wahsega labs

IP Paging Zone Controller with VoIP

User's Guide

Getting Started

This step by step guide will help you setup and install your Wahsega Labs IP Paging Zone Controller with VoIP.

Important Notice

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Chapter 1
Overview

Receive broadcasted audio and voice to analog paging speakers within specified zones using the Wahsega IP Paging Zone Controller with VoIP. Leveraging the power of VoIP, it can use any SIP-based telephone system to create a large paging network using existing VoIP telephones. The Wahsega IP Paging Zone Controller with VoIP is perfect for paging applications in school auditoriums, multi-level buildings and retail operations with multiple branch locations.

Functionality

- **Send or received live or pre-recorded audio streams**
- **Available in single or two-channel configurations**
- **RTP Multicast, RTP Unicast or SIP inputs and/or outputs**
- **Built in Web server**
  - All configuration options accessible via easy-to-use HTTP interface
- **Easy installation**
  - Standard 35mm DIN Rail (top-hat) mounting in any orientation
- **PoE 802.3af powered**
  - 10/100 Ethernet port with Power-over-Ethernet (802.3af PoE)
  - +9V to +16V DC input (if not using PoE)
- **Customizable line level output gain**
- **Multiple mono codecs to choose from**
  - Options include G.711, G.726 (16/24/32/40kbps), G.722, DVI4 (narrow/HD/Ultra HD), Linear PCM, iLBC, Speex, SILK
- **Reset to default software/configuration button**
- **Remote firmware upgradeable**

Quality Standards

Wahsega Labs zone controllers achieve the highest standards of performance in the market by utilizing our complete quality assurance program encompassing software testing, product design and a multistage automated factory test program.

- Wahsega Labs' ultimate goal is to provide a solution that is both cost effective and unsurpassed in quality. By leveraging existing relationships with suppliers to guarantee premium components at the lowest possible prices, we are able to ensure Wahsega Labs products are the finest quality in the market while still offered at highly competitive prices directly to installers.

- In order to achieve the greatest possible voice clarity, all voice and related algorithms have been individually tested to ensure the highest potential MOS score. The accumulated error syndrome, which can cause poor voice quality, is mitigated through this testing process.

- Wahsega Labs' engineering team utilizes a wide array of dedicated test servers to pull and build the various software projects multiple times per day. Each automatic build is then run through an extensive set of automated test cases to ensure the highest performance of each and every firmware version released. This test case coverage is expanded on a continual basis.

- All Wahsega Labs products are 100% factory tested at the board level through a bed of nails full functional test, not just an "is it close enough?" flying probe test. Every finished product is 100% tested again after the final assembly via an automated test station to ensure the highest production quality product for installers.

- To assure the highest quality standards, all Wahsega Labs products are designed, developed and manufactured in the USA.

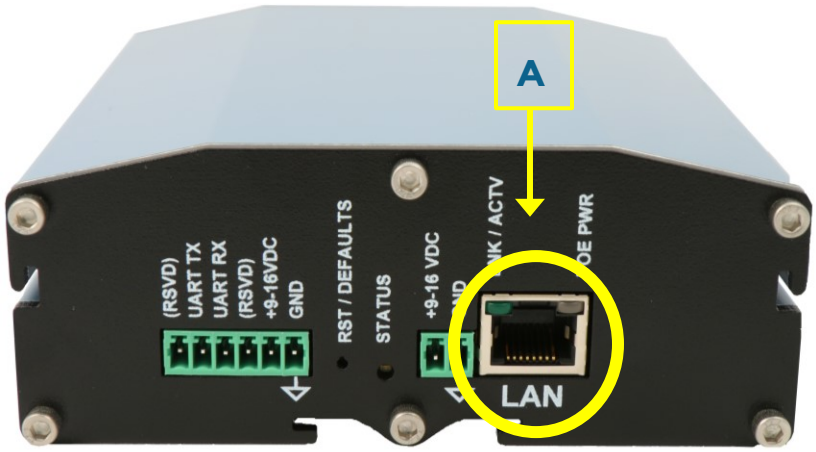
Chapter 2
General Hardware Installation

Wiring

Apply power to your zone controller using ***either*** **Option A** ***or*** **Option B**. The status LED will increase in brightness as the zone controller is powering up and will remain steadily lit when the unit is successfully powered.

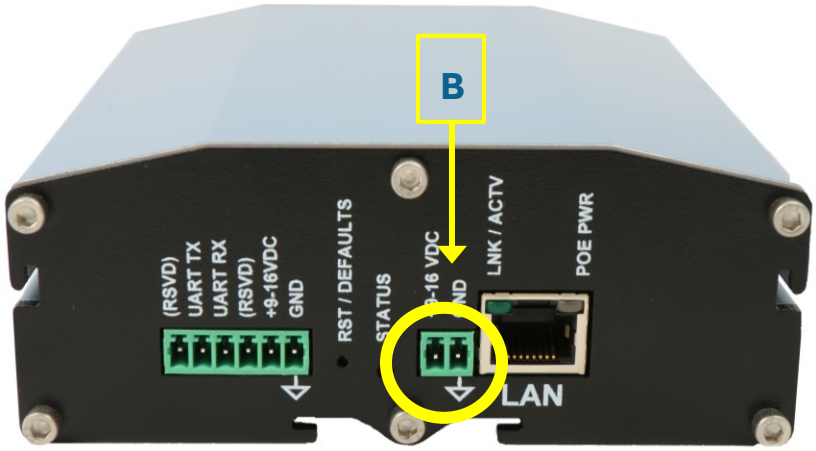
Power – Option A

- **LAN -** Using Power-over-Ethernet (PoE), route Cat 5 or Cat 6 Ethernet cable through a PoE injector to the LAN port.



Power – Option B

- **9-16V DC -** If using 9-16V DC power instead of PoE, plug in via 2-pin PCB terminal connector.



Audio Inputs / Outputs

- **Line 1 & Line 2 –** Connect audio in or out via RCA mono connectors. Configure audio settings in software as described in *Chapter 4: Configuration and Web Interface*.

- **Line 1 STAT & Line 2 STAT –** LED status feedback for respective audio lines in and/or out.

Chapter 3
User Experience

Software Capabilities

The zone controller's configuration is accessible using an HTTP Web interface, viewable from any Web browser on the same LAN.

