Integrated Power Amplifier Configuration Guide

NQ-GA20P2

BOGEN®
COMMUNICATIONS, INC.

Contents

List of Figures

List of Tables

Configuring the Nyquist Integrated Power Amplifier

The NQ-GA20P2 is a plenum-rated Nyquist 20-watt integrated power amplifier that works as a page zone extender to facilitate voice access to a single zone of one-way paging over the Nyquist network.

It also works in background music applications, leveraging the exhaustive audio management and distribution capabilities of Bogen's Nyquist platform.

The NQ-GA20P2 appliance uses the latest in Class D amplifier technology and provides unparalleled sonic quality, exceptional reliability, and reduced power consumption to permit standalone PoE+ operation over the local network.

The Nyquist server or system controller can automatically discover and configure the NQ-GA20P2, but you can also manage the device, and manually configure some settings, through the appliance's web-based user interface (web UI).
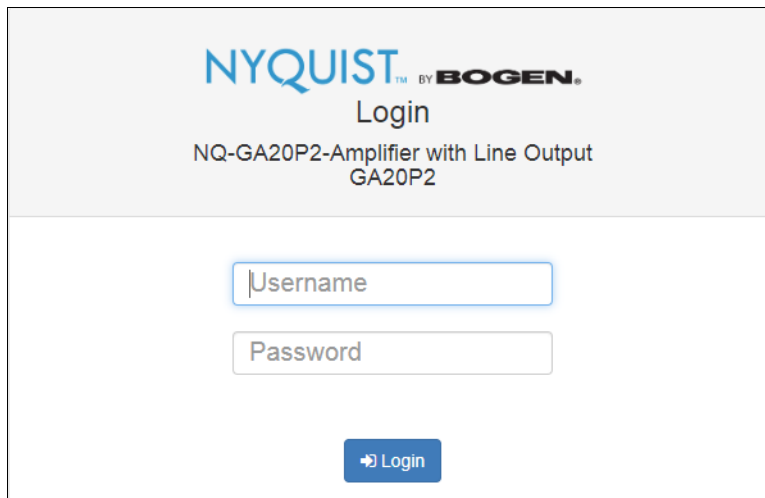
A short press of the appliance's **Reset** button reboots the device. If you press the **Reset** button for 10 seconds, the appliance returns to the factory default configuration settings. Returning to the default configuration settings does not change the appliance's firmware.

The following sections describe settings and configurations that can be applied to this device which are not controlled by the Nyquist server. For information about using Nyquist's automatic configuration process, refer to the appropriate *Nyquist System Administrator Guide*.

> Note: Do not use third-party Chrome browser extensions with the Nyquist user interface.

To access the appliance's UI:

1. Access the appliance's web UI by doing one of the following:

    a) On your web browser, enter the IP address for the appliance as the URL.

    b) From the Nyquist web UI navigation bar, select **Stations**, select **Stations Status**, navigate to the device that you want to configure, and then select the **Link** icon.
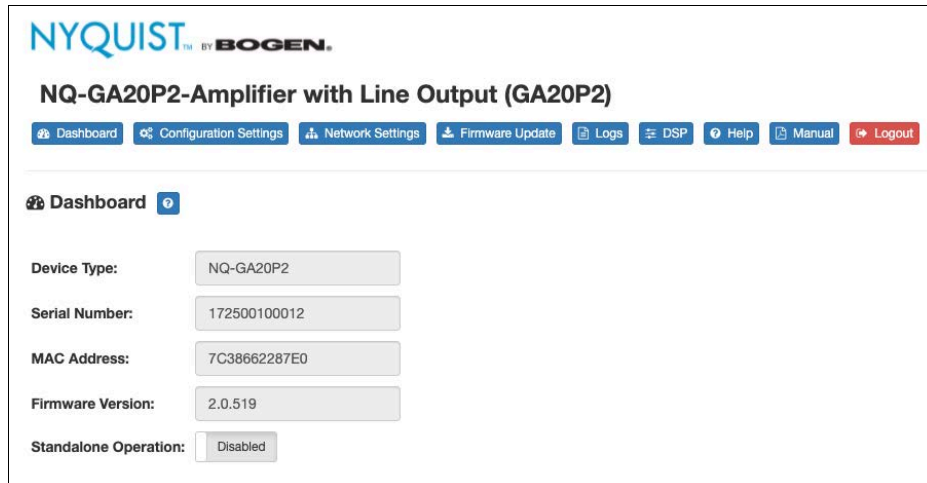
1

Figure 1. Nyquist Appliance Login

2 At the Nyquist Appliance Login page, enter username and password, and then select **Login**.

The dashboard for the selected appliance appears.

Figure 2. NQ-GA20P2 Dashboard

Using the Dashboard

The dashboard displays the following fields:

Table 1. Appliance Dashboard Fields

Device Type	Identifies the model of this device.
Serial Number	Identifies the serial number for the device.
MAC Address	Specifies the Media Access Control (MAC) address, which is a unique identifier assigned to network interfaces for communications on the physical network segment.
Firmware Version	Provides the firmware version installed on the device.
Standalone Operation	Enables or disables Standalone mode.

