected to a Dante network. When a Dante network is available, the Analog Input on your amplifier can be sent through its Dante Transmit channels.
 - **Analog Failover.** By enabling Analog Failover, you can use the analog connection on the amplifier as backup. When no Dante sync is detected, your loudspeaker will automatically switch to the analog inputs. This is the default setting.
10. **Dante Network Status.** The indicator displays the status of the Dante network. This indicator allows you to easily see whether your loudspeaker is connected to and communicating with your Dante network. When the Dante network is available, the Dante Lock indicator will illuminate white. If no Dante network connection is detected, the Dante Lock indicator will illuminate red.
11. **Factory Reset.** Resets all parameters for every loudspeaker in the group to the default setting.

5.2 Creating Speaker Groups

Worx Control allows you to create multiple speaker groups within any Venue preset. Each speaker group has its own level control and 8-band parametric EQ and can be designed in Worx Control to mimic each loudspeaker's physical placement within the room.

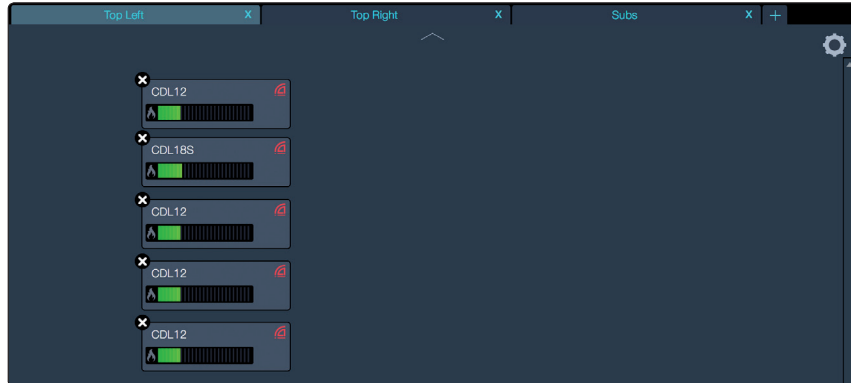
Adding Speakers

To add a loudspeaker to a group, simply select the speaker by clicking on its icon in the Speaker Net browser and dragging it into the Group Design field.



Speaker Arrangement

Loudspeakers can be arranged in the Group Design field to mimic their physical placement in the room. This provides you with visual cues indicating which loudspeaker you are monitoring or controlling at any given time.



Opening/Closing the Speaker Net Browser



To open or close the Speaker Net browser, click on the button in the upper left corner.



You can also click on the arrow in the middle of the Group Design field to open and close the Speaker Net Browser.

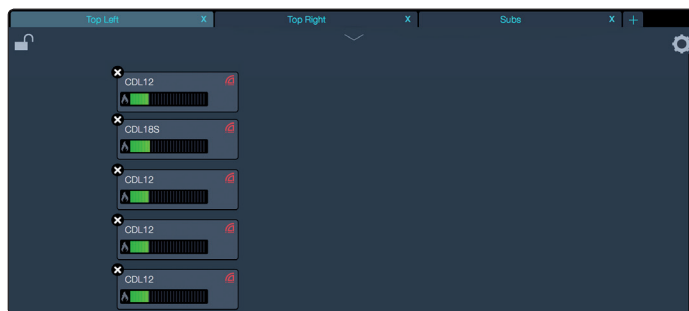
Adding/Removing Speaker Groups



The Speaker Group Manager functions much like a Web browser.

- To continue creating speaker groups, click on the “+” button to the right of the Speaker Group tab.
- To delete a group, click on the “x” in its tab.
- You can navigate between Speaker Groups by clicking each tab.

5.2.1 Group Monitor Page



When you close the Speaker Net browser, your speaker group will enter the Group Monitor page. From this page, you can monitor the performance of every loudspeaker in the group, and edit the group parameters.



If you need to make placement adjustments or delete a loudspeaker from a group at any time, simply click the Unlock Group button in the upper left corner. When you are done, be sure to relock your group by clicking on the same button.