Here you will you configure the function of each input/output on your device as well as network/IP address, audio settings, and access administrative functions such as firmware upgrade and configuration backup/restore.

The configuration is stored in a .JSON file, which is human readable and can be edited by site administrators.

Getting Started

1. Connect the IP Paging Zone Controller with VoIP's Ethernet port to a network using a Power-over-Ethernet (PoE) Ethernet connection (*Option A*, page 5). When connected, it will power on immediately and the indicator light will begin to blink.

2. Locate and note your zone controller's MAC address. It is printed on a white sticker on the bottom of the device's enclosure. A single-channel zone controller will have one MAC address, and a two-channel zone controller will have two MAC addresses.

3. Discover the IP Paging Zone Controller with VoIP's IP address. Your zone controller—whether single channel or two-channel—will only have one IP address. When it boots, it uses DHCP by default to automatically obtain a suitable IP address on your local area network (LAN). It also runs Simple Service Discovery Protocol (SSDP) so you can discover it from Windows Explorer or any SSDP-enabled application.

   From a Windows PC on the same LAN, open "My Computer." In the left-hand pane, go to the "Network" view.

   Right-click in the right-hand Network panel and select "Refresh." This will start a search for devices on the network. You may get a popup asking if you want to allow your PC to search the network, in which case you should click "yes" or "allow."

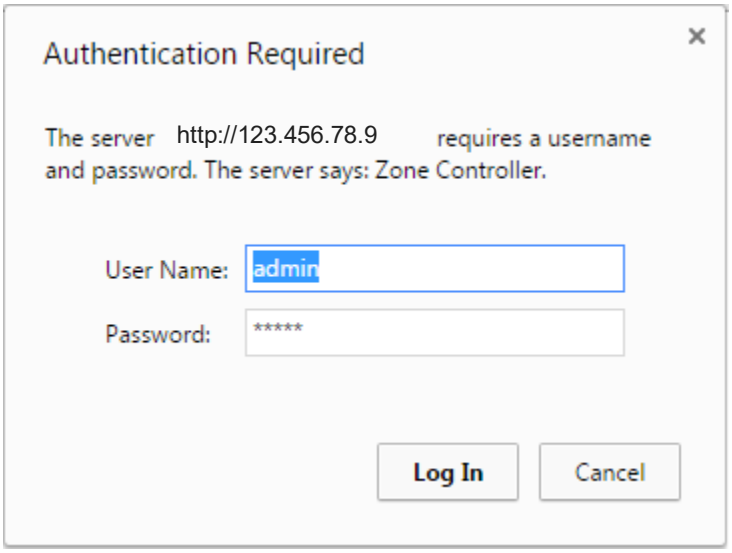
If you are not using SSDP or cannot discover the zone controller on your network, you can:

- consult your DHCP server's logs to determine its IP address;
- use a network discovery app (such as Fing on iOS and Android); or
- use Wireshark to observe the DHCP network traffic.

4. Once the search is complete, the zone controller will appear in the Network view as "Wahsega Zone Controller (:XX:XX)." The last two octets of its MAC address will be included in its name, so you can easily distinguish multiple units. Double-click the zone controller's icon to open its Web interface.

5. After you determine the zone controller's IP address, navigate to that IP address in your Web browser (for example, http://123.456.78.9).

6. When you access the webpages, the zone controller will ask for a username and password. The default username and password are "admin" and "admin".



7. On the right side of the page is the Status bar. It shows the zone controller's current system information (current IP address, Ethernet MAC address and system time) and SIP account status.

8. To change the IP address settings, go to the Network tab and modify settings in the *WAN* section. To set the network for DHCP, click the *Dynamic IP* radio button. For static IP addressing, click the *Static IP* radio button and fill in the relevant IP address fields with values from your network administrator. See *Network Configuration* on pages 21-22 for examples.

9. After configuring the network settings for your zone controller, use the webpages described in the next section to customize the inputs and/or outputs and their settings.

Chapter 4
Configuration and Web Interface

The Web interface is a set of webpages used to configure the various settings available on the Wahsega IP Paging Zone Controller with VoIP. It allows the zone controller to be configured from any computer or device with a Web browser.

Input / Output Settings

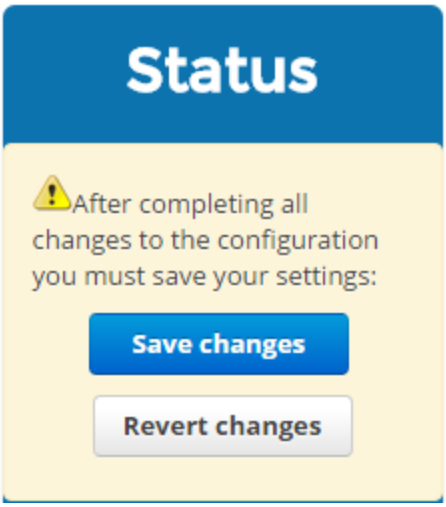
Configure direction and settings for Line 1 and Line 2.

