Waves CA1000

Commercial Audio DSP Engine

Getting Started Guide

WAVES CA
COMMERCIAL AUDIO

Waves CA1000 is designed to dramatically improve audio quality and clarity in AV installations. It integrates easily into an audio system using a standard ASIO device or Dante® audio networking.

The CA1000 can process up to 16 bidirectional (16x16) audio channels. The DSP processing engine uses the Waves SuperRack application, which is fully integrated to run natively on the CA1000.

There are seventeen audio processing presets included, each designed for professional AV installations. They address challenges of playback quality, speech intelligibility, feedback suppression, and more. The presets are based on over two dozen low-latency Waves premium plugins. They can be used with their factory settings or modified and saved as user presets for quick access to your custom settings.

Dante network audio channels are supported through the integrated Dante Virtual Soundcard driver (DVS), and audio can be routed easily to and from the CA1000, using the Dante network controller.

ASIO devices are supported by installing the appropriate ASIO device driver directly on the CA1000.

The CA1000 is physically rugged and operationally robust and is designed for space-limited installations. It can be rack-mounted or sit on a surface. It occupies only 1U half rack space.

The CA1000 hardware features include:

- Intel® Celeron processor
- 8 GB RAM
- 256 GB SSD internal storage
- 2 HDMI ports
- 2 Ethernet ports
- 2 USB-3 ports, 2 USB-2 ports
- Shelf-mountable case, 1U half-rack

Connections and Controls

Front Panel

1	Power switch	Hold for five seconds to shut down the device.
2	2 USB-2 ports	

Real Panel

1	Power connector (C13)	100-240 VAC, 15W, auto-switching
2	2 USB-3 ports	
3	2 HDMI ports	
4	2 Gigabit Ethernet Network ports	RJ-45 Gb Ethernet connectors. Use either port for connection to the Dante network. The right-most connector is the factory-configured Dante network port.

Setup Guide

Follow these steps to prepare the CA1000 for operation in an AV installation with an ASIO interface or Dante network audio.

Hardware Connections

1. Connect the power cables to mains. For the computer and all devices, use the enclosed power cables.
2. Connect the keyboard and mouse (used for CA1000 setup and configuration).
3. Connect up to two displays to the HDMI ports.
4. Connecting the CA1000 to a Dante network: Connect one of the LAN Ethernet ports to the switch on the Dante audio network. The right-most RJ45 connector is the factory-configured Dante network port. Port assignment can be changed in the Dante Virtual Soundcard (DVS) configuration window.
   Note: DVS is configured at the factory as the selected Audio Device in the SuperRack Setup tab.
5. Connecting the CA1000 to an ASIO interface: Connect the ASIO interface to one of the USB connectors on the CA1000. Follow instructions provided by the interface manufacturer to install and configure the ASIO driver on the CA1000.
   Note: DVS is configured at the factory as the selected Audio Device in the SuperRack setup tab. If using an ASIO device, the corresponding device driver must be selected after installing the ASIO interface.

Waves CA1000 Software

The Waves CA1000 comes with the software activated and is ready to use. The following applications are included with the Waves CA1000 system:

- Waves SuperRack
- Audinate Dante Virtual Soundcard (DVS)

Waves plugins that are used in the Waves CA preset library are installed and activated on the CA1000.

It is also possible to download the CA1000 software and plugins using your own Waves account. Follow these steps to transfer the pre-activated licenses to your account:

1. Create a free Waves account, if you don't already have one (www.waves.com/create-account). This account is used to manage your Waves products and licenses.
2. Register the CA1000 at www.waves.com/support. The product serial number can be found on a sticker placed on the chassis of the CA1000 device, or on a printed sheet included in the CA1000 product box. Once your registration is complete, the associated product license(s) will be deposited in your license cloud.
3. Connect the CA1000 to the Internet using one of the Ethernet ports and launch the Waves Central application to manage your Waves product license(s).

Waves CA1000 System Power Protection

It is highly recommended that the Waves CA1000 is installed in a rack with a power protection device, such as an Uninterruptible Power Supply (UPS). The UPS should include a power status notification mechanism, typically a USB connection and software driver for the protected device.

Installing the system with the UPS status notification allows monitoring of the source power. In the event of a power failure, the UPS will trigger a managed shutdown of the CA1000 and the Windows operating environment.