The following buttons are available at the top of all pages in the application.

Table 2. Appliance Dashboard Buttons

Dashboard	Displays the dashboard.
Configuration Settings	Accesses the Configuration Settings page where you can view and set various options. If Standalone Operation is not enabled, you can also receive configuration settings from a Nyquist server.
Network Settings	Accesses the Network Settings page where you can view and set network settings, such as the static IP address.
Firmware Update	Accesses the Firmware Update page where you can view the current Nyquist version, update firmware to a new version, restore the configuration to factory defaults, and reboot the appliance.
Logs	Accesses log files, which record either events or messages that occur when software runs and are used when troubleshooting the appliance.
DSP	Accesses the DSP page where you can view and set parameters for Digital Signal Processing (DSP).
Help	Accesses the appliance's online help.
Manual	Displays this appliance's configuration guide.
Logout	Logs out of the appliance's dashboard.

Standalone Operation

This device can run in Standalone Operation mode, where it will not interact with a Nyquist server (e.g., E7000 or C4000). This means the device will not:

- Fetch device configuration from Nyquist server
- Register with Nyquist server (via SIP)
- Store backup information to Nyquist server
- Allow access to Nyquist server-based NTP

Standalone Operation mode is ideal for scenarios that do not require the full functionality provided by an integrated system, such as the Bogen C4000 or E7000 Series, but has the ability to provide paging, multi-channel audio processing, and a SIP endpoint for a PBX/VoIP phone system. It can be used to play music, audio, paging, and related functions.

Updating Firmware

When you select **Firmware Update** from the appliance's web UI, the Firmware Update page appears. From this page you can determine which Nyquist firmware version the appliance is using and if an update is available. You can also load a firmware release, install the loaded firmware, restore the configuration to factory defaults, and reboot the appliance.

> *Note:* A Nyquist appliance connected to the Nyquist network receives a configuration file from the Nyquist server that includes the latest firmware available from the server. If the firmware is different from the one installed on the appliance, an automatic firmware update occurs unless the **Firmware** parameter for the station is left blank. Refer to the *Nyquist System Administrator Guide* for more information.

Figure 3. Firmware Update Page

To use the Firmware Update page:

1 On the appliance web UI's main page, select **Firmware Update** to view or update the firmware version.

2 If the device is in Standalone mode, selecting the **Check for Updates** button checks the Bogen website for the latest firmware version available. If a version newer than the one currently installed is found, it is downloaded to the appliance.

3 If you already have a firmware file you would like to install to the appliance, select **Upload Firmware** to upload the firmware file from your computer to the appliance. A popup screen appears that allows you to select the file that you want to upload. You can navigate to the file's location. After you select the file, select **Upload**.

4 The page displays the uploaded firmware version ("New Nyquist Version") and an **Update Firmware** button appears. Select this button if you want to update the appliance's firmware to the uploaded version.

5 If you want to return your appliance to its original factory configuration, select **Restore Factory Settings**.

6 Select **Reboot Appliance** to restart your appliance.

Table 3. Firmware Update settings

Current Nyquist Version	Shows the version of the appliance's currently installed firmware.
New Nyquist Version	Shows the version of the firmware that has been loaded, though not installed, onto the appliance.
Update Firmware	Available only when a new firmware version has been loaded onto the appliance (as specified in New Nyquist Version). Installs the loaded firmware. A reboot may be required after installation.
Upload Firmware	Prompts the user to specify a firmware file, which will then be loaded (though not installed) onto the appliance. *Note:* To obtain the firmware file for a specific version, please contact Bogen Customer Service.
Check for Updates	Available only when the appliance is configured for Standalone mode. Checks the Bogen website for the latest firmware version available and, if it finds a version newer than what is currently installed, downloads it to the appliance.
Restore Factory Settings	Returns the appliance to its original factory configuration. *Note:* This does not install the original appliance firmware. The firmware will not be changed.
Reboot Appliance	Restarts the appliance.

Network Settings Tab Parameters

Network settings can be configured dynamically by the Nyquist server or manually by using the appliance's web UI.

To manually configure network settings:

1 On the appliance web UI's main page, select **Network Settings**.

6

2 Select your desired network settings.

3 Select **Save**.

Figure 4. Network Settings

Network settings are described in the following table:

Table 4. Network Settings

IP Address	Identifies the IP address assigned to the appliance.
Netmask	Identifies the subnetwork subdivision of an IP network.
Gateway	Identifies the address, or route, for the default gateway.
VLAN ID	Identifies the Virtual Local Area Network (VLAN) for this appliance. Values range from 0 to 4094.
VLAN Priority	Identifies the priority of the network traffic on the VLAN. Priority can range from 0 through 7.