5.2.2 Group Edit Page



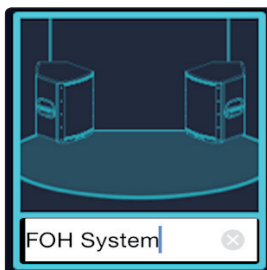
Grouping speakers of the same model is an easy way to manage each side of your line array. For instance, if you have four CDL12 loudspeakers flown on each side of your stage in a vertical array, you can create a group for the right side and another for the left.

Any changes you make on the Group Edit page will be broadcasted to and applied on each loudspeaker in the group. Because of this, vertical arrays that require gain shading should be managed individually and not as groups.

To open the Group Edit page, click on the “gear” in the upper right corner of the Group Monitor page.

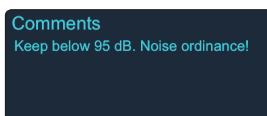


Naming Speaker Groups



To give your speaker group a custom name, click on the default name in its icon.

Comments



To add comments about any speaker group, click in the Comments field. Press Enter when finished.

5.2.3 Global Group Controls

Besides Dynamics, EQ, Level, and Alignment Delay, the following Global Group controls are available.



1. **Mute.** Mutes every loudspeaker in the group.
2. **High Pass Filter.** Sets the threshold of the group high pass filter.
3. **Preset.** Selects applies a factory preset. *See Section 7 for preset functions for each supported loudspeaker model.*
4. **Input.** Switches the Source Input for every loudspeaker in the group. Three input modes are provided:
 - **Dante Only.** This mode disables the analog inputs on your amplifier whether or not it is on the Dante network.
 - **Analog Only.** This mode disabled the Dante Receive channels to your amplifier whether or not it is connected to a Dante network. When a Dante network is available, the Analog Input on your amplifier can be sent through its Dante Transmit channels.
 - **Analog Failover.** By enabling Analog Failover, you can use the analog connection on the amplifier as backup. When no Dante sync is detected, your loudspeaker will automatically switch to the analog inputs. This is the default setting.
5. **Dante Network Status.** The indicator displays the status of the Dante network. This indicator allows you to easily see whether loudspeakers in the group connected to and communicating with your Dante network. When the Dante network is available for every loudspeaker in the group, the Dante Lock indicator will illuminate white. If no Dante network connection is detected for any loudspeaker in the group, the Dante Lock indicator will illuminate red. Use the Group Monitor page to troubleshoot the Dante network connectivity for each loudspeaker in the group.
6. **Factory Reset.** Resets all parameters for every loudspeaker in the group to the default setting.

The Level, Alignment Delay, Limiter, Compressor, and EQ controls are identical whether you're editing a loudspeaker group or an individual loudspeaker. *See Section 5.3.*

5.3 Customization Controls

Whether you are customizing each loudspeaker individually or optimizing the performance of an entire loudspeaker group, the following options are available on both the Speaker Edit and Group Edit pages.

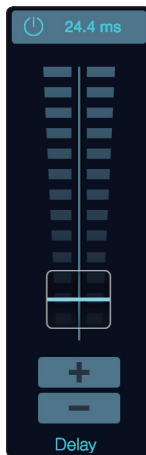
5.3.1 Level Adjustment



The Volume control consists of four elements:

- **On/Off switch.** By default, level control is off. To enable it, click the On/Off switch.
- **Level readout.** This displays the input level for the onboard DSP. You can also manually enter the level in decibels you wish to set by clicking in this field.
- **Fader.** This controls the level of your amplifier.
- **0.2 dB increment/decrement buttons.** Use these buttons to make fine adjustments to your amplifier level.

5.3.2 Alignment Delay



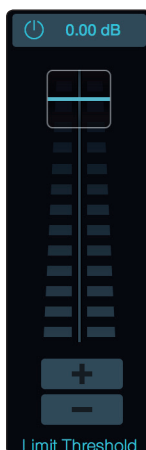
Controls the output delay for your loudspeaker. You can delay your loudspeaker up to 800 ms in 0.1 ms increments.