Routing Setup

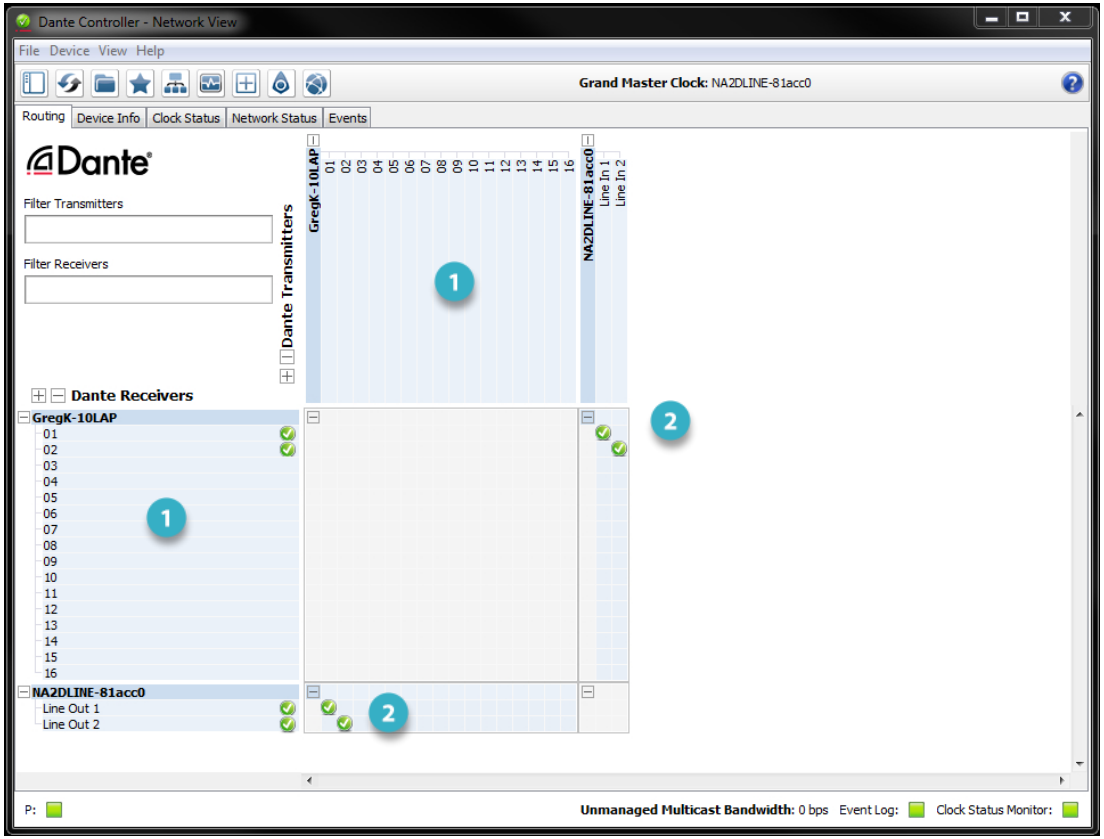
All devices should be properly connected and powered on. The CA1000 will automatically load all required drivers and software and launch SuperRack.

Channel Patching and Routing Overview

All audio channels are routed to and from the CA1000 using either the Dante network or the ASIO interface. For Dante installations, audio channel routing is completed using the internal rack audio patching on SuperRack, and the external Dante patching, using the Dante Controller (or another compatible routing application).

Routing Dante channels to the CA1000 using Dante Controller

The CA1000 appears on the Dante Controller application as a 16x16 channel device. Using the Routing View window is a common way to create audio routes in Dante, as shown below. Refer to the Audinate website (www.audinate.com) for more information.



1. CA1000 Tx/Rx channels (16x16)
2. Patches select routing between Dante network devices

Routing Dante Channels to CA1000 SuperRack Channels

Now you're ready to route the Dante channels in SuperRack. A rack must be routed to an input and an output Dante channel. Rack input and output routing is done in the SuperRack Rack window or Overview window. In the following example, we will route rack input from a Dante channel to a single rack in the Rack window. Use the tab at the top to open the Rack window.