Table 4. Network Settings (Continued)

NTP Server	Identifies the IP address or the domain name of the Network Time Protocol (NTP) Server. *Note:* This field is only editable when Standalone Operation is enabled.
TFTP Server	Identifies the host name or IP address of the Trivial File Transfer Protocol (TFTP) server. The specified TFTP server can be used to automatically set this device's **Configuration** settings via the **Get Configuration from Server** button. If **TFTP Server from DHCP** (see below) is set to "Yes", this value will be auto-configured via DHCP option 66, assuming the DHCP server has been configured to provide option 66. For details, see the documentation for your DHCP server. *Note:* A TFTP server runs on the Nyquist server on port 69 (the standard TFTP port) and the optional Nyquist DHCP service automatically provides this TFTP address via option 66. *Note:* If this value is unspecified, the **TFTP Server from DHCP** will automatically be set to "Yes", this field will become read-only, and DHCP will be used to configure this setting. To change this value, the **TFTP Server from DHCP** setting must be set to No, which makes the field editable. *Note:* This setting is not available when Standalone Operation is enabled.
TFTP Server from DHCP	"Yes" means the device will use the DHCP option 66 value to retrieve an address for the TFTP Server from DHCP. "No" means the device will ignore the DHCP option 66 value and use the manually configured value of the TFTP Server (see above). *Note:* This setting is not available when Standalone Operation is enabled.

Table 4. Network Settings (Continued)

DHCP Enabled	Indicates if the device is enabled to use DHCP to retrieve its IP configuration.
Reboot Appliance	Indicates that this appliance should reboot when the Save button is clicked.

Configuration Settings Tab Parameters

The way to configure this Nyquist appliance is to obtain configuration settings from the Nyquist server by selecting **Get Configuration From Server**.

To view or modify the Nyquist appliance configuration:

1 On the appliance Web UI's main page, select **Configuration Settings**.

2 View the settings as described in Table 5 on page 10 for normal configuration, or modify the settings as described in "*Standalone Operation Configuration Settings" on page 11* for Standalone Operation configuration.

3 If changes were made (Standalone Operation only), click the **Save Configuration Settings** and/or **Save Multicast Addresses** buttons to save your changes.

Figure 5. Appliance Configuration Settings

The following table describes the Configuration Settings tab settings when Standalone Operation is *not* enabled for this device:

Table 5. Configuration Settings (Standalone disabled)

Web Username	Provide a web username for this appliance.
Emergency-All-Call	Identifies the IP address, port number, cut level (volume), and station list used for emergency all-call pages.
All-Call	Identifies the IP address, port number, cut level (volume), and station list used for all-call pages.
Audio Distribution	Identifies the IP address, port number, cut level (volume), and station list used for audio distribution.
Multicast #	Identifies the IP address, port number, cut level (volume), and station list used for the multicast audio stream of one (or more) zones.

The **Configuration Settings** tab also displays the following information for each **Device Station** attached to the amplifier:

Port Number	Shows the port number of the appliance.
Port Type	Shows the device type to which the port connects.
Account ID	Shows the SIP account (IP address) associated with the device preceded by the extension of the device associated with this port.
Local Port	Shows the port used for SIP.
Username	Shows the username or extension for the station associated with the port.

Standalone Operation Configuration Settings

Figure 6. Appliance Configuration Settings (Standalone enabled)

The following table describes the **Configuration Settings** tab settings when Standalone Operation is enabled for this device:

Table 6. Configuration Settings (Standalone enabled)

Device Type	Displays the type of this device.
Device Name	Provides a name for this device.
Web Username	Specifies a web username for this appliance.

Table 6. Configuration Settings (Standalone enabled)

Web Password	Specifies a web password for logging into the appliance.
Web Confirm Password	Re-enter the password used to log into the appliance.
Time Zone	Specifies the time zone in which the device resides.
Enable SIP Calls	Enables this device to receive one-way SIP calls, wherein only the caller can be heard (such as announcements). If enabled, a number of SIP-related configuration settings are displayed.
SIP Server Address[a]	Specifies the IP address of the SIP Registration Server with which the device will register.
SIP Network Port[a]	Specifies the IP port on which to communicate with the SIP Registration Server (typically 5060).
SIP Codecs[a]	Displays a read-only list of codecs allowed on SIP sessions.
SIP Extension[a]	Specifies the SIP extension for this device.
	The extension, along with the IP address, is used to specify the URI used to place a SIP call to this extension: `sip:<extension>@<local_ip_address>`
SIP Username[a]	Specifies the SIP user name used to register Channel A, B, C, or D with the SIP server.
SIP Password[a]	Specifies the SIP registration password used to register Channel A, B, C, or D with the SIP server.
Output Power (Watts)[a]	Specifies the output power for the amplifier in Watts. Valid values are: 1/8, 1/4, 1/2, 1, 2, and 4.
Cut Level[a]	Cut level for intercom calls. This can be a value from -42 to 0 dB.

a. Available only when Enable SIP Calls has a value of Yes.