The Alignment Delay control consists of four elements:

- **On/Off switch.** By default, alignment delay is off. To enable it click the On/Off switch.
- **Time readout.** This displays the delay time in milliseconds. You can also manually enter the time in milliseconds you wish to set by clicking in this field.
- **Fader.** This controls the alignment-delay time for your loudspeaker in whole milliseconds. **Note:** Do not make drastic changes to the alignment delay time while passing audio through your loudspeaker.
- **0.1 ms increment/decrement buttons.** Use these to make fine adjustments to your loudspeaker's delay time.

Power User Tip: The alignment delay allows you to align sources that are physically set apart from one another, such as a center-fill speaker that is reproducing the summed stereo signal in a front-of-house system. By using fine output-delay adjustments on the center-fill speaker and carefully setting the level, the entire system can be in phase, creating a seamless transition so that the audience can't hear where either main speaker ends and the center-fill begins.

5.3.3 Limiter



The Limiter control consists of four elements:

- **On/Off switch.** By default, the limiter is off. To enable it click the On/Off switch.
- **Threshold readout.** This displays the set limiter threshold. You can also manually enter the threshold in decibels you wish to set by clicking in this field.
- **Fader.** This controls the threshold of the limiter. When the signal's amplitude (level) exceeds the threshold setting, the limiter will engage. The threshold can be set from -28 to 0 dB.
- **0.5 dB increment/decrement buttons.** Use these buttons to make fine adjustments to the limiter threshold.

Note: This is not your amplifier's protection limiter.

5.3.4 Compressor



The compressor provides the following controls:

- **On/Off switch.** By default, the compressor is off. To enable it click the On/Off switch.
- **Threshold.** You can set the compressor threshold from -56 to 0 dB.
- **Attack.** You can set the compressor attack from 0.2 to 150 ms
- **Release.** You can set the compressor release from 2.5 to 900 ms
- **Ratio.** You can set the compressor ratio from 1:1 to 14:1
- **Make-up Gain.** You can set the compressor make-up gain from 0 to 28 dB

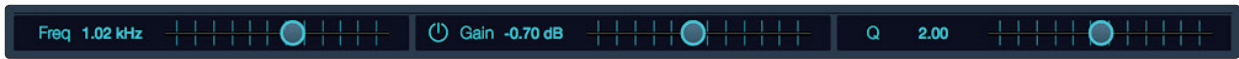
5.3.5 8-band Equalizer



By default, the parametric EQ for both the Group Edit and Speaker Edit pages is disabled. To enable it, click on the on/off button in the upper left of the EQ graph. You cannot make changes to the parametric EQ unless it is enabled.

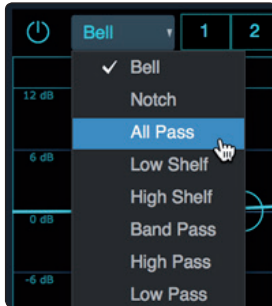
To reset the parametric EQ to 0 dB, simply click the Reset button. This returns each band to 0 dB, so that no frequency band is boosted or attenuated, and returns the Frequency and Q parameters to their default state.

You can adjust the parametric EQ by clicking on any of the bands in the graph and using your mouse to draw a curve.



When any band is selected, the three controls at the top of the parametric EQ will switch to control that band's frequency, gain, and Q. These controls allow you to make fine adjustments to each band. You can turn off an individual band by pressing the On/Off button next to the Gain control or by clicking the band in the graph.

The following filters are available for each of the eight bands: Bell, Notch, Allpass, Low Shelf, High Shelf, Band Pass, High Pass, or Low Pass.