SuperRack Channel Assignment

1. Select a rack.
2. Click on the Input arrow. This opens the Input Device Assignment menu.
3. Select an input format (e.g., mono, Stereo, 5.0).
4. Select an input audio channel. Note that channels are displayed in the "Dante Virtual Soundcard."

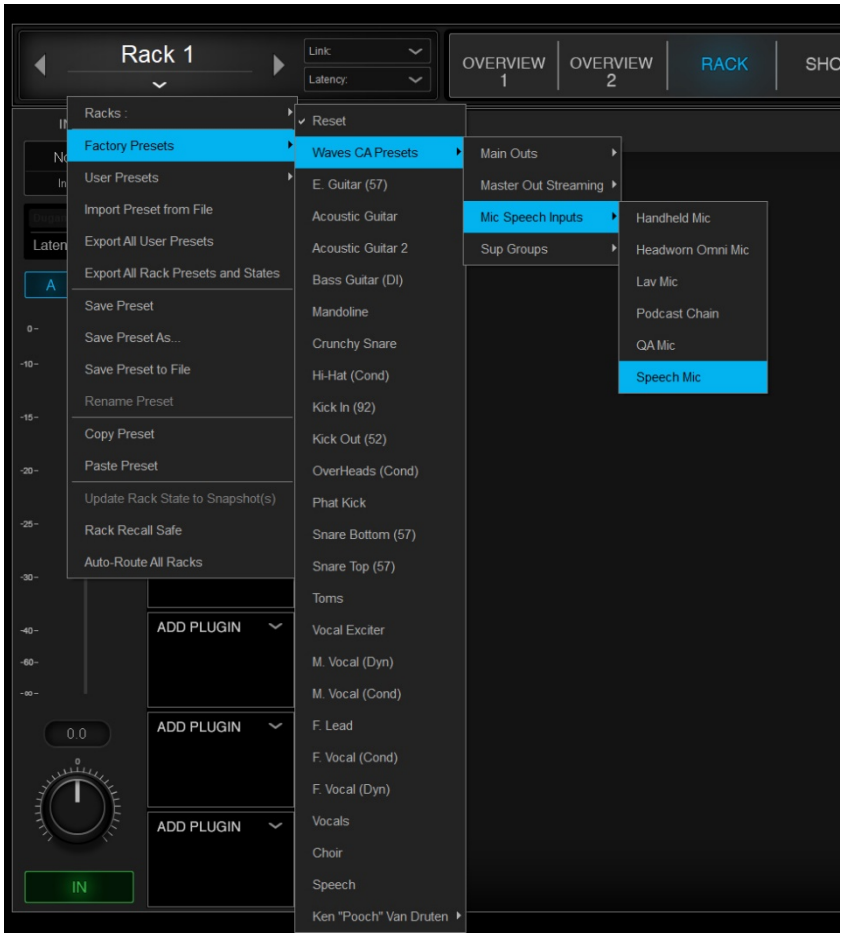
Rack outputs are routed in the same manner.

Confirm the routing in the Dante Controller for the network devices that will be connected to and from the CA1000.

Inserting the CA1000 Presets (Plugin Chains)

Each plugin rack can support a single Waves CA preset. A preset includes several plugins, which are automatically loaded when the preset is selected.

SuperRack Rack Menu



1. To insert a preset in a rack, click on the down arrow (Rack window). This opens the drop-down menu.
2. Select “Factory Presets”, then “Waves CA Presets”.
3. Choose a preset category, then the desired preset.

Please refer to the [Waves SuperRack user guide] for comprehensive instructions about setting up and using the Plugin rack. Download user guides for Waves plugins from the [Waves Manuals Download page].

Waves CA Presets (Plugin Chains)

The Waves CA Presets are arranged in four groups in SuperRack. The groups and corresponding presets are shown below:

- Main Outs
  - Main Out PA Generic
  - Main Out PA with Subs
  - Podcast Mic Mix Out
- Master Out Streaming
  - Main Out Streaming 1
  - Main Out Streaming 2
  - Podcast Master
- Mic Speech Inputs
  - Handheld Mic
  - Headworn Mic
  - Lav Mic
  - Podcast Mic
  - QA Mic
  - Speech Mic
  - Gooseneck Mic

- Subgroups
    - Handheld Group
    - Lav Group
    - Mic Group
    - Music Ducking Control
    - Playback Group

The following sections provide brief descriptions of the presets and the plugins used to create them. These are ideal starting points for many typical installations. Each preset is designed to be usable without any changes. It is, however, recommended that the integrator evaluates the resulting audio in the specific room installation and makes necessary changes to the plugin settings to achieve optimal results.