The following parameters appear for each Multicast Address configured for this device.

Multicast IP Address	Specifies the multicast IP address on which to receive audio streams.
Multicast Port Number	Specifies the multicast port on which to receive audio streams.

Codec   Specifies the codec to be used when decoding audio.
                              Select one of the following values:

- G711 u-law

    - Intercom call quality

    - A narrowband audio codec that provides toll-quality audio at 64 kbps. The u-law version is primarily used in North America and Japan.

- G711 a-law

    - Intercom call quality

    - A narrowband audio codec that provides toll-quality audio at 64 kbps. The a-law version is primarily used in most countries outside of North America and Japan.

- G722

    - Tone and paging quality

    - A wideband audio codec operating at 48, 56, and 64 kbps.

- OPUS

    - Music quality

    - An audio codec format designed for speech and general audio, supporting low latency, constant and variable bitrate encoding (6 to 510 kbps), and five sampling rates (from 8 to 48 kHz).

Channels   Channel(s) on which the audio streams will be output.

                              One or more of the following values:

- Speaker

Tip: Fine tuning of levels per output channel can be adjusted using DSP settings.

Cut Level (dB)   Specifies the cut level for the audio stream.

                              This can be a value from -70 to 0 dB.

                              The default value is -20 dB.

                              Note: To modify, click on the value, adjust the slider on the popup using the cursor keys or mouse, and click the check box button.

Tip: To fine tune the cut level per channel, adjust the gain settings on the DSP Router.

Note: A maximum of 24 multicast entries is supported.

Multicast Addresses should be ordered by priority, highest priority first. If multiple streams are active on the same channel simultaneously, the one with the highest priority will be played. Set the **Sorting** switch to Enabled and drag entries using the 4-way arrow symbols to drag entries up and down to rearrange the priorities.

Accessing Log Files

A log file records events and messages that occur when software runs, to be used when troubleshooting the appliance. From the appliance's web-based UI, log files can be viewed directly or exported via download to your PC, Mac, or Android device, where they can be copied to removable media or attached to an email for technical support.

To view a log file:

1 On the appliance Web UI's main page, select **Logs**.

2 From the drop-down menu, select the log that you want to view.
Multiple versions of the same log, and zipped copies of the log, may be available.

3 To export the file, select **Export**.
A link to a .txt file appears in the browser's lower left corner.

Figure 7. Logs

Available logs are described in the following table. If a log file is empty, however, it will not appear in the drop-down list of available logs.

Table 7. Logs

Log	Description
ampws.log	Contains information about protection status and logs protection events with temperature information at the time of event.
auth.log	Contains system authorization information, including user logins and authentication methods that were used.
btmp	Contains information about failed login attempts.
daemon.log	Contains information logged by the various back-ground daemons that run on the system.
debug	Contains errors and debug information.
dpkg.log	Contains information that is logged when a package is installed or removed using dpkg command.
faillog	Contains user failed login attempts.

15

Table 7. Logs (Continued)

Log	Description
kern.log	Contains information logged by the kernel and recent login information for all users.
lastlog	Contains information on the last login of each user.
messages	Contains messages generated by Nyquist.
php5-fpm.log	Contains errors generated by the PHP script.
syslog	Contains list of errors that occur when the server is running and server start and stop records
user.log	Contains information about all user level logs.
wtmp	Contains historical record of users logins at which terminals, logouts, system events, and current status of the system, and system boot time.

Setting DSP Parameters

When you select **DSP** from the appliances web UI, the DSP page appears.
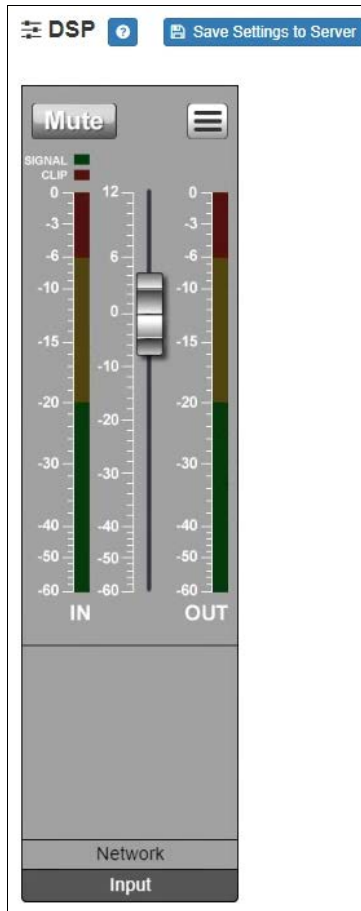
Figure 8. DSP Page with Channel Drop-Down Menu

From this page, you can adjust settings in the DSP. The appliance uses traditional processors (for example, Compressor, Limiter) for audio signals in the digital domain.

The DSP page shows **Mute** and **Level** selections for the input channel and allows you to adjust the channel input level.