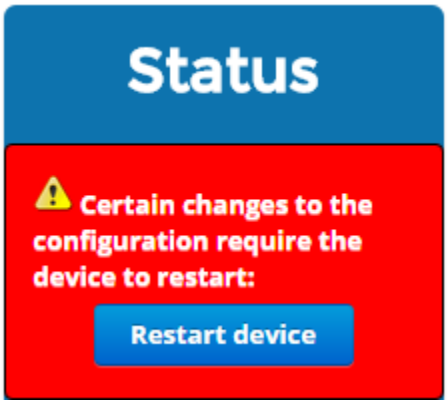
Input

Input Method

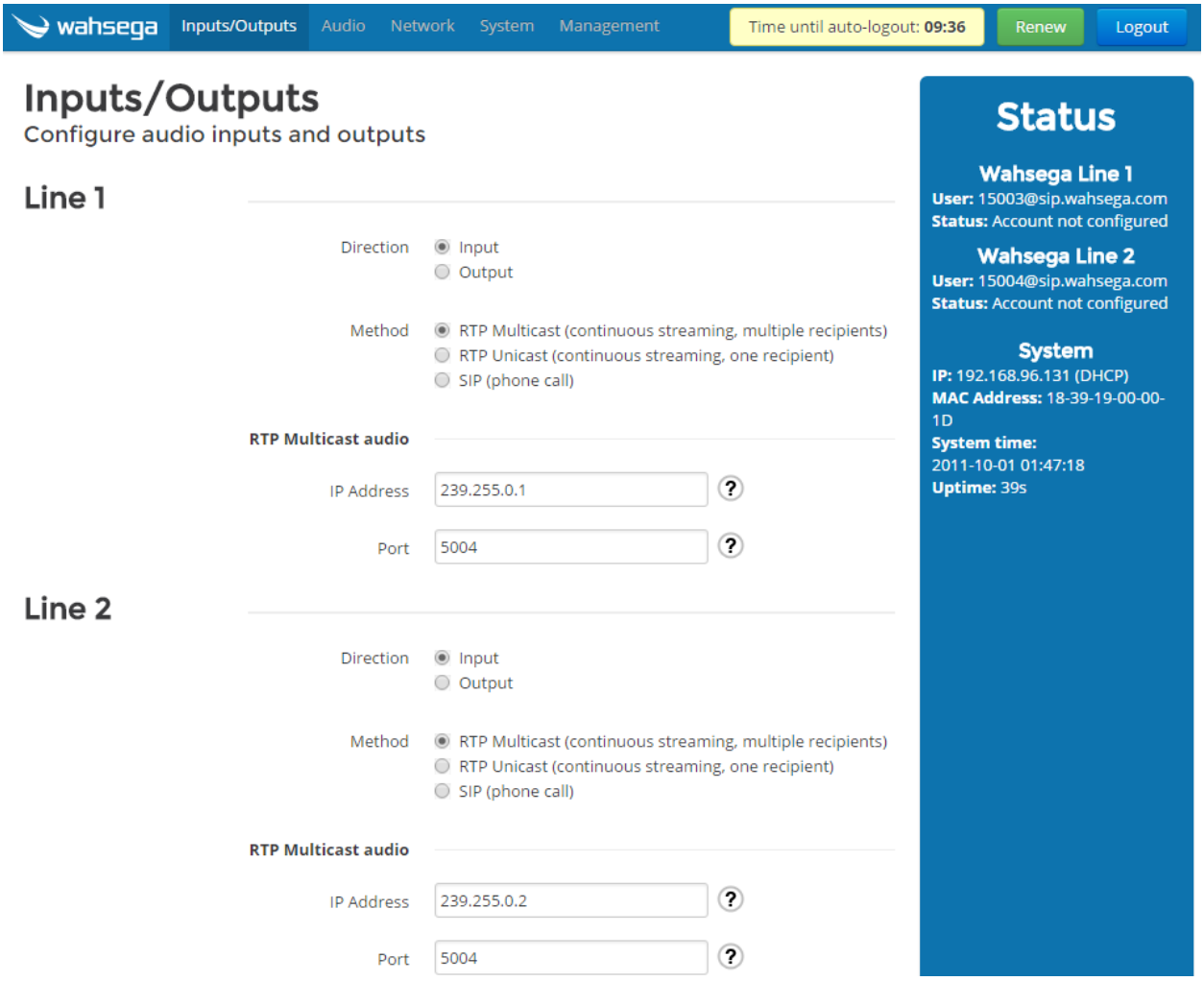
- **RTP Multicast –** Continuous streaming, multiple recipients
- **RTP Unicast –** Continuous streaming, one recipient
- **SIP –** Phone call

As you configure various settings, note that you will be prompted to save changes and/or restart your device for those changes to take effect.