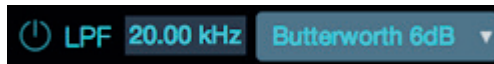
High Pass Filter



In addition to the 8-band parametric EQ, a high pass filter is also provided with the following adjustable parameters:

- **On/Off.** Engages or disengages the high pass filter
- **Frequency.** Click on this field to enter the frequency threshold.
- **Filter Type.** Click on the pull-down to select the filter type and slope. You can choose between the following filters and slope combinations: Butterworth (6dB, 12 dB, 18 dB, or 24 dB slope), Bessel (6dB, 12 dB, 18 dB, or 24 dB slope), Linkwitz-Riley (12 dB or 24 dB slope).

Low Pass Filter



In addition to the 8-band parametric EQ, a low pass filter is also provided with the following adjustable parameters:

- **On/Off.** Engages or disengages the low pass filter
- **Frequency.** Click on this field to enter the frequency threshold.
- **Filter Type.** Click on the pull-down to select the filter type and slope. Like the High Pass Filter, you can choose between the following filters and slope combinations: Butterworth (6dB, 12 dB, 18 dB, or 24 dB slope), Bessel (6dB, 12 dB, 18 dB, or 24 dB slope), Linkwitz-Riley (12 dB or 24 dB slope)

5.4 Saving and Loading EQ Presets



A preset stores all level, alignment delay, limiter, parametric EQ, and notch filter settings, as well as mute state.



To open the preset list, click on the preset button in the upper right hand corner.



Save

Save. To save a speaker preset, click the Save button.



Load

Load. To load a speaker preset, click the preset name in the preset list and click the Load button.

Delete. To delete any preset in the preset list, select it and click the Delete button (X).



Left main system



DFU

DFU button. Click on the DFU button to update your product firmware.

6 Using Dante Network Audio

6.1 Dante Controller

To connect your Dante network, you will need a Mac or Windows computer with an Ethernet port and Audinate's Dante Controller application.

Dante Controller is a free software application that allows you to route audio and configure devices on a Dante network. Thanks to automatic device discovery, one-click signal routing, and user-editable device and channel labels, setting up a Dante network is relatively simple.

Dante Controller also provides essential device status information and powerful real-time network monitoring, including device-level latency and clock stability stats, multicast bandwidth usage, and customized event logging, enabling you to identify and resolve network issues. You can also back up, restore, move, and reuse Dante network configurations using presets and can edit Dante routing configurations offline.

The Dante Controller application and associated documentation are available at www.audinate.com/products/software/dante-controller.

6.2 Naming Your Loudspeakers

When you connect your PDA-1000 and PDA-2000 equipped loudspeakers to your Dante network for the first time, they will be named "SL-AI-PA-" followed by a unique numeric identifier (e.g. SL-AI-PA-0123a4). Taking a moment to give your speakers a custom name will save time later.

To name your loudspeakers, only add one loudspeaker to your network at a time. From within Dante Controller double-click on the speaker name. Click on the Device Config tab and give your loudspeaker a descriptive name (FOH Left, Center Balcony, etc.).

Power User Tip: Dante device names can be up to 31 characters and are not case sensitive (e.g., "Guitar wedge" and "guitar Wedge" are treated as the same label). Device names must start with a letter of the alphabet but numbers and hyphens may also be used.

6.3 Routing Audio

Before you start routing audio to your Dante network, there are a few terms with which you should become familiar:

Device: A device means a Dante-enabled device.

Transmit (Tx) channel: As its name suggests, a Transmit channel transmits audio from the audio hardware to the network. When in Analog Input mode, both Transmit channels will send the same signal. Note: While Transmit channels for your loudspeakers are always available, they will only contain an audio signal when the analog inputs on your loudspeaker are active.

Receive (Rx) channel: A Receive channel receives audio from the network and sends it to the audio hardware. The PDA-1000 and PDA-2000 provides two Receive channels for your loudspeaker, however to prevent phasing issues, only Channel 1 is sent to the DSP. Channel 2 is ignored.

Flow: Dante audio routing creates flows. Each flow carries several channels of audio from a transmitter to one or more receivers. Unicast routing creates flows to single receivers. Multicast routing creates flows that can be received by multiple receivers. Multicast flows are assigned IDs, enabling them to be identified in Dante Controller.