Selecting the **Menu** button displays other parameters. DSP parameters and the Mute and Level buttons are described in the following table:

Table 8. DSP Page

Save Settings to Server	Backs up the DSP settings to the server. If this device is later replaced or reset to factory defaults, these DSP settings can be restored when the new device is "swapped" for the old on the Nyquist server.
	Note: This button appears on each DSP feature page.
Mute	Silences the audio.

17

Table 8. DSP Page

DSP Features button ☰	Presents a menu of DSP features that can be applied to the corresponding channel.
Level Slider	Adjusts the channel volume level in 1-dB increments.
Signal LED	Illuminates when a signal is present.
IN VU meter	Indicates the strength of the *analog input* signal.
OUT VU meter	Indicates the strength of the *network send* signal.
Input Gain	Adjusts the strength of the *analog input* signal.

The DSP features that can be applied to a channel, accessible through the DSP Features menu, are described in the following table.

Table 9. DSP Features

Compressor	Lessens the dynamic range between the loudest and quietest parts of an audio signal.
High/Low Pass	Sets the band of frequencies that will pass through the high pass and low pass filters and selects the type of filter that is used.
Limiter	Prevents a signal from exceeding an adjustable maximum level.
Outputs	Allows you to enable speaker or line outputs and to adjust the volume level for each output.
Parametric EQ	Uses a center/primary frequency to allow tailoring of the frequency content of an audio signal.
Settings	Allows you to provide names and colors for the input channel.
Signal Present	Illuminates green when audio is present in the channel input.
Reset button ↺	Present on almost all DSP screens other than the main mixer, this button will reset the DSP settings to the displayed feature's default setting.

Setting the Channel Level

The Channel Level control is a vertical slider that is adjusted in 1-dB increments and controls the output level for the channel. The Channel Levels can range from -60 to 12 dB. If you place the mouse over the slider, the numerical value of the level appears.

Adjusting Volume Levels

The vertical slider control can be used to adjust the channel's output level in 1-dB increments between -60 and +12 dB. The overall adjusted output level of the channel signal can be viewed on the **OUT** VU meter, marked in 2-dB increments between -60 and 0 dB.

Tip: For best results, use the vertical slider to adjust the input level until you have a strong signal (i.e., within the green and yellow areas on the meter), then adjust the final output levels using the DSP Outputs controls.

To adjust the channel volume level:

1   On the appliance Web UI's main page, select **DSP**.

2   Use the channel's slider to adjust the volume level.

Knob Adjustments

Many DSP controls use knobs to adjust one or more settings. The value of a knob can be adjusted in one of two ways:

1   Click the knob control, hold the mouse button down, and drag the mouse up or down to increase or decrease the value.

2   Double-click the knob, type a value into the resulting popup, and click the Save button.

Signal Indicators

Each input channel has signal indicators and two vertical volume unit (VU) meters, labeled "IN" and "OUT".

The green input signal LED(s) automatically illuminates when a signal is being received.

The red **Clip** LED automatically illuminates when the signal is clipping (i.e., exceeding a predefined threshold). Clipping can result in distortion and, for output signals, can even damage speakers. Note that the specific level and duration that a signal must reach in order to trigger the input signal LED can be configured via the **Signal Present** settings.

The "IN" VU meter indicates the strength of the channel's input signal (after gain adjustments), while the "OUT" VU meter indicates the strength of the channel's output signal. The VU meter not only illuminates green, yellow, or red (depending on the signal level), but also has a scale ranging from -60 to 0 dB to indicate the actual signal level.

Muting a Channel

You can mute a channel to cut off an audio signal and stop the input signal from being sent to the output channel. Note the input signal will still be visible on the IN meter, but the OUT meter will show that nothing is being forwarded to the output channel.

To mute a channel:

1 On the appliance Web UI's main page, select **DSP**.

2 Click the **Mute** button for the channel that you want to silence.

The **Mute** button will illuminate red. You can click the **Mute** button again to unmute the channel.

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Adjusting Compression Settings

A compressor reduces the dynamic range of a signal. This effect is perceived as quieting loud sounds and boosting quiet sounds.

Figure 9. Compressor Settings

To adjust the compressor settings for a channel:

1 On the appliance Web UI's main page, select **DSP**.

20

2 Select the **Menu** button for the channel.

3 From the drop-down menu, select **Compressor**.

4 Make desired adjustments using the controls described in *Table 10, "Compressor Settings," on page 21*.

Note: If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

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5 Select **Enable** to apply the settings to the selected channel.