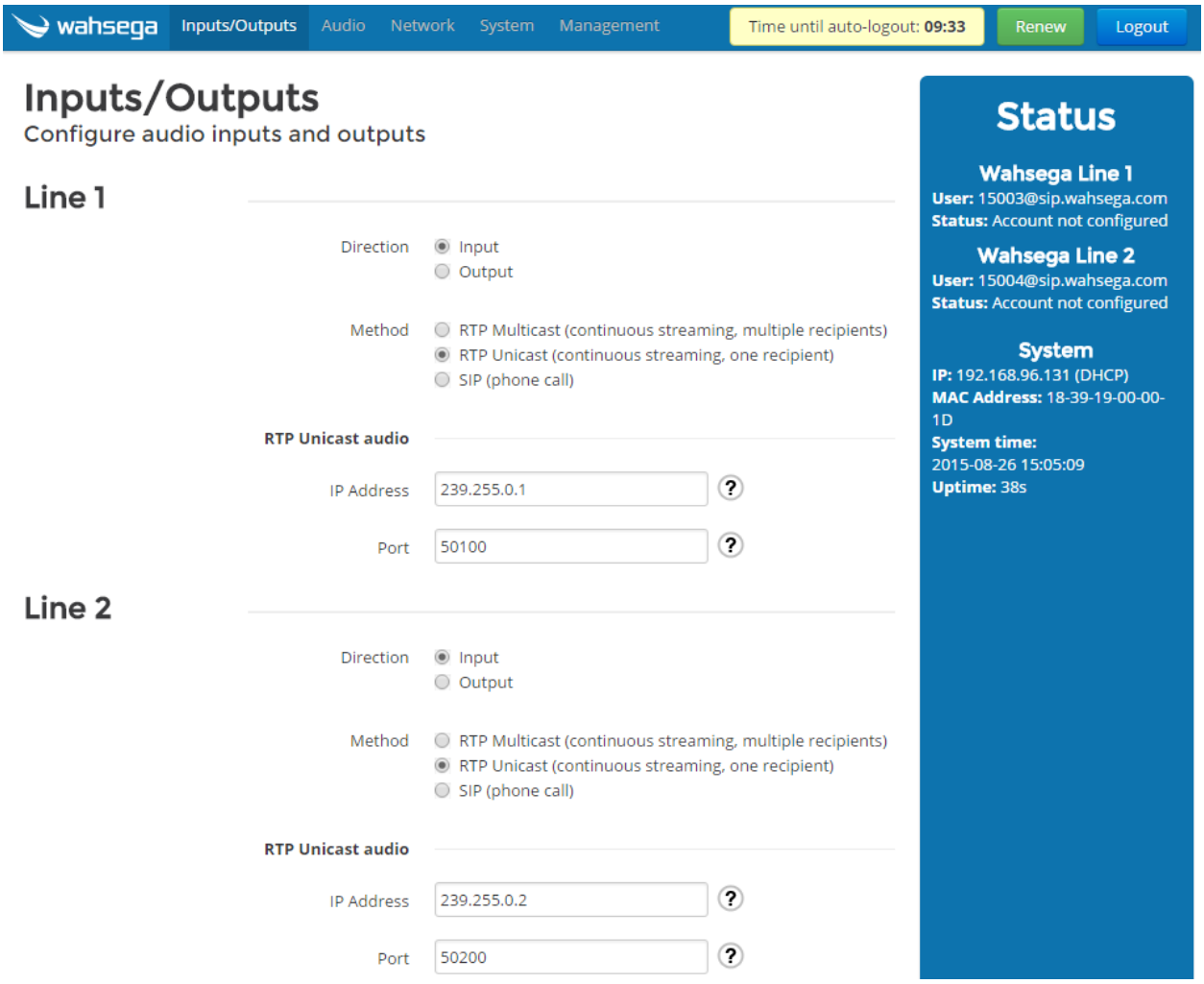
RTP Multicast



- **IP Address –** Audio from this line will be sent from and/or received on this multicast IP address. Valid addresses range from **224.0.0.1** to **239.255.255.255**.
    - Note: Some addresses, particularly in the **224.xx.xx.xx** range, are globally reserved and should not be used! Consider using addresses in the **239.255.xx.xx** range, which are "Administratively Scoped Local Addresses."

- **Port –** Audio on this line will be sent to and/or received from this UDP port. Valid ports range from **1** to **65535**. The default port is **5004**.

RTP Unicast



- **IP Address** – Audio from this line will be sent to and/or received from this IP address.

- **Port** – Audio from this line will be sent on or received from this UDP port. Valid ports range from **1** to **65535**. The default port is **50100** for Line 1 and **50200** for Line 2.

SIP


wahsega
Inputs/Outputs
Audio
Network
System
Management
Time until auto-logout: 08:09
Renew
Logout
Inputs/Outputs
Configure audio inputs and outputs
Line 1
Direction
Input
Output
Method
RTP Multicast (continuous streaming, multiple recipients)
RTP Unicast (continuous streaming, one recipient)
SIP (phone call)
SIP account
General
Topology
QoS
Advanced
Display name
Wahsega Line 1
Username/Number
15003
Domain
sip.wahsega.com
Register with domain
Password
Line 2
Direction
Input
Output
Method
RTP Multicast (continuous streaming, multiple recipients)
RTP Unicast (continuous streaming, one recipient)
SIP (phone call)
SIP account
General
Topology
QoS
Advanced
Display name
Wahsega Line 2
Username/Number
15004
Domain
sip.wahsega.com
Register with domain
Password
Status
Wahsega Line 1
User: 15003@sip.wahsega.com
Status: Account not configured
Wahsega Line 2
User: 15004@sip.wahsega.com
Status: Account not configured
System
IP: 192.168.96.131 (DHCP)
MAC Address: 18-39-19-00-00-1D
System time:
2015-08-26 15:11:51
Uptime: 5m 39s

- **General**

  Most users will only need to set *Username/Number* and *Domain*. You may also provide a *Display name*, which may be used by your SIP server depending on its configuration.

  If a password is required for your SIP server or proxy server, provide it in the *Password* field. If your SIP server or proxy server requires an authentication username that is different from the name entered in *Username/Number*, enter it on the account's *Advanced* tab in the *Authentication username* field.

  - **Display name** – The name to report to the SIP server, which may be shown to other callers (depending on the SIP server's configuration).

  - **Username/Number** – The phone number or extension this phone is configured with on the SIP server.

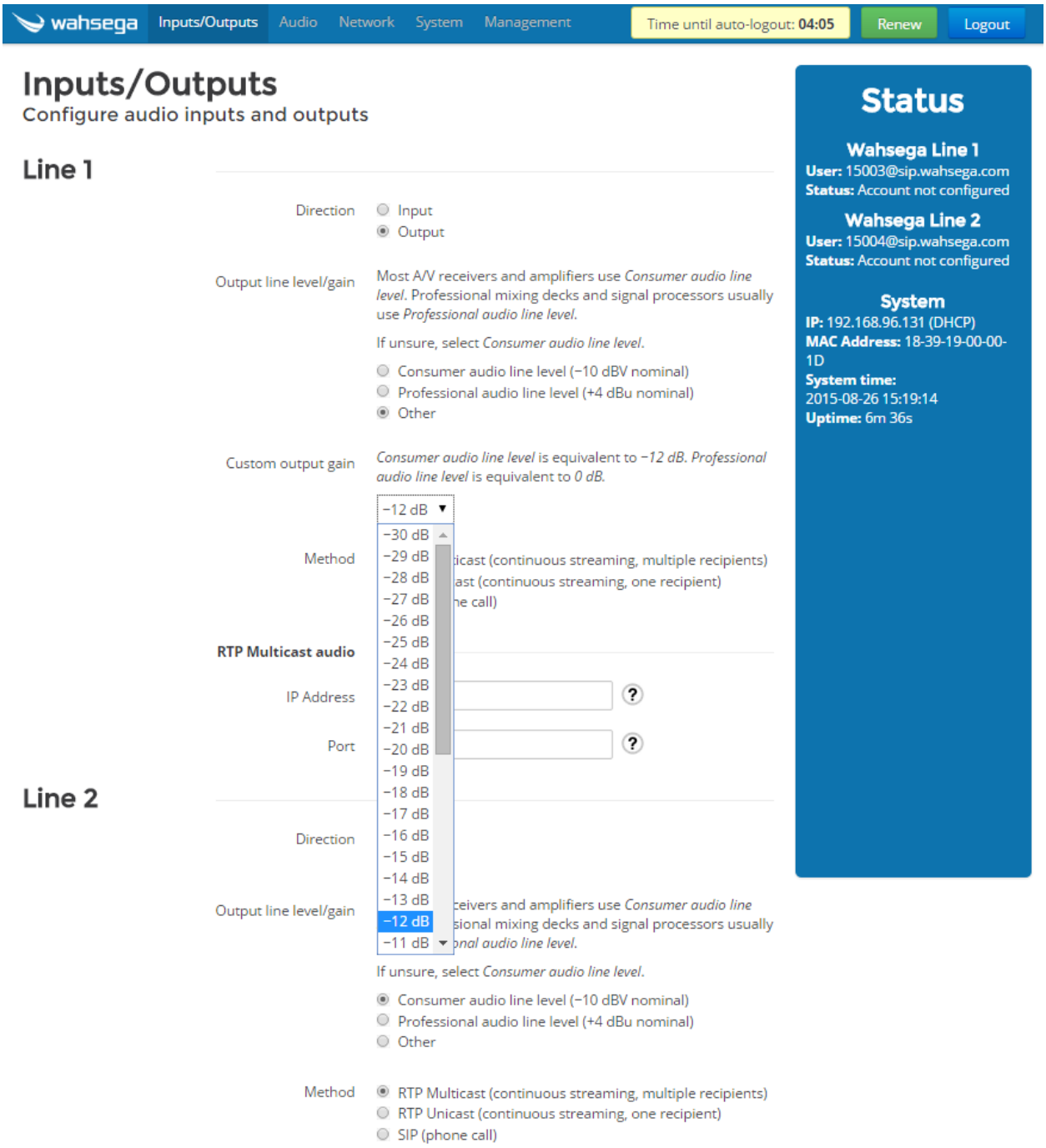
  - **Domain** – The hostname or domain name of the SIP server. Not used in peer-to-peer (P2P) mode.