Unicast routing: Unicast flows are point-to-point from a single transmitter to a single receiver. Unicast flows typically have room for four channels of audio.

Multicast routing: Multicast flows are one-to-many from a single transmitter to any number of receivers. Use Dante Controller to choose which channels are to be multicast. Unlike unicast routing, multicast flows consume network bandwidth even if there are no receivers but do not require additional bandwidth to add more receivers.

Subscription: A subscription configures a Receive channel to receive audio from a transmit channel on another Dante device.

Subscription status: For a Receive channel, subscription status indicates whether it is subscribed, whether it is receiving unicast or multicast audio, whether the subscription is okay, or whether an error has occurred.

Now that you're acquainted with a few Dante networking terms, let's route some audio. **Note:** *The complete Dante Controller User Guide is available from www.audinate.com/resources/technical-documentation.*

Power User Tip: *Dante supports devices using different samples rates on the same network; however, you can only route audio to and from devices with the same sample rate. PDA-1000 and PDA-2000 amplifiers only operate at 48 kHz on a Dante network. Any device you'd like to route audio to or from your loudspeakers must also be set to 48 kHz.*

Connect all devices on your Dante network to your switch. If you are configuring a very large Dante network, you may want to consider adding a few components at a time, making the necessary routing, and then moving on to the next section. For example, you may wish to hook up your FOH system, then your monitor system, etc. Once you have connected all your devices, launch Dante Controller.

On the Routing tab, you will see all your connected devices. Click on the "+" next to each device to view its Transmit or Receive channels. Patch a Transmit channel from your Dante network to the first Receive channel (RxChan 0) of your PDA-1000 or PDA-2000 and continue patching Transmit channels from devices on your Dante network to the rest of the amplifiers on your network.

6.4 Frequently Asked Questions About Dante

Can I connect a Dante device directly to my computer?

Yes. Simply connect your Dante-enabled devices to an Ethernet switch, using CAT5e or CAT6 Ethernet cable, then connect your computer to the same switch.

If you have only one Dante-enabled device to connect to your computer, you can eliminate the switch and simply connect the two with a CAT5e or CAT6 Ethernet cable.

What type of Ethernet cable is recommended for Dante?

As most Dante devices support gigabit Ethernet, CAT5e or CAT6 cable is recommended. For purely 100 Mbps networks, CAT5 may be used.

Does Dante work with fiber optic network cable?

Yes. Because Dante works with standards-based networking technology, using fiber is simple. Use a switch that supports fiber connections to send Dante data over a fiber optic cable.

Ethernet is not copper- or fiber-based; it is independent of the cabling medium. Many organizations will have fiber already in place from other projects, and this can simply be reused on a Dante network.

Is it possible to make direct connections between Dante-enabled equipment?

Yes. Once routes are established with Dante Controller, a simple network of two Dante devices will work in a stand-alone fashion.

Can Dante devices be daisy-chained?

In most cases the answer is “no.” Dante devices are connected via a network switch, which most often means a “star” topology: All devices are connected to a single central point, which minimizes the number of “hops” through which data must pass. This also avoids the scenario in which the failure of one device causes the entire chain to break.

Note: The secondary port found on some Dante devices is not to be used for daisy chaining; this is for Dante redundancy only. Please check your device’s documentation.

Can Dante operate over a Wi-Fi network?

No. While possible in principle, the practical limitations of current wireless technology (802.11 a/b/g/n) render reliable performance unachievable. For this reason Dante software such as Virtual Soundcard will not recognize wireless connections for audio data. Wireless access points for non-Dante traffic (device control, etc.) can be configured using managed switches.

Does Dante require any special network infrastructure?

No, special network infrastructure is not required. Since Dante is based upon universally accepted networking standards, Dante-enabled devices can be connected using inexpensive off-the-shelf Ethernet switches and cabling.

Does Dante require a dedicated network infrastructure?

No, a dedicated network infrastructure is not required. Dante-enabled devices can happily coexist with other equipment making use of the network, such as general-purpose computers sending and receiving email and other data.

