Nyquist Integrated Power Amplifier
Configuration Manual
NQ-GA20P2

BOGEN®
COMMUNICATIONS, INC.

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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.

You can let the Nyquist server or system controller automatically discover and configure the NG-GA20P2, or you can manually configure it 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 the process for manual configuration. For information about using Nyquist's automatic configuration process, refer to the appropriate ***Nyquist System Administrator Manual***.

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

To access the appliance's UI:

Step 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.
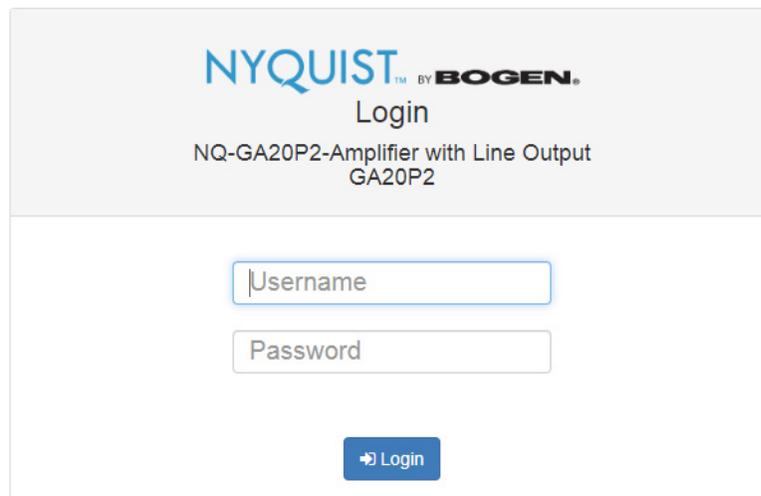
Figure 1, Nyquist Appliance Login

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

The dashboard for the selected appliance appears.
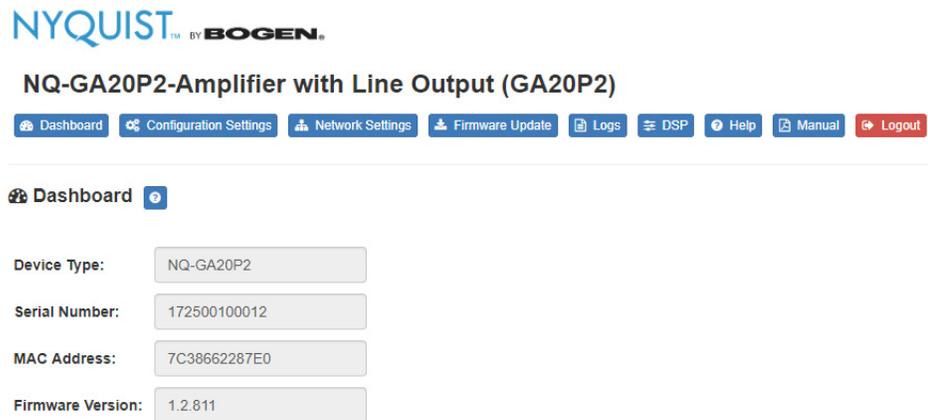
Figure 2, NQ-GA20P2 Dashboard

1 Using the Dashboard

The dashboard displays the following read-only fields:

Table 1, Appliance Dashboard Read-Only Fields

Device Type	Identifies the physical device used by the station.
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 station.

The dashboard also contains the following buttons:

Table 2, Appliance Dashboard Buttons

Dashboard	Refreshes the dashboard.
Configuration Settings	Accesses the Configuration Settings page where you can either manually set various options, such as the SIP Username, or select to receive configuration settings from the 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, check for updates, restore factory settings, 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 the Nyquist Manual.
Logout	Logs out of the appliance's dashboard.

2   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 version the appliance is using and if an update is

required. You can also use this page to restore factory settings and to 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 later than 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 Manual* for more information.

Figure 3, Firmware Update Page

To use the Firmware Update page:

Step 1   On the appliance web UI's main page, select **Firmware Update** to ensure you have the latest firmware version.

Step 2   Select **Upload Firmware** to upload firmware from the server to the appliance.