  - **Register with domain** – If checked, operates in normal SIP mode. If unchecked, operates in P2P mode.

  - **Password** – If the SIP server requires a password to authenticate, enter it here.

Output

Output level/gain – Select the audio line level for your application. If you are unsure of line level, choose “Consumer audio line level.”



- **Consumer audio line level** = -10 dBV nominal
  Most A/V receivers and amplifiers use this level.

- **Professional audio line level** = +4 dBu nominal
  Professional mixing decks and signal processors usually use this level.

- **Other** = Choose a custom level from the *Custom output gain* dropdown menu below. For reference, *Consumer audio line level* is equivalent to *−12 dB* and *Professional audio line level* is equivalent to *0 dB.*

    - **Custom output gain** – If a level other than -10 dBV or +4 dBu is needed, choose it here. Output level ranges from -30dB to +6dB.

Output Method

See *Input Method* on pages 12-16 for more details on configuration for all three input options:

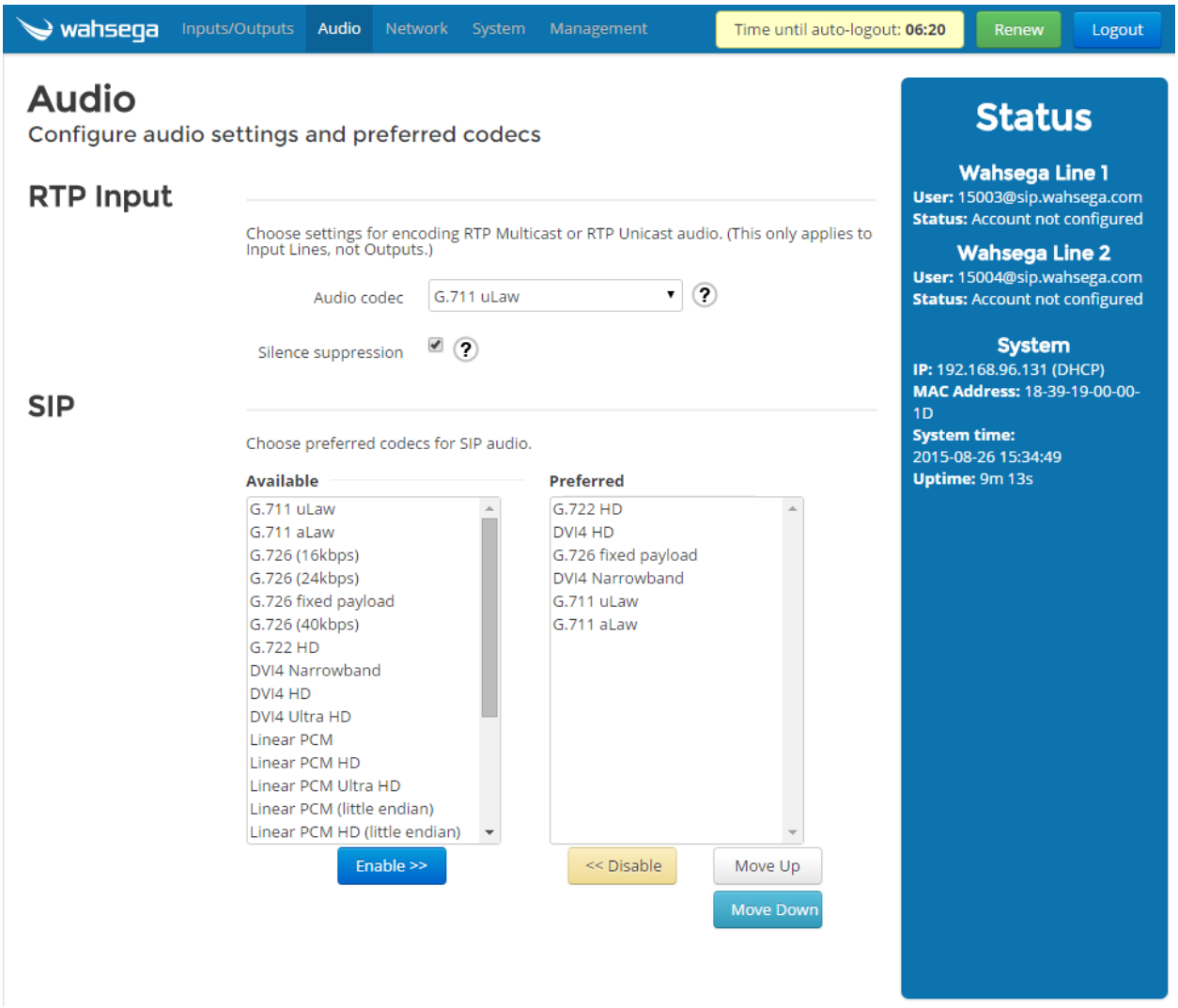
- **RTP Multicast –** Continuous streaming, multiple recipients
    - See page 13 for more details.