Can you mix control data and audio on the same network?

Yes, audio can be sent over the same network as control information and even unrelated data traffic.

Does Dante require special switches?

No. However, we strongly recommend that gigabit switches be used due to the clear advantages in performance and scalability.

What is the minimum requirement for switches in a Dante network?

All Ethernet switches are capable of working with Dante. However, please be aware that there are some features on some kinds of switches that will allow you to build larger and more reliable Dante networks.

While gigabit switches are recommended, 100 Mbps switches may be used in limited scenarios.

- For channel counts of 32 or more, gigabit switches are essential. QoS is required when using Dante in networks that have 100 Mbps devices. QoS is also recommended for gigabit switches on networks that share data with services other than Dante.
- For lower channel counts (<32), a 100 Mbps switch may be used as long as it supports proper QoS, and QoS is active. The use of 100 Mbps switches without QoS is not recommended or supported.

What features are important when purchasing a switch?

Dante makes use of standard Voice over IP (VoIP) Quality of Service (QoS) switch features, to prioritize clock sync and audio traffic over other network traffic. VoIP QoS features are available in a variety of inexpensive and enterprise Ethernet switches. Any switches with the following features should be appropriate for use with Dante:

- Gigabit ports for inter-switch connections
- Quality of Service (QoS) with four queues
- Diffserv (DSCP) QoS, with strict priority
- A managed switch is also recommended, to provide detailed information about the operation of each network link: port speed, error counters, bandwidth used, etc.

Can I use switches with EEE (Energy Efficient Ethernet or Green Ethernet) in my Dante network?

Short answer: No.

Long answer: EEE (Energy Efficient Ethernet) is a technology that reduces switch power consumption during periods of low network traffic. It is also sometimes known as Green Ethernet and IEEE802.3az. Although power management should be negotiated automatically in switches that support EEE, it is a relatively new technology, and some switches do not perform the negotiation properly. This may cause EEE to be enabled in Dante networks when it is not appropriate, resulting in poor synchronization performance and occasional dropouts.

Therefore we strongly recommend that:

1. If you use managed switches, ensure that they allow EEE to be disabled. Make sure that EEE is disabled on all ports used for real-time Dante traffic.
2. If you use unmanaged switches, do not use Ethernet switches that support the EEE function because you cannot disable EEE operation in these switches.

What is Quality of Service (QoS)?

Quality of Service (QoS) is a feature of managed switches, which ensures that certain types of network packets (e.g. clock sync and audio packets) get preferential treatment and are “moved to the front of the line” ahead of other traffic. This is achieved by attaching a priority number to each packet, which is then used by the switches to ensure that high priority packets get processed before lower priority packets.

When do I need to use QoS in a Dante network?

QoS is required when using Dante in networks that have 100 Mbps devices and is optional in networks with gigabit devices. We recommend that QoS be enabled in all Dante networks in order to ensure proper operation under all possible conditions.

How does Dante manage QoS?

Dante uses standard Voice over IP (VoIP) Quality of Service (QoS) switch features to prioritize clock sync and audio traffic over other network traffic. QoS is available in many inexpensive and enterprise Ethernet switches. Any switch that supports Diffserv (DSCP) QoS with strict priority and four queues and has gigabit ports for inter-switch connections should be appropriate for use with Dante.

How does Dante use DSCP / Diffserv priority values when configuring QoS?

Switches prioritize packets using what are called DSCP/Diffserv values. Although Dante packet priority values have been chosen to make it simple to configure QoS with many switches, some switches require special configuration to recognize and prioritize specific DSCP values.