Visit waves.com to learn more about the plugins used in these presets.

Mic Speech Input Presets

Handheld Mic Preset

Designed to support a broad range of handheld mics used for any purpose, including singing and speaking. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **NS1** provides noise suppression to substantially reduce background noise without affecting the vocal audio source from the mic.
- **MV2** helps improve the level of vocal audio and keeps the audio consistent.
- **Q10** provides the front-end EQ to reduce low frequencies (typically troublesome with handheld mics) and lower/eliminate “pops” in the voice processing.
- **Sibilance Live** greatly reduces the “S” and “Sh” sounds that occur in speech, which can be overemphasized when amplified. This plugin process is very transparent and maintains the natural timbre and resonance of the speaker’s voice.

Headworn Omni Mic Preset

Designed to support common head-worn omnidirectional mics, as used by an individual speaker (e.g., a main presenter, pastor, master of ceremonies). Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **X-FDBK** provides real-time feedback suppression. It identifies the precise frequencies that cause feedback and surgically cuts them, dramatically shortening the setup time required.

- **PSE** helps to decrease ambient noise and potential phasing from other nearby mics. PSE also lets you reduce stage bleed and sensitivity to feedback when a mic is idle, by automatically lowering mic levels when that mic is not being spoken into.
- **Q4** provides the front-end EQ to reduce low frequencies (typically troublesome with headworn mics) and lower/eliminate “pops” in the voice processing.
- **RVox** smooths vocal dynamics with light compression and limiting. It gives more presence to quiet speakers or those who are not familiar with speaking into a microphone, and it tames loud or overly dynamic speakers.
- **Sibilance Live** greatly reduces the “S” and “Sh” sounds that occur in speech, which can be overemphasized when amplified. This plugin process is very transparent and maintains the natural timbre and resonance of the speaker’s voice.
- **F6-RTA** is the final plugin process in the chain; it adds polish to the speaker’s voice before amplification.

Lav Mic Preset

Designed to support common lapel or lavalier (lav) mics, typically used by speakers who move about the stage, such as presenters and pastors. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **Q10** provides the front-end EQ to reduce low frequencies (typically troublesome with headworn mics) and lower/eliminate “pops” in the voice processing.
- **C1 Comp** balances the voice dynamics using very subtle compression settings.
- **F6-RTA** is the final plugin in the chain; it adds polish to the speaker’s voice before amplification.

Podcast Mic Preset

Designed to process mic channels (or spoken voice channels, teleconference system inputs, etc.) used for online streaming or podcasts.

Processing Chain by Plugins:

- **NS1** provides noise suppression to substantially reduce background noise without affecting the vocal audio source from the mic.
- **Q4** provides the front-end EQ to roll off low frequencies and reduce/eliminate “booms” and “pops” in the voice processing. The preset also has a small boost between 1-2kHz to improve the clarity of the speaking voice.
- **Sibilance Live** greatly reduces the “S” and “Sh” sounds that occur in speech, which can be overemphasized when amplified. This plugin process is very transparent and maintains the natural timbre and resonance of the speaker’s voice.
- **Playlist Rider** provides automatic levelling of the audio signal to maintain a consistent vocal audio level for the stream.

QA Mic Preset

Designed to support a broad range of handheld mics that may be used for audience Q&A. These mics are usually placed in the room, and thus “in front” of the main PA. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **X-FDBK** provides real-time feedback suppression. X-FDBK identifies the precise frequencies that cause feedback and surgically cuts them, dramatically shortening the setup time required.

- **PSE** helps to decrease ambient noise and potential phasing issues from other nearby mics. PSE also lets you reduce stage bleed and sensitivity to feedback when a mic is idle by automatically lowering mic levels when that mic is not being spoken into.
- **Vocal Rider Live** automatically adjusts and smooths the vocal audio to maintain a consistent signal level. Vocal Rider also has an exclusive Spill control to differentiate the vocal from background instruments and noise.
- **Q4** provides the front-end EQ to reduce low frequencies (typically troublesome with handheld mics) and minimize the “thumps” and “pops” that occur when the mic and/or stand is handled.
- **D5** is the final plugin in the chain. It provides five state-of-the-art dynamics processors—Gate, Leveler, DeEsser, Compressor, and Limiter—in one easy-to-use interface.