- **RTP Unicast –** Continuous streaming, one recipient
    - See page 14 for more details.

- **SIP –** Phone call
    - See pages 15-16 for more details.

Audio Settings

Once you have configured RTP or SIP direction and method in *Inputs/Outputs*, configure specific audio and codec settings in *Audio Settings*.



RTP Input

- **Audio codec** – *Used only in Multicast and Unicast RTP audio input configurations*. Choose settings here for encoding audio. “HD” or “wideband” codecs have better audio quality. Default audio codec is G.722 HD.

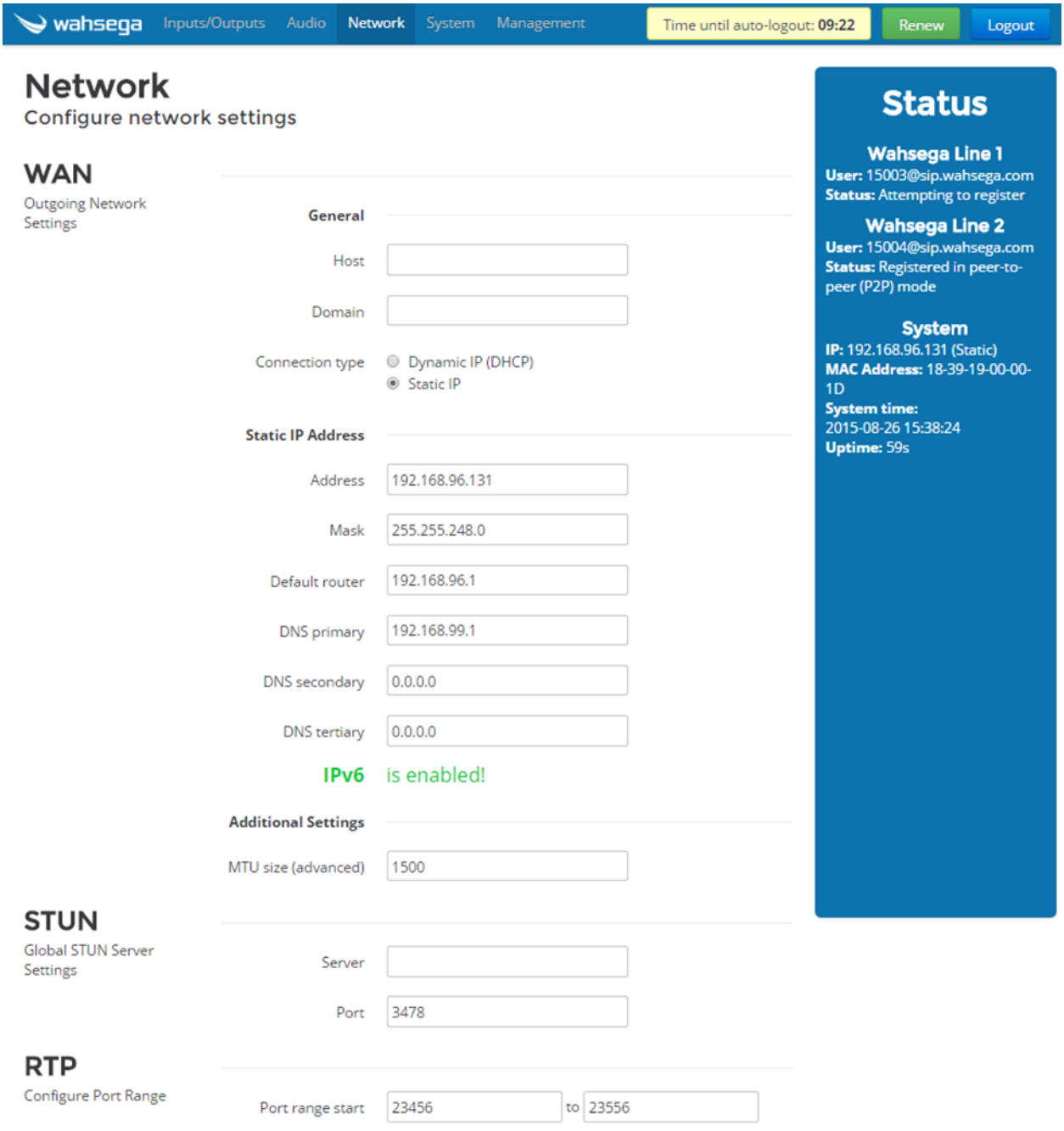
- **Silence Suppression** – *Used only in Multicast and Unicast RTP audio input configurations*. When enabled, RTP coding will enable silence suppression so that it can cease transmitting when there is no audio. Default status is silence suppression enabled.

SIP

- **Choose preferred codecs** – *Used only in SIP audio configurations*. These settings enable/disable audio codecs and set their order of use. The system tries codecs at the top of the “Preferred” list before trying codecs at the bottom of the list.

Network Configuration

Configure settings for TCP/IP networking.



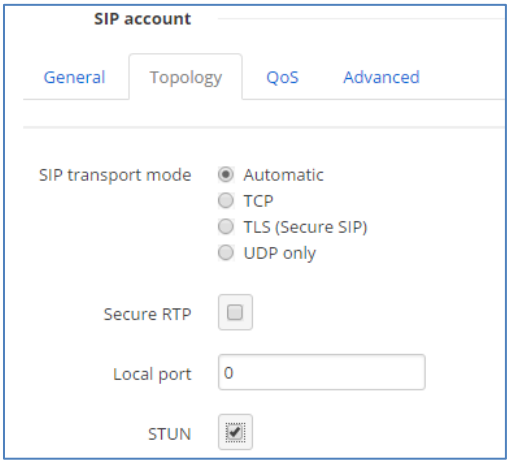
WAN

- **Connection Type**
    - **Dynamic IP** – Choose this to use DHCP to assign an address automatically. Note that when using DHCP, you will have to determine the IP address assigned to the zone controller using your DHCP server or through some other method in order to access the configuration webpages in the future.