If you select this option, 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**. If Nyquist discovers a new firmware version, the Firmware Update page displays an **Update Firmware** button. Select this button if you

want to update the appliance's firmware to the new version.

Step 3   If you want to return your appliance to its original state (undoing firmware updates), select **Restore Factory Settings**.

Step 4   Select **Reboot Appliance** to restart your appliance.

3 Setting Network 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:

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

Step 2   Select your desired network settings.

Step 3   Select **Save**.

Figure 4, Network Settings

Network settings are described in the following table:

Table 3, Network Settings

Static IP	Identifies the fixed IP address assigned to the appliance by a system administrator.
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.
NTP Server	Identifies the IP address or the domain name of the Network Time Protocol (NTP) Server. This field is read only.
TFTP Server	Identifies the IP address of the Trivial File Transfer Protocol (TFTP) server. TFTP is used by Nyquist VoIP phone and appliance provisioning. A TFTP server runs on the Nyquist server on port 69 (the standard TFTP port #).
	Device provisioning files are stored on the Nyquist server in directory: `/srv/ tftp.` This is the only directory exposed by the TFTP server.
DHCP Server Override	Indicates if you want to override the TFTP server information provided by the Dynamic Host Configuration Protocol (DHCP) via option_66.
	DHCP supplies IP addresses to the Nyquist server and associated devices. It also supplies the TFTP server IP address or name via option_66.
DHCP Enabled	Indicates if the device is enabled to use DHCP.
Reboot Appliance	Allows you to save the network options and reboot the appliance.

4 Setting Configuration Tab Parameters

The easiest way to configure Nyquist appliances is to obtain configuration settings from the Nyquist server by selecting **Get Configura-**

tion From Server. However, you can manually configure an appliance through the appliance's Web UI.

Note: Manual configuration will be overwritten by the server once the appliance is connected and discovered by the server.

To manually configure your Nyquist appliance:

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

Step 2   Select your desired settings.

Step 3   Select **Save**.

Figure 5, Appliance Configuration Settings

The following table describes the Configuration tab settings:

Table 4, Configuration Settings

Web Username	Provide a web username for this appliance.
Web Password	Provide a web password for logging into the appliance.
Web Confirm Password	Re-enter the password used to log into the appliance.
SIP Username	Provide the username used for Session Initiation Protocol (SIP) device registration.
SIP Password	Provide the password used for SIP device registration.
SIP Confirm Password	Re-enter the password used for SIP device registration.
Server	Identifies the IP address of the Nyquist server.
Local Port	Identifies the local port.
Emergency-All-Call	Identifies the IP address, port number, and volume used for emergency all-calls pages.
All-Call	Identifies the IP address, port number, and volume used for all-calls pages.
Audio Distribution	Identifies the IP address, port number, and volume used for audio distribution.

5 Accessing Log Files

A log file records either events or messages that occur when software runs and is 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 and then copied to removable media or attached to an email to technical support.

To view a log file:

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

Step 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.

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

Figure 6, Logs

Available logs are described in the following table:

Table 5, Logs

Log	Description
alternatives.log	Contains information by the update-alternatives, which maintain symbolic links determining default commands.
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.
bootstrap.log	Contains information actions, errors, and warnings that occur during booting of the appliance.
btmp	Contains information about failed login attempts.
daemon.log	Contains information logged by the various background daemons that run on the system.
debug	Contains errors and debug information.
dmesg	Contains kernel ring buffer information. When the system boots up, the screen displays information about the hardware devices that the kernel detects during the boot process. These messages are available in the kernel ring buffer, and whenever a new message comes, the old message gets overwritten.
dpkg.log	Contains information that is logged when a package is installed or removed using dpkg command.
faillog	Contains user failed login attempts.
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.

Table 5, Logs (Continued)

Log	Description
wtmp	Contains historical record of users logins at which terminals, logouts, system events, and current status of the system, and system boot time.
wvdialconf.log	Contains basic information about the modem port, speed, init string, and Internet Service Provider (ISP).