The table below shows how Dante uses various Diffserv Code Points (DSCP) packet priority values:

Priority	Usage	DSCP Label	Hex	Decimal	Binary
High	Time critical PTP events	CS7	0x38	56	111000
Medium	Audio, PTP	EF	0x2E	46	101110
Low	(reserved)	CS1	0x08	8	001000
None	Other traffic	BestEffort	0x00	0	000000

7 Factory Presets

7.1 CDL12

Preset	Description
Preset 1	(1) CDL12 - Suspended or Pole-mounted with or without a CDL18s
Preset 2	(2) CDL12 - Suspended or Pole-mounted in a vertical array with or without a CDL18s
Preset 3	(3) CDL12 - Suspended in a vertical array with or without a CDL18s
Preset 4	(4) CDL12- Suspended in a vertical array with or without a CDL18s
Preset 5	(5) CDL12- Suspended in a vertical array with or without a CDL18s
Preset 6	(6) CDL12- Suspended in a vertical array

7.2 CDL18s

Preset	Description	Frequency Response
Preset 1	(1) CDL18s - Suspended or Pole-mounted with (1) CDL12	35 Hz to 90 Hz
Preset 2	(2) CDL18s - Suspended or Pole-mounted in a vertical array with or without CDL12	35 Hz to 90 Hz
Preset 3	80 Hz Crossover	35 Hz to 80 Hz
Preset 4	100 Hz Crossover	35 Hz to 100 Hz

7.2 PDA2000 Models

7.2.1 TLX2-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	Flat Response	---	---	---
Preset 2	1	High Shelf	1 kHz	-1 dB	3
Preset 3	1	High Shelf	1 kHz	0 dB	3
Preset 4	1	High Shelf	1 kHz	1 dB	3
Preset 5	1	High Shelf	1 kHz	2 dB	3

7.2.2 TLXL2-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	Flat Response	---	---	---
Preset 2	1	High Shelf	2.2 kHz	4 dB	8.25
Preset 3	1	High Shelf	2.2 kHz	6 dB	8.25

7.2.3 TLX3-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	Flat Response	---	---	---

7.2.4 TLX5-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	Flat Response	---	---	---
Preset 2	1	High Shelf	1 kHz	-1 dB	3
Preset 3	1	High Shelf	1 kHz	0 dB	3
Preset 4	1	High Shelf	1 kHz	1 dB	3
Preset 5	1	High Shelf	1 kHz	2 dB	3

7.3 PDA1000 Models

7.3.1 XL1-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	5 kHz	1 dB	10
Preset 2	1	High Shelf	5 kHz	2 dB	10
Preset 3	1	High Shelf	5 kHz	3 dB	10
Preset 4	1	High Shelf	4 kHz	3 dB	10
Preset 5	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	1 dB	3
Preset 6	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	3 dB	3
Preset 7	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	5 dB	3
Preset 8	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	7 dB	3
Preset 9	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	9 dB	3

7.3.2 XL1M-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	5 kHz	1 dB	10
Preset 2	1	High Shelf	5 kHz	2 dB	10
Preset 3	1	High Shelf	5 kHz	3 dB	10
Preset 4	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	0 dB	3
Preset 5	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	3 dB	3
Preset 6	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	3 dB	3
Preset 7	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	7 dB	3
Preset 8	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	9 dB	3
Preset 9	1	High Shelf	4 kHz	3 dB	10
	2	High Shelf	1 kHz	9 dB	3

7.3.3 X1-PAS

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-8 dB	3
	6	High Shelf	3 kHz	-2	12.26
Preset 2	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-6 dB	3
	6	High Shelf	3 kHz	0	12.26
Preset 3	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-5 dB	3
	6	High Shelf	3 kHz	2	12.26
Preset 4	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-4 dB	3
	6	High Shelf	2 kHz	4 dB	12.26
Preset 4	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-6 dB	3
	6	High Shelf	3 kHz	0	12.26
Preset 5	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-4 dB	3
	6	High Shelf	2 kHz	6	12.26
Preset 6	1	PEQ	400 Hz	-3 dB	6.5
	2	PEQ	670 Hz	-4 dB	6
	3	PEQ	4.1 kHz	-1 dB	9
	4	PEQ	7.8 kHz	-2 dB	5
	5	High Shelf	11.5 kHz	-4 dB	3
	6	High Shelf	2 kHz	8	12.26