    - **Static IP** – Choose this to enter IP address settings manually. *Warning: If you enter a configuration that is not accessible from your network, you may be unable to communicate with the zone controller! Double-check that the settings you enter are correct before rebooting the zone controller to apply them.*

STUN

. **Server/Port** – Enter your STUN server here. STUN servers may be required to operate with a public SIP server from behind a NAT or router. If using a STUN server, make sure to select the appropriate settings on the *Inputs/Outputs* page under *SIP Account Topology.*

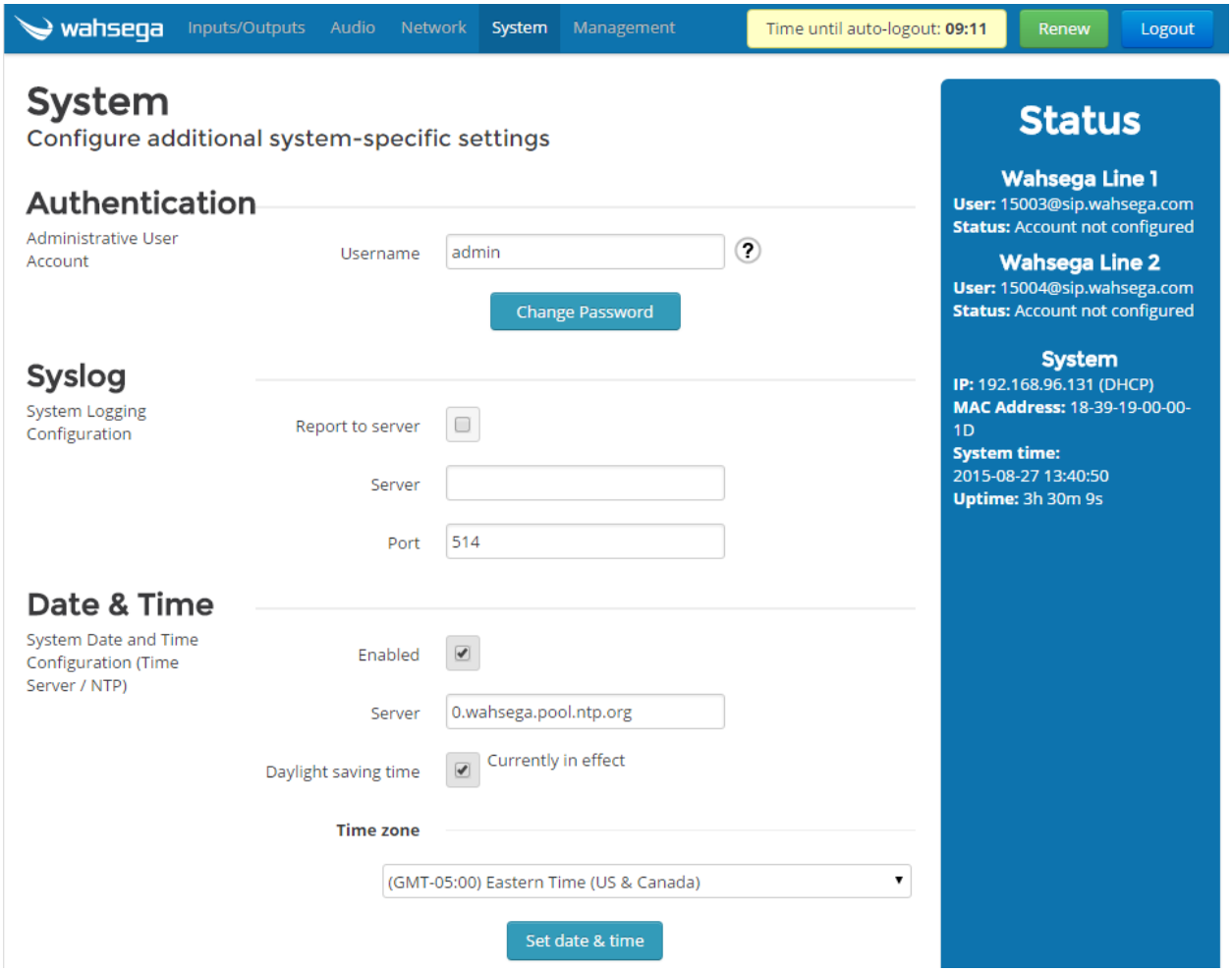


RTP

- **Port Range** – Select the UDP port range to use for sending RTP audio network traffic during a call.

General System Configuration

Configure settings for the zone controller's operating system and other administrative functions.



Authentication

- **Username –** Set the username and password used on the configuration webpages and Telnet shell. Default username and password are “admin” and “admin”.

Syslog

- **Report to server -** Configures a syslog server that can receive system logs from the zone controller. This requires a PC or server running a syslog server to receive and store the logs.

Date & Time

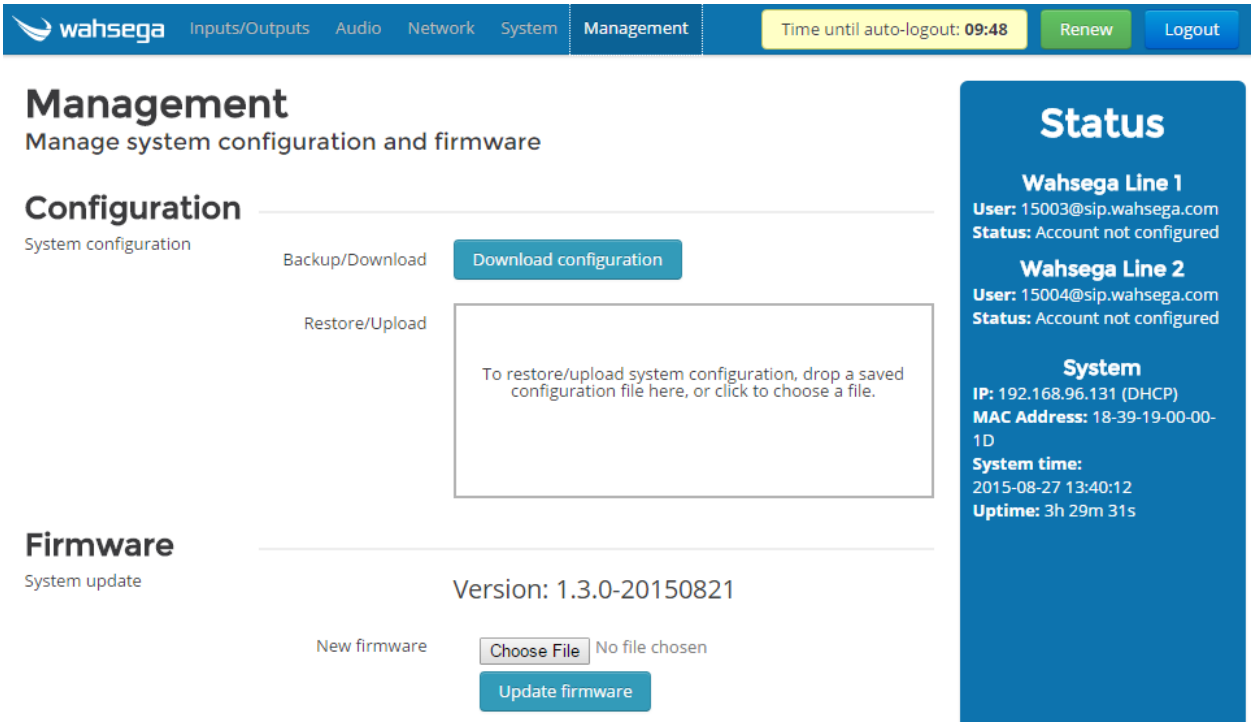
- **NTP Enabled –** Automatically determines the time of day using an NTP server. This is recommended, as the zone controller does not have a battery-backed clock.