6   Setting DSP Parameters

When you select **DSP** from the appliances web UI, the DSP page appears.
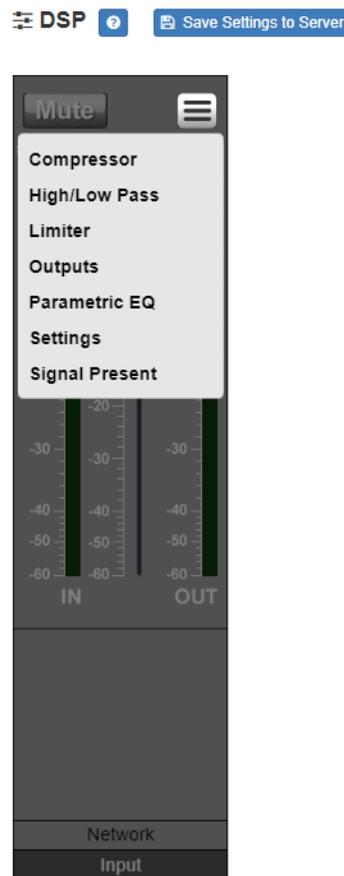
Figure 7, DSP Page with Channel Drop-Down Menu

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 set the input and output channel level.

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

Table 6, DSP Page

Mute	Silences the audio.
Level	Adjusts the channel volume leve in 1 dB increments.
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.

6.1   Setting the Channel Level

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

To adjust the channel volume level:

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

Step 2   Use the slider for the **Channel Level** to adjust the level for the selected channel.

6.2   Muting a Channel

You can mute a channel to cut off an audio signal and stop the production of sound.

To mute a channel:

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

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

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

6.3   Adjusting Compression Settings

A compressor slightly reduces the dynamic range of a signal. This effect is perceived to quiet loud sounds and boost quiet sounds. A compressor smooths transients. Compressor parameters are set per channel. The Compressor dialog box has LEDs for the input and output signals.
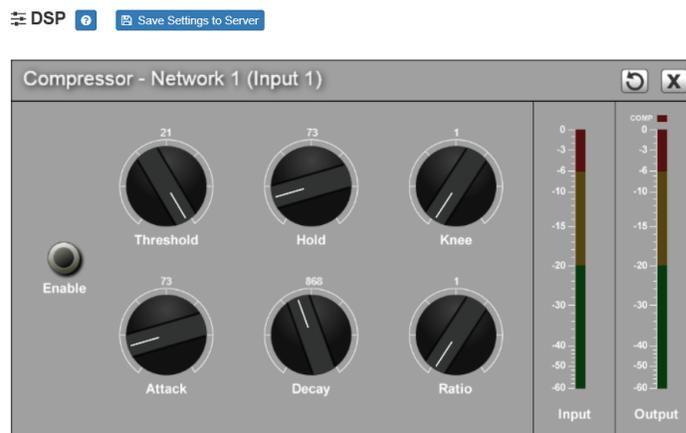
**Figure 8, Compressor Settings**

To adjust the compressor settings for a channel:

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

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

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

Step 4   Make desired adjustments using the controls described in "Compressor Settings" on page 18.

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

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

Table 7, Compressor Settings

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 fast the compressor turns on when the audio signal passes the threshold level. The range is 1 to 500 ms.
Hold	Sets how long the compressor is on after the signal has fallen below the threshold. The range is 1 to 500 ms.
Decay	Sets the rate of turn off of the compressor after the signal is below the threshold.he range is 0 to 2000 ms.
Knee	Sets how the compressor reacts to signals once the threshold is reached. Increasing the knee level decreases the obvious transition from the uncompressed to the compressed sound. The range is 1 to 100.
Ratio	Sets the compression ratio. For example, if the ration is set for 6 (6:1), the input signal must cross the threshold by 6 dB for the output level to increase by 1 dB. The range is 1 to 100.

6.4   Setting High Pass/Low Pass Parameters

You can set the band 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 9, High/Low Pass Parameters

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

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

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

Step 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.

Step 4   Set the parameters described in the following table:

Table 8, High Pass/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 hand held microphones are used.