Table 10. Compressor Settings

Enable	Enables or disables the compressor DSP effect for this channel.
Threshold	Sets the threshold level, which is the point where the signal activates the compressor circuit.
	The range is -135 to +21 dB.
Attack	Sets how quickly or slowly compression will be applied to the signal once the audio signal goes above the threshold level. It specifies the length of time over which the compression ratio will gradually increase from no compression to full compression.
	The range is 1 to 500 ms.
Hold	Sets how long compression will be applied after the signal has fallen below the threshold.
	The range is 1 to 500 ms.
Decay	Sets how quickly or slowly compression will be removed from the signal after the signal has dropped below the threshold *and* the Hold interval has expired. It specifies the length of time over which the compression ratio will gradually decrease from full compression to no compression.
	The range is 0 to 2000 ms.

Table 10. Compressor Settings

Knee	Sets how far below the threshold compression will begin to be *gradually* applied to the signal. A very low value, known as a *hard knee*, immediately applies full compression once the threshold is reached. A high value, known as a *soft knee*, will gradually start applying compression before the signal reaches the threshold, not reaching the full effect until the threshold is reached, thereby "rounding off" the compression effect. Increasing the knee level decreases the obvious transition from the uncompressed to the compressed sound. The range is 1 to 100 dB.
Ratio	Sets the compression ratio to be applied to the signal. For example, if the ratio is set for 6 (6:1), the input signal must increase by 6 dB for the output level to increase by 1 dB. The range is 1 to 100.
Input meter	Shows the strength of the input signal.
Output meter	Shows the strength of the output signal, providing a visual indicator of the effect of the compressor on the output signal.
Comp LED	Illuminates when compression is being applied to the signal.

Setting High Pass/Low Pass Parameters

High-pass filters allow signals that are higher than the specified frequency and attenuate signals that are lower. Low-pass filters allow signals that are lower than the specified frequency and attenuate signals that are higher. When combined, they are known as a *band-pass filter*. Band-pass filters can be used to tailor the frequency response of a microphone exclusively for vocals, which can be very useful in a noisy environment to filter out the higher and lower frequencies that could mask the human vocal range during announcements.

You can specify the range of frequencies that will pass through the high-pass and low-pass filters and select the type of filter that is used through the channel's **High/Low Pass** drop-down menu option.

Figure 10. High/Low Pass Parameters

To adjust the high/low pass parameters for a channel:

1 On the appliance Web UI's main page, select **DSP**.

2 Select the **Menu** button for the channel.

3 From the drop-down menu, select **High/Low Pass**.

> *Note:* If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

4 Set the parameters described in the following table:

Table 11. High/Low Pass Parameters

High-Pass (Low Cut)

This feature helps eliminate low-frequency noise (signals of 100 Hz and below, such as background rumble from ventilation systems, etc.) and is used primarily with microphone-level input. It is particularly effective when handheld microphones are used.

Frequency	Set the cutoff frequency. You can adjust the frequency by moving the knob (click and move up or down) or by double-clicking the knob and typing the frequency. When typing the frequency, only numeric values from 20 Hz to 20,000 Hz can be entered.
	The high-pass filter attenuates content below this frequency and lets frequencies above this cutoff frequency pass through the filter.
Type	Available filter types are:
	• Linkwitz-Riley (12, 24, 36, and 48 dB per octave)
	• Butterworth (6, 12, 18, 24, 30, 36, 42, and 48 dB per octave)
	• Bessel (12, 18, and 24 dB per octave)
	Note: The term "dB per octave" describes how steeply frequencies below the selected cutoff frequency are attenuated. For example, if the cutoff frequency is 100 Hz and the filter type specifies 12 dB per octave, a 50-Hz signal (i.e., one octave lower) will be attenuated by 12 dB and a 25-Hz signal (i.e., two octaves lower) will be attenuated by an additional 12 dB.

Table 11. High/Low Pass Parameters (Continued)

Low-Pass (High Cut) This feature helps eliminate high-frequency noise (signals of 8000 Hz and above) such as background hiss and sibilance (excessive "S" in vocals, etc.) and is used primarily with microphone-level input. It is particularly effective when handheld microphones are used.	
Frequency	Set the cutoff frequency. You can adjust the frequencies by moving the knob (click and move up or down) or by double-clicking the knob and typing the frequency. When typing the frequency, only numeric values from 20 Hz to 20,000 Hz can be entered. The low-pass filter attenuates content above this frequency and lets frequencies below this cutoff frequency pass through the filter.
Type	Available filter types are: • Linkwitz-Riley (12, 24, 36, and 48 dB per octave) • Butterworth (6, 12, 18, 24, 30, 36, 42, and 48 dB per octave) • Bessel (12, 18, and 24 dB per octave) *Note:* The term "dB per octave" describes how steeply frequencies above the selected cutoff frequency are attenuated. For example, if the cutoff frequency is 8,000 Hz and the filter type specifies 12 dB per octave, a 16,000-Hz signal (i.e., one octave higher) will be attenuated by 12 dB and a 32,000-Hz signal (i.e., two octaves higher) will be attenuated by an additional 12 dB.

Adjusting the Limiter

A limiter is a compressor with a high slope (i.e., attack) that is used to prevent a signal from exceeding a set decibel level. Limiters are used as safeguards against signal clipping.