Speech Mic Preset

Designed to support a broad range of handheld mics or conference table mics, as used by an individual speaker (e.g., main presenter, pastor, forum speaker, master of ceremonies). Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **Q4** provides the front-end EQ to reduce low frequencies (typically troublesome with handheld mics) and lower/eliminate “thumps” and “pops”.
- **RVox** smooths vocal dynamics with light compression and limiting. It gives more presence to quiet speakers or those who are not familiar with speaking into a microphone, and it tames loud or overly dynamic speakers.
- **Sibilance Live** greatly reduces the “S” and “Sh” sounds that occur naturally in speech, which can be overemphasized when amplified. This plugin process is very transparent and maintains the natural timbre and resonance of the speaker’s voice.
- **F6-RTA** is the final plugin in the chain; it adds polish to the speaker’s voice before amplification.

Gooseneck Mic Preset

Designed to reduce problems commonly encountered when gooseneck mics are mounted to a lectern or table stand. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **X-FDBK** provides real-time feedback suppression. X-FDBK identifies the precise frequencies that cause feedback and surgically cuts them, dramatically shortening the setup time required.
- **F6-RTA** is used to make precise EQ adjustments to the voice audio based on the type and installation placement of the mic.
- **Q4** provides the front-end EQ to reduce low frequency thumps (which may occur from bumping the lectern or table area around the gooseneck mic) and boost the mid- and high-mid frequencies for improved voice clarity.
- **PSE** helps to decrease ambient noise and potential phasing issues from other nearby mics. PSE also lets you reduce stage bleed and sensitivity to feedback when a mic is idle by automatically lowering mic levels when that mic is not being spoken into.

Subgroups Presets

Handheld Group Preset

Designed to optimize the PA for the summation of multiple handheld or table mics used in a typical installation environment. This preset should be used to ring out the system prior to setting the individual input channel presets. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **F6-RTA** is first in the chain to help focus the audio processing tasks.
- **X-FDBK** provides real-time feedback suppression. It identifies the precise frequencies that cause feedback and surgically cuts them, dramatically shortening the setup time required. At installation, X-FDBK should be set up to capture the specific characteristics of the room.
- **GEQ Modern** is the final plugin in the chain. It is used to remove any remaining problem frequencies in the handheld mic group. Although basic generic EQ notches are provided for many common problematic frequencies, these should be adjusted as needed during installation system tuning.

Lav Group Preset

Designed to optimize the PA for summing multiple lavalier (lav) mics. This preset should be used to “ring out” the system prior to setting the individual input channel presets. Some adjustments may be needed to fine-tune for a specific installation use case.

Processing Chain by Plugins:

- **F6-RTA** is first in the chain to help focus the audio processing tasks.

- **X-FDBK** provides real-time feedback suppression. It identifies the precise frequencies that cause feedback and surgically cuts them, dramatically shortening the setup time required. At installation, X-FDBK should be set up to capture the specific characteristics of the room.
- **GEQ Modern** is the final plugin in the chain. It is used to remove any remaining problem frequencies in the handheld mic group. Although basic generic EQ notches are provided for many common problematic frequencies, these should be adjusted as needed during installation system tuning.

Mic Group Preset

Designed to optimize the PA for the summation of multiple mics used by multiple speakers. This preset helps to even out and level the mics for sound consistency. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **C6-SC** provides dynamic compression for general shaping of the mic subgroup, with additional processing to help with de-essing and de-popping.

Music Ducking Control Preset

Designed to provide a special processing chain for one subgroup (typically mics) that can override another chain (typically background music). In this case, the background music is automatically compressed when a mic is being used. This chain requires the use of the sidechain feature to trigger the chain's music ducking control.

Processing Chain by Plugins:

- **Vitamin** provides multiband processing of the background source (music).
- **Playlist Rider** provides automatic levelling of the audio signal. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips)—automatically, non-destructively, and in real time—to achieve natural, consistent levels.
- **D5** compresses the background music audio when there is audio signal on the sidechain input. This should be connected to the appropriate mic subgroup.