Frequency	Set the cutoff frequency. You can adjust the frequencies by moving the knob 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 to pass through the filter.
Type	Available filter types are: • Linkwitz-Riley (12, 24, and 36 dB per Octave) • Butterworth (12, 18, and 24 dB per Octave) • Bessel (12, 18, and 24 dB per Octave) The filter type name and the selected dB appear above the knob.

Table 8, High Pass/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 hand held microphones are used.

Frequency	Set the cutoff frequency. You can adjust the frequencies by moving the 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. The low pass filter attenuates content above this frequency and lets frequencies below this cutoff level to pass through the filter.
Type	Available filter types are: • Linkwitz-Riley (12, 24, and 36 dB per Octave) • Butterworth (12, 18, and 24 dB per Octave) • Bessel (12, 18, and 24 dB per Octave) The dB per Octave refers to how steep the roll off of the filter is after the selected cutoff frequency. The filter type name and the selected dB appear above the knob.

Band pass filters consist of a High Pass/Low Cut and a Low Pass/High Cut filter. This arrangement can be useful for tailoring the frequency response of a microphone exclusively for vocals, sometimes useful in a very noisy environment to filter out the higher and lower frequencies that could mask the human vocal range during announcements.

6.5   Adjusting the Limiter

A limiter is a compressor with a high slope that is used to prevent a signal exceeding a set decibel level. Limiters are used as safeguards against signal clipping. Limiter parameters are set per channel.

Figure 10, Limiter Settings

To adjust the limiter settings for a channel:

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

Step 2   Select the **Menu** button for the channel or select the **Menu** button for the **Output**.

Step 3   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.

Step 4   Adjust the following settings as needed:

Table 9, Limiter Settings

Threshold	Sets the signal level at which the limiter is enabled. The range is -24 to +24 dB.

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Table 9, Limiter Settings (Continued)

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	Sets how fast the limiter reacts to the above threshold signal. RMSTC range is 50 to 10000.

6.6 Adjusting Outputs

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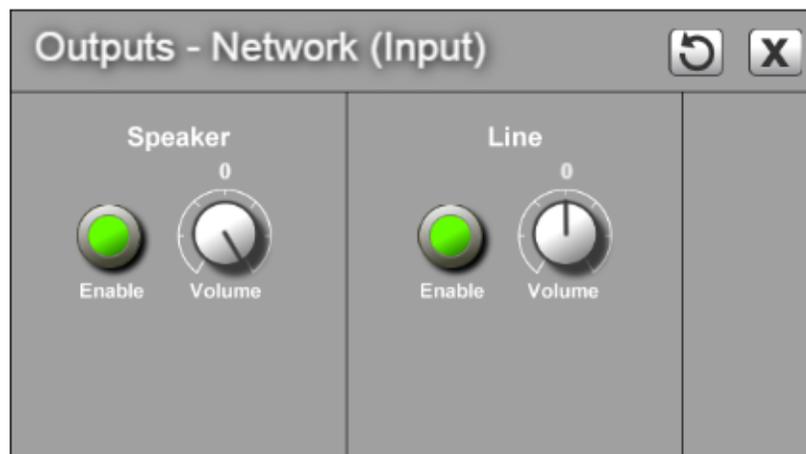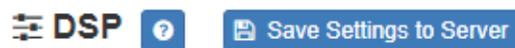

Figure 11, Outputs

To adjust outputs for speaker or line:

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

Step 2   Select the **Menu** button.