Limiter parameters are set per channel.

Figure 11. Limiter Settings

To adjust the limiter settings for a channel:

5 On the appliance Web UI's main page, select **DSP**.

6 Select the **Menu** button for the channel or select the **Menu** button for the **Output**.

7 From the drop-down menu, select **Limiter**.

Note: If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

8 Adjust the following settings as needed:

26

Table 12. Limiter Settings

Threshold	Sets the signal level at which the limiter is triggered. Any signal exceeding this threshold will be compressed to this level. The range is -24 to +24 dB.
Decay	Sets the rate for turn off of the limiter after the signal is below the threshold. Decay range is 5 to 2300 milliseconds.
RMSTC **(Root Mean Square Time Constant)**	Sets how fast the limiter reacts to a signal that has exceeded the threshold. RMSTC range is 50 to 10000 dB/sec.

Adjusting Outputs

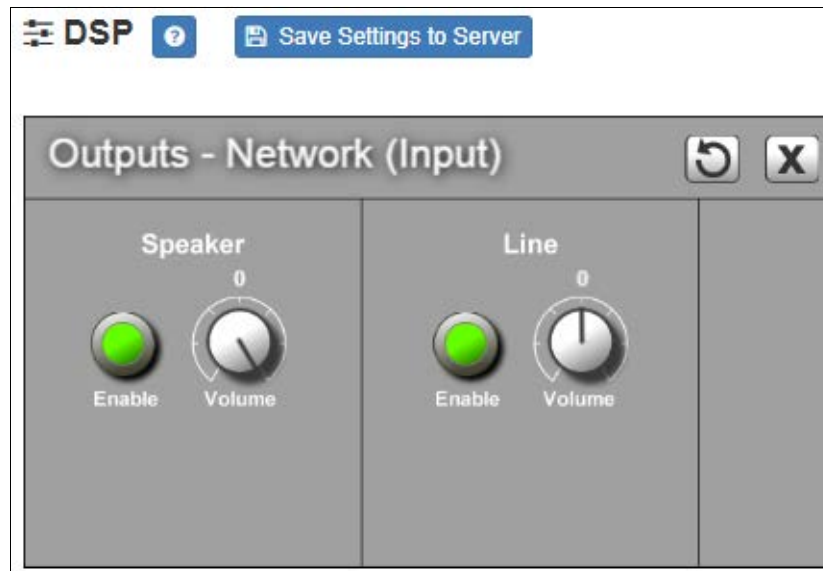Selecting **Outputs** allows you to enable and adjust the volume levels for speaker and line outputs.

Figure 12. Outputs

To adjust outputs for speaker or line:

1   On the appliance Web UI's main page, select **DSP**.

2   Select the **Menu** button.

3   From the drop-down menu, select **Outputs**.

4   To enable outputs for a speaker or line, select **Enable** for the corresponding output.

5   Make desired Volume adjustments by adjusting the knob. Volume levels range from 0 to 15 dB for the Speaker Output and -15 to 15 dB for the Line Output.

Adjusting Parametric Equalizer Settings

A parametric equalizer is a multi-band variable equalizer that allows control of frequency amplitude (boost/cut), center frequency, and frequency bandwidth, or Q.
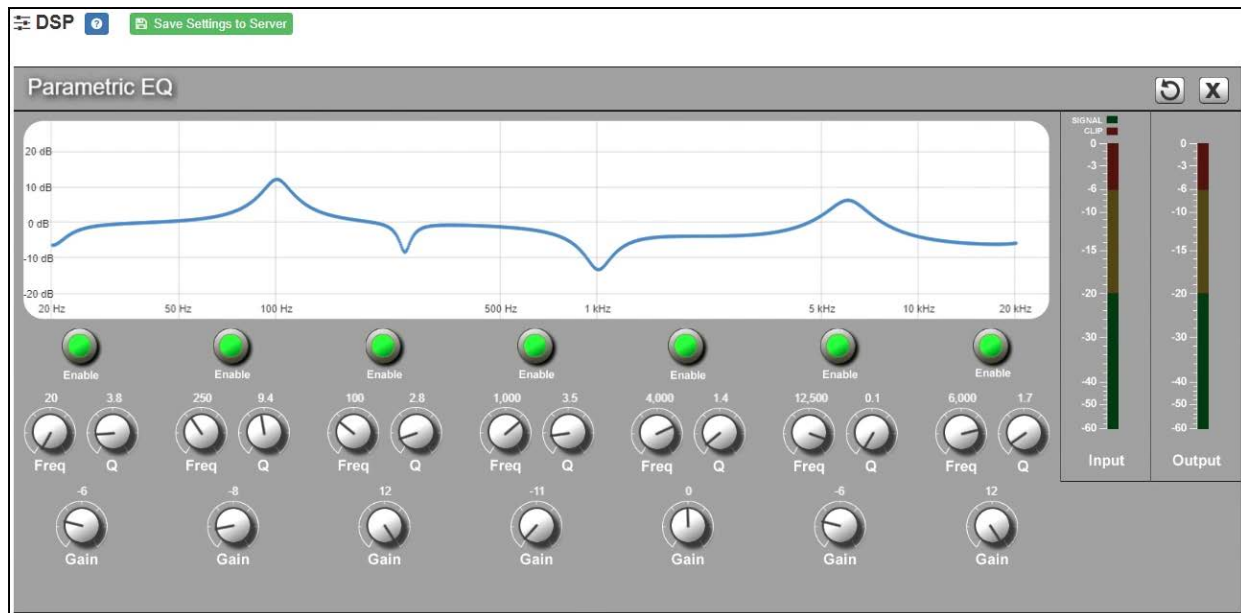

Figure 13. Parametric Equalizer Settings

The parametric equalizer settings for your device allows you to adjust the Q and gain for seven separate frequencies, which then become plot points on the screen's graph.

To adjust the parametric equalizer settings for a channel:

1   On the appliance Web UI's main page, select **DSP**.

2   Select the **Menu** button for the channel.

3   From the drop-down menu, select **Parametric EQ**.

28

> *Note:* If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

4   Adjust frequencies as desired, ensuring the **Enable** LEDs are green for each selected frequency. You can adjust the frequencies by moving the **Freq** knob or by double-clicking the knob and typing the frequency. When typing the frequency, only numeric values from 20 to 20,000 can be entered.

5   Make desired **Q** adjustments by adjusting knob (or double-clicking and typing the desired adjustment). Q can be from 0.1 to 20 and sets how wide to either side of the selected frequency the adjacent frequencies are affected.

Q is the Quality or Quality Factor, which refers to the bandwidth of one band of a parametric equalizer. Q is calculated by dividing the center frequency in Hz by the width of the boost or cut zone, +3 dB or -3 dB above or below 0 dB.

6   For each frequency, use the **Gain** knob or double-click the knob and type the gain to either boost (turn up) or cut (turn down).

Gain knobs can be moved between +12 or -12 dB. By default, each knob is set at 0 dB, which means that no frequencies are being boosted or cut.

7   Select **Save Settings to Server**.

Settings

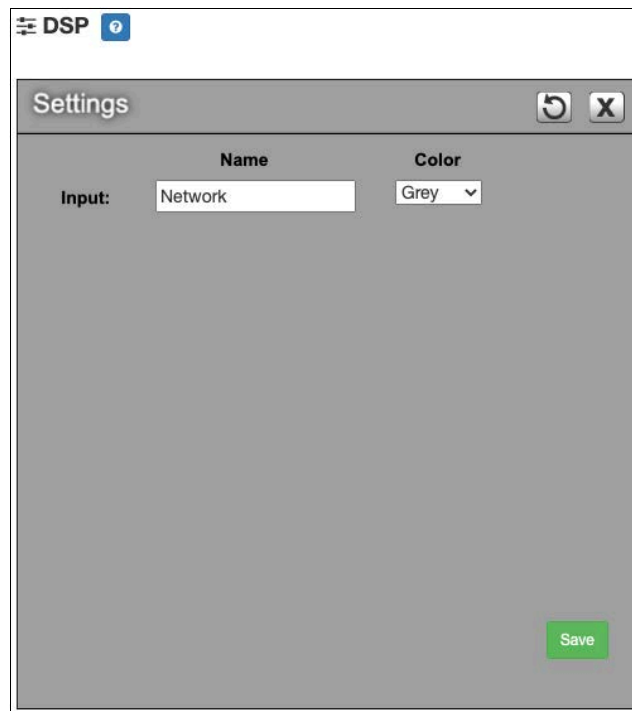You can set select a name and a color for the input channel.

Figure 14. Settings Parameters

To adjust the settings for the channel:

1 On the appliance Web UI's main page, select **DSP**.

2 Select the **Menu** button for the channel.

3 From the drop-down menu, select **Settings**.

4 Type the name that you want to display for the channel.

5 Select a color that will be used to highlight the channel.

Note: If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

6 Select **Save**.

Signal Present

You can configure the threshold level that a signal must reach before the signal LED is lit, as well as how long the LED will remain lit. You can configure this for each channel.

Figure 15. Signal Present Parameters

To adjust the Signal Present settings for a channel:

1 On the appliance Web UI's main page, select **DSP**.

2 Select the **Menu** button for the channel.

3 From the drop-down menu, select **Signal Present**.

> *Note:* If you want to return to the factory settings, select the **Reset** icon that appears in the right corner.

4   Adjust the following settings as needed.

<div align="center">

Table 13. Signal Present Parameters

</div>

Threshold	Sets the minimum level the signal must reach before the signal LED is illuminated.
	Threshold range is -144 to +24 dB.
Hold	Sets the minimum number of milliseconds that the signal LED will remain illuminated.
	Hold range is 2 to 200 milliseconds.