Playback Group Preset

Designed to provide consistent volume level and sound for source audio players assigned to the subgroup.

Processing Chain by Plugins:

- **C1 Comp** is first in the chain and provides moderate compression when the overall input signal is too high.
- **Playlist Rider** provides automatic levelling of the audio signal. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips)—automatically, non-destructively, and in real time—to achieve natural, consistent levels.
- **F6-RTA** is the final plugin in the chain. It adds polish to the playback group audio before amplification.

Main Out Presets

Main Out PA Generic Preset

Designed to provide final processing of the audio signal before amplification in the PA (for an installation without subwoofers). Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **F6 RTA** adds low- and high-mid frequency polishing to the audio mix.
- **MaxxVolume** provides additional final processing to smooth and level the audio before routing to the main PA.

Main Out PA with Subs Preset

Designed to provide final processing of the audio signal before amplification in the PA, for an installation that includes subwoofers. Some adjustments may be needed to fine-tune for a specific installation.

Processing Chain by Plugins:

- **C1 Comp** is the first plugin in the chain. It provides very light compression to smooth the overall input signal.
- **Q4** provides the overall output EQ control, with a slight boost in the 2kHz range.
- **F6 RTA** adds low- and high-mid-frequency polishing to the audio mix.
- **Sub Align** aligns the PA subs and tops for the specific room installation to add punch and clarity to the low frequencies.

Podcast Mic Mix Out Preset

Designed to provide final processing of the audio signal that is sent to an online streaming system, such as an interview-format podcast or live-stream QA session.

Processing Chain by Plugins:

- **NS1** provides noise suppression to substantially reduce background noise without affecting the vocal audio source from the mic.
- **Playlist Rider** is used to provide automatic levelling of the audio signal. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips) automatically, non-destructively, and in real-time, to achieve natural, consistent levels.
- **WLM Plus** is included in the preset for review and final adjustment for the target streaming used in the installation. It provides precision loudness measurement, metering, correction, and adjustment tools. WLM Plus also features Gain and Trim controls for correction of loudness levels and a True Peak Limiter, which saves you the need to utilize additional equipment or software.

Master Out Streaming Presets

Main Out Streaming 1 Preset

Designed to provide final processing of the audio signal for general-purpose online streaming.

Processing Chain by Plugins:

- **Playlist Rider** is the only plugin used in this preset. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips)—automatically, non-destructively, and in real time—to achieve natural, consistent levels.

Main Out Streaming 2 Preset

Designed to provide final processing of the audio signal for online streaming that may include mixed media elements (voice, speech, music, or other media playback).

Processing Chain by Plugins:

- **Playlist Rider** is the first plugin in this preset. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips)—automatically, non-destructively, and in real time—to achieve natural, consistent levels.
- **Vitamin** enhances the overall tone or sound of the audio signal using advanced EQ, compression, and saturation processing to add final polish to the stream.
- **WLM Plus** Loudness Meter plugin provides precision loudness measurement, metering, correction, and adjustment tools. WLM Plus also features Gain and Trim controls for correction of loudness levels and a True Peak Limiter, which means that additional metering tools are not needed.

Podcast Master Preset

Designed to provide final processing of the audio signal for general-purpose online streaming.

Processing Chain by Plugins:

- **Playlist Rider** is the first plugin in this preset. It helps balance the volume of multiple sources (host, guest, music playlist, audio clips)—automatically, non-destructively, and in real-time—to achieve natural, consistent levels.
- **WLM Plus** provides precision loudness measurement, metering, correction, and adjustment tools. WLM Plus also features Gain and Trim controls for correction of loudness levels and a True Peak Limiter. This enables review and final adjustment of the signal for streaming from the installation.

Specifications

Electrical

100-240 VAC, 50/60 Hz, 15 W,
auto-switching;
C13-type connector

Dimensions

Case:
Width: 22 cm / 8.7 in
Depth: 27.7 cm / 10.9 in
Height: 4.2 cm / 1.7 in

Rubber Feet:
Height: 4 mm / 0.15 in

Weight: 2.1 Kg / 4.6 lb

Software Installed

Windows 10
Waves SuperRack
Audinate Dante Virtual Soundcard

Battery Disposal Information

CAUTION

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible.

Disposal of used batteries must be in accordance with local environmental regulations.