- **Daylight saving time –** Select this only if daylight saving time is currently in effect in your location.

- **Time zone –** Select the region that most closely matches your time zone. (Note that daylight saving time is *not* automatically applied based on region.)

Firmware Management

Manage and update the zone controller's configuration and firmware.



Configuration

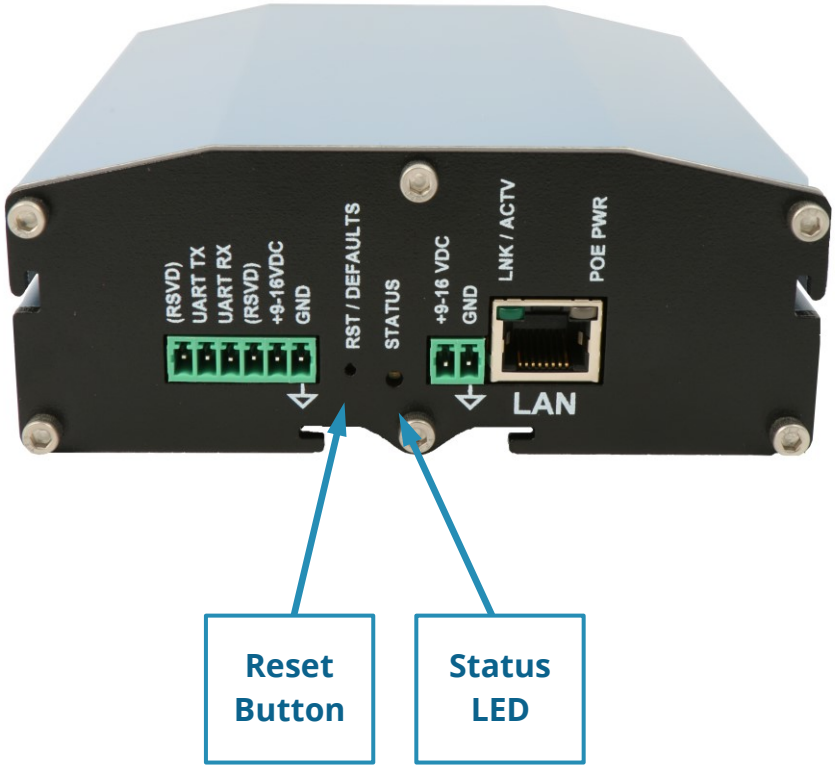
- **Backup/Download –** Use this to retrieve a copy of the zone controller's current configuration and save to disk.
- **Restore/Upload –** Use this to upload a valid configuration file that was retrieved and saved from a zone controller. *Note that a reboot will be required before the settings take effect.*

Firmware

- **New firmware –** Use this to upload new firmware.
  DO NOT UNPLUG THE ZONE CONTROLLER OR INTERRUPT THE FIRMWARE UPGRADE PROCESS BEFORE IT COMPLETES, OR IT MAY BE RENDERED UNUSABLE.

Appendix A
Factory Reset

Software-Based Factory Reset



If you need to erase the configuration settings in your zone controller for any reason, you can do so in one of two ways. **Option A** returns all settings to factory default, and **Option B** returns only select settings to factory default.

Option A - Steps for activating a full factory reset:

1. Start with the zone controller powered off.

2. Using either method on pages 5-6, apply power to your zone controller. As soon as power is applied, hold the reset button until the status light begins to blink.

3. Once the light starts blinking, continue to hold the button for **at least 5 seconds**. NOTE 1

4. After 5 seconds, the status light will flash rapidly to indicate that the file system has been reformatted and all data has been erased from your device. NOTE 2

5. Unplug and restart your zone controller for the new settings to take effect. You have successfully reset your configuration!

Note 1: If you release the button early, the zone controller will proceed with normal startup.

Note 2: If the status light instead begins to blink more slowly, the reset was not successful. Unplug and restart your device, and then attempt a reset once again.

Option B - Steps for activating a partial factory reset:

1. While the unit is running and the status LED is steadily lit, press and hold the reset button.

2. Continue to hold down the button as the status light first turns off and then begins to advance through reset options. Every 5 seconds, the status light will blink to indicate a different reset option as described below.

   1 blink = Reset type 1

   - Erases network configuration, reverting back to defaults *for network configuration only*. All other configuration settings remain unchanged.

   2 blinks = Reset type 2

   - Erases all configuration settings, reverting back to factory defaults. All other system files remain unchanged.

3. Release the button when you reach the type of reset you need. NOTE 3

4. The status light will flash rapidly to indicate that the selected settings have successfully been erased. NOTE 4

5. Restart your zone controller for the new settings to take effect. You have successfully reset your configuration!

Note 3: If you release the button before the LED begins to blink, nothing will be reset, and you will not need to reboot.

Note 4: If the status light begins to blink more slowly after you release the button, the reset was not successful. Unplug and restart your device, and then attempt a reset once again.

IP Paging Zone Controller with VoIP

WL-ZN-CTR-2CH

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