7.3.4 X1-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	1 kHz	0 dB	3
Preset 2	1	High Shelf	1 kHz	2 dB	3
Preset 3	1	High Shelf	1 kHz	4 dB	3
Preset 4	1	High Shelf	1 kHz	6 dB	3
Preset 5	1	High Shelf	1 kHz	8 dB	3

7.3.5 X1M-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	1 kHz	0 dB	3
Preset 2	1	High Shelf	1 kHz	2 dB	3
Preset 3	1	High Shelf	1 kHz	4 dB	3
Preset 4	1	High Shelf	1 kHz	6 dB	3
Preset 5	1	High Shelf	1 kHz	8 dB	3

7.3.6 V5-PAS

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
Preset 2	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
	5	High Shelf	1.6 kHz	2 dB	3
Preset 3	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
	5	High Shelf	1.6 kHz	4 dB	19.21

7.3.7 V5-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	3.5 kHz	0 dB	3
Preset 2	1	High Shelf	3.5 kHz	3 dB	3
Preset 3	1	High Shelf	3.5 kHz	6 dB	3

7.3.8 V5M-PAS

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
Preset 2	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
	5	High Shelf	1.6 kHz	2 dB	3
Preset 3	1	PEQ	775 Hz	-4 dB	2.4
	2	PEQ	3.3 kHz	-1 dB	5
	4	High Shelf	6 kHz	-5 dB	8.4
	5	High Shelf	1.6 kHz	4 dB	19.21

7.3.9 V5M-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	High Shelf	3.5 kHz	0 dB	3
Preset 2	1	High Shelf	3.5 kHz	3 dB	3
Preset 3	1	High Shelf	3.5 kHz	9 dB	3

7.3.10 8A-PAS

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
Preset 2	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	1 dB	3
Preset 3	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	2 dB	3
Preset 4	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	3 dB	3

7.3.11 8A-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
Preset 2	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	1 dB	3
Preset 3	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	2 dB	3
Preset 4	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	3 dB	3
Preset 5	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
	5	High Shelf	1.2 kHz	4 dB	3

7.3.12 8M-PAS

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
Preset 2	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
Preset 3	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15
Preset 4	1	PEQ	850 Hz	-3.5 dB	2.25
	2	PEQ	4.4 kHz	-5 dB	5
	3	PEQ	8.65 kHz	-5 dB	6
	4	High Shelf	11.5 kHz	4 dB	15

7.3.13 12M-P

Preset	Band	PEQ / Shelf	Frequency	Gain	Q
Preset 1	1	PEQ	440 Hz	-2 dB	4
	2	PEQ	2 kHz	-8 dB	5
	3	PEQ	4.4 kHz	-3.5 dB	9

Added bonus: PreSonus' previously Top Secret recipe for . . .

Red Beans and Rice

Ingredients:

- 1 lb dried Red Kidney Beans
- 1 large onion (diced)
- 3 celery stalks (diced)
- 1 large green bell pepper (diced)
- 6-8 C vegetable stock
- 1 Tbs. Old Bay seasoning
- ½ fresh parsley
- 2 tsp. kosher salt
- 2 Tbs. olive oil
- 1 smoked ham hock (optional)

Cooking instructions:

1. Rinse red beans in cold water.
2. In a pressure cooker, heat olive oil on medium high. Sauté onion, celery, bell pepper, beans, and ham hock (if using) until onions are translucent.
3. Stir in Old Bay, parsley, and salt.
4. Add vegetable stock until beans and vegetables are covered.
5. Close pressure cooker and bring to full pressure on high heat.
6. Reduce heat to low while maintaining full pressure. Cook for 40 minutes.
7. Allow pressure to drop naturally (20-30 minutes).
8. Remove lid and crush with a potato masher until creamy.
9. Correct seasoning with salt and pepper if necessary.
10. Serve over rice with hot sauce and grilled Andouille sausage (optional).

PreSonus Worx Control

Control Software for CDL-series loudspeakers and WorxAudio PDA-series systems

Software Reference Manual

