IP Display with InformaCast®

User's Guide

Getting Started

This step by step guide will help you set up and program your Wahsega IP Display with InformaCast®.

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Chapter 1
Overview

The Wahsega product line offers the highest quality two-way audio and durability in the industry today. Each and every Wahsega product is designed, developed and manufactured in the USA, ensuring a superior product at the best price available in the market.

IP Display Functionality

The initial functions of the Wahsega IP Display with InformaCast® include:

Dual registration

- Simultaneous support for SIP PBX and InformaCast registration
- Access for both from a single IP endpoint

InformaCast enabled

- Ability to receive live or pre-recorded audio from InformaCast
- Automatic registration on the InformaCast server
- Receive bell & event schedule alerts from InformaCast or third party

SIP intercom

- IP paging speaker
- Crystal clear audio
    - Multiple mono audio codecs to choose from
    - Environmental noise suppression
- Extensive interoperability with most SIP servers and PBXs
- Peer-to-peer (P2P) mode available for decentralized communication

Web-based configuration

- All configuration options accessible via a simple HTTP Web interface
- Mic and speaker volume control within configuration webpages
- Remote firmware upgradeable
- Time set by network SNTP Server – no manual adjustments needed

Primary inputs

- Built-in microphone
    - Available push-button override for sound reinforcement
- Two onboard relays for door lock control

Secondary inputs

- Second RJ45 connector for easy installation and expansion
    - Able to drive second, auxiliary Wahsega Extension Speaker (WL-SPKR-22-A or WL-SPKR-SMT-A) up to 20m away via Cat5e or Cat6 cable
- Compatible with standard panic buttons
    - Advanced panic button functionality, designed to reduce false alarm triggers (short press vs. long press)
- Classroom sound reinforcement via optional audio input wallplate
    - Audio input
    - Volume control
    - Activation button
    - LED indicator
    - Line-in microphone

Simple installation

- Power-over-Ethernet (PoE 802.3af) powered
- Four rear mounting brackets with two positions for easy installation with a standard 2-gang electrical back box or wall surface mounting
- Wiring access through rear or either side via raceway knockouts

Industrial temperature range (-40°C to +60°C)

Industry-leading standby power of < 2W

Multiple display options

- Display 12- or 24-hour clock with four or six numerals
- Auto-dim feature for energy reduction
- Text display configurable for scrolling of page by page mode
- 32,768 LED colors
- 32 x 64 resolution
- One to three lines of text display
- Text display up to 5” high

Quality Standards

- Wahsega products 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's 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 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's 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 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 products are designed, developed and manufactured in the USA.

Chapter 2
User Experience

The Wahsega IP Display with InformaCast can receive audio from both the InformaCast Advanced Notification System and a SIP PBX, acting as an intercom for two-way conversations with the help of its built-in microphone. It can also receive standard RTP Multicast audio broadcasts.

Featuring dual registration with both InformaCast and SIP servers, the IP Display is able to receive InformaCast pages in high- or low-quality audio, both live and pre-recorded, while also supporting normal SIP intercom calls.

The IP Display may also be connected to a panic button to make emergency SIP calls and/or to a remote wall panel to access classroom sound reinforcement functions. Its two onboard relays can be controlled by the InformaCast server to operate door locks for up to two doors per classroom.

In addition, a second, auxiliary speaker may be connected up to 20 meters away via Ethernet cable. This auxiliary speaker—which is powered by the IP Display—acts as a companion to the main speaker. The auxiliary speaker will always broadcast the same audio as the IP Display, but its volume can be adjusted independently.

Once your IP Display is installed and configured, you will be able to receive SIP calls, InformaCast broadcasts and text messages, and RTP Multicast broadcasts with no additional in-room setup. Two-way SIP communication is clear and simple with a built-in microphone which transmits audio from the classroom to the caller.

If a panic button is connected to the IP Display, it will make an emergency call to a preset SIP number on the PBX. To reduce the incidence of false panic calls, the panic button has two call modes: short press and long

press. The short press call—which is a call placed after the button is depressed for any length of time ***less*** *than two seconds*—calls a first, preconfigured number, such as a front office. The long press call—a call placed after the button is depressed for *two or more seconds*—calls a second, preconfigured emergency number, such as 911.

If the installation includes a sound reinforcement wall panel, the panel will have a 3.5mm audio input, volume control knob with activate button, and an LED indicator light.

Software Capabilities

The IP Display's configuration is accessible using an HTTP Web interface, viewable from any Web browser on the same LAN. This allows access to various settings such as network/IP address, SIP account and InformaCast instance configuration, intercom/speaker behavior, panic button call numbers, and 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

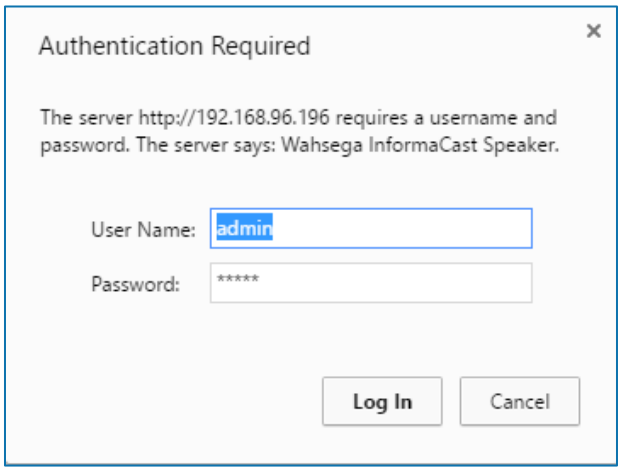
1. Connect the IP Display's main Ethernet port—labeled *LAN*—to a network using a Power-over-Ethernet (PoE) Ethernet connection. When connected, it will power on immediately, and the *LINK/ACTV* status LED will begin to blink.

2. Locate and note your IP Display's MAC address. It is printed on a white sticker located on the rear of the device.

3. Your IP Display will automatically recognize and register with the InformaCast server when you power up and connect to the network via PoE. Use the InformaCast server interface to discover your IP Display's IP address. Look for the device matching the MAC address you just noted.

4. Once you determine the IP Display's IP address, navigate to that IP address in your Web browser (for example, `http://123.456.78.9`).

5. When you access the configuration webpages, the IP Display will ask for a username and password. The default username and password are *admin* and *admin*.



6. On the right side of the page is the Status bar. It shows the current SIP account status (default status is *unconfigured* and *unregistered*), the registration status and Ethernet MAC address of the InformaCast instance, and the IP Display's system information (current IP address, Ethernet MAC address and system time).

7. To change the IP address settings, go to the *Network* page 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.

8. To change the SIP account settings, go to the *Accounts* page and modify settings in the account. Most users will only need to set *Username*/*Number* (the phone number or extension assigned to this IP Display) and *Domain* (the hostname or IP address of your SIP server). You may also provide an *Account Name*, which is used only for logging purposes, and 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 under the *Advanced* tab in the *Auth Username* field.

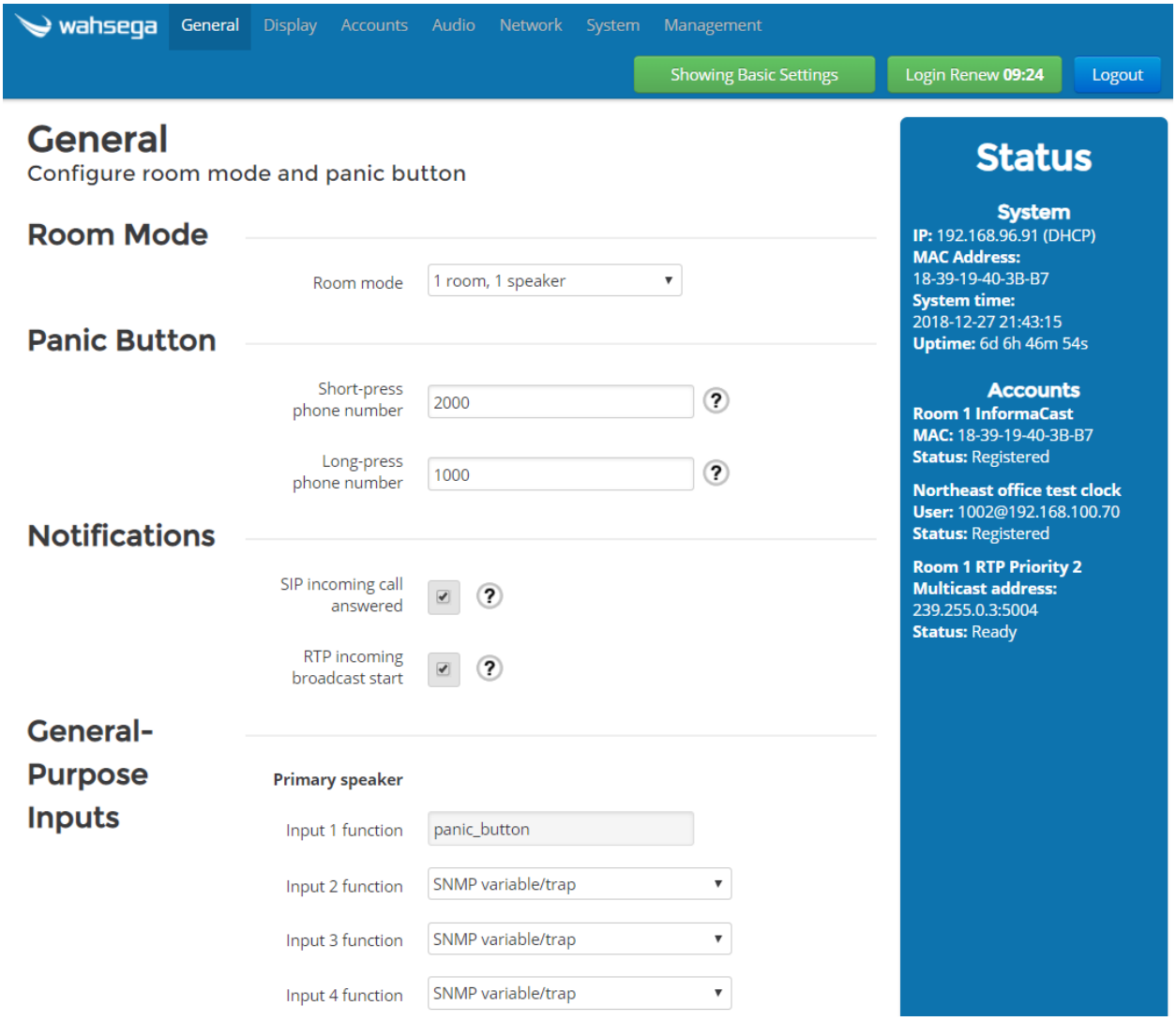
9. After configuring the network and SIP settings for your IP Display, use the configuration settings described in the next sections to customize the speaker, intercom, panic button and InformaCast functionality.

10. Be sure to set up your speaker, display, and relays (if applicable) in the InformaCast programming utility. For setup assistance, visit https://www.singlewire.com/academy.

Chapter 3
Configuration and Web Interface

The Web interface is a set of webpages used to configure the various settings available on the InformaCast-enabled IP Display. It allows the IP Display to be configured from any computer or device with a Web browser on the same network.

General Settings



The ***General*** page configures settings for Room Mode and Panic Button.

Room Mode

- **Room Mode –** Configure the number of speakers controlled by this IP Display.
    - **1 room, 1 speaker –** Single room, single speaker configuration.
    - **1 room, 2 speakers –** Single room, two speaker configuration. (Second speaker is a WL-SPKR-*xx*-A.)

Panic Button

- **Short-press phone number –** The number or extension to call when the panic button is pressed for *less than two (2) seconds*.
- **Long-press phone number –** The number or extension to call when the panic button is pressed for *2 seconds or longer*.

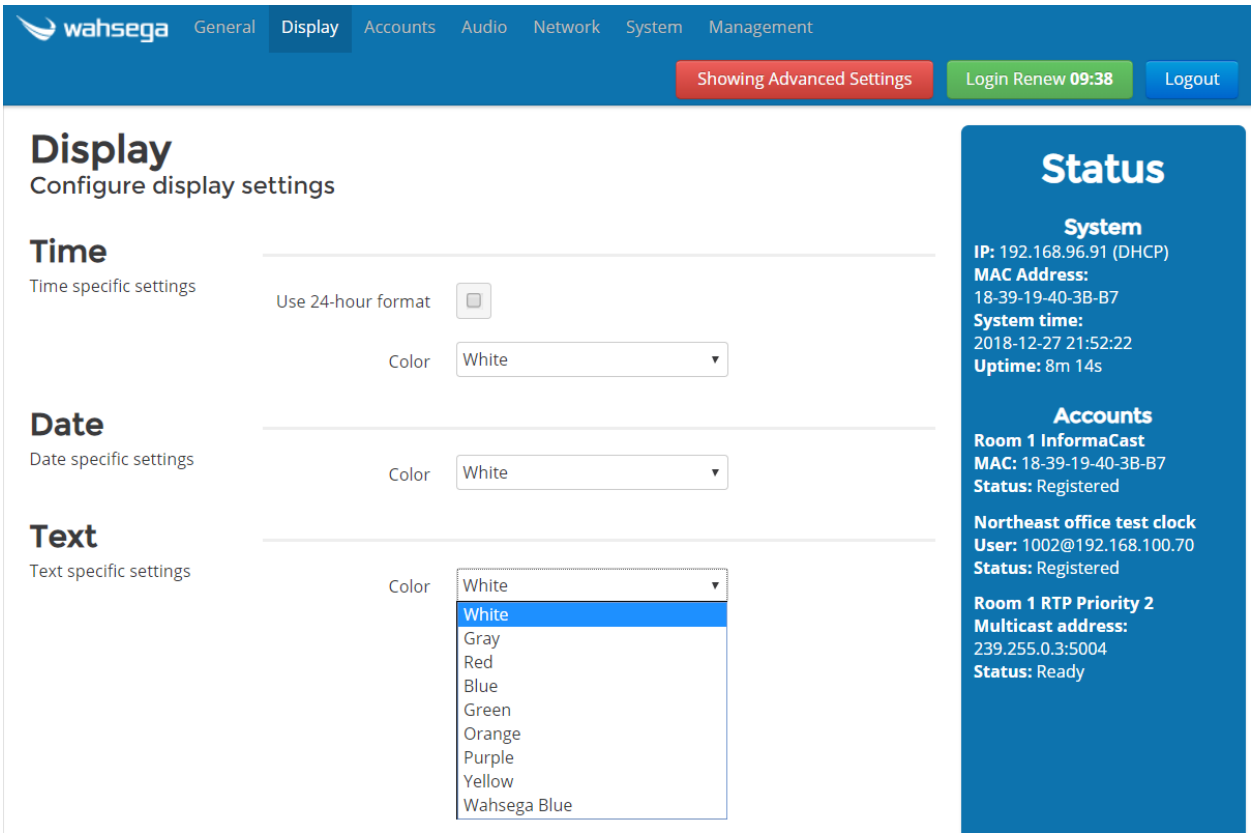
Notifications

- **SIP incoming call answered –** If checked, a tone will be played when an incoming SIP call is answered.
- **RTP incoming broadcast start –** If checked, a tone will be played when an incoming RTP Multicast broadcast is played.

General-Purpose Inputs

- **Input function –** Determines the function of the input.
    - **Input 1** defaults to Panic button.
    - **Inputs 2, 3, and 4** are configurable.
        - **SNMP variable/trap –** Choose this function if triggering SNMP trap with this input. Configure trap destinations on Network page.
        - **Volume button (cycle to next volume) –** Choose this function if using a Wahsega button for local speaker volume control.

Display Settings



The ***Display*** page configures settings for visual display on the IP Display.

Time

- **Use 24-hour format –**If checked, time will be displayed in 24-hour format. If unchecked, time will be displayed in 12-hour format.
- **Color –** Color of text for time displayed. Available colors include White, Gray, Red, Blue, Green, Orange, Purple, Yellow, or Wahsega Blue.