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

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

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

6.7   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.
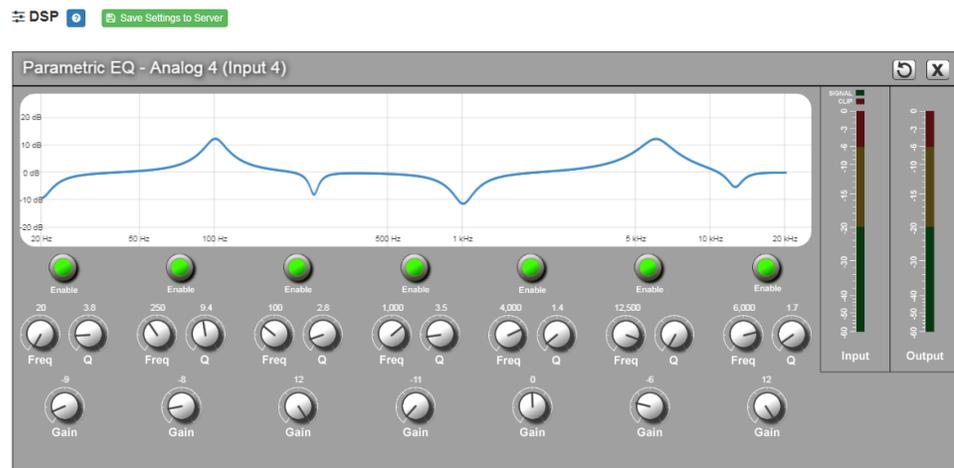
Figure 12, Parametric Equalizer Settings

The parameter 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:

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

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

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

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

Step 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.

Step 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.

Step 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.

Step 7   Select **Save Settings to Server**.

6.8   Settings

You can set select a name and a color for the input channel.
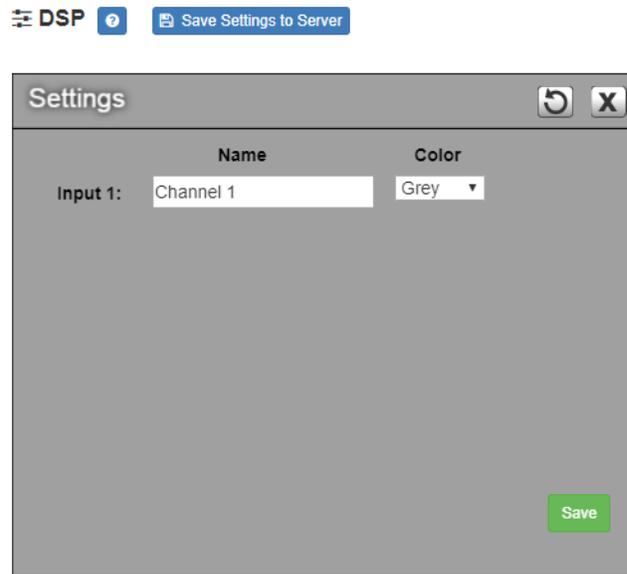
Figure 13, Settings Parameters

To adjust the settings for the channel:

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

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

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

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

Step 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.

Step 6   Select **Save**.

6.9   Signal Present

You can set parameters for when a channel accepts a signal. You can set specific parameters for each input channel and for the output channel.
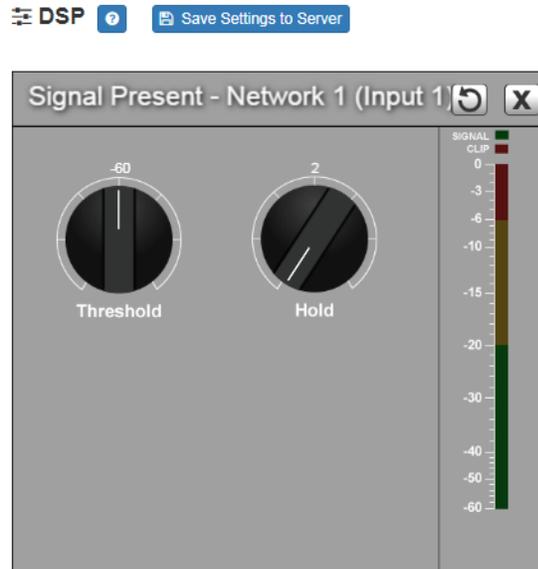
Figure 14, Signal Present Parameters

To adjust the Signal Present settings for a channel:

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

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

Step 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.

Step 4   Adjust the following settings as needed.

Table 10, Signal Present Parameters

Threshold   Sets the threshold level, or at what level the
                           Signal LED is illuminated.

Hold   Sets the number of milliseconds that the sig-
                           nal light stays on after the signal is no longer
                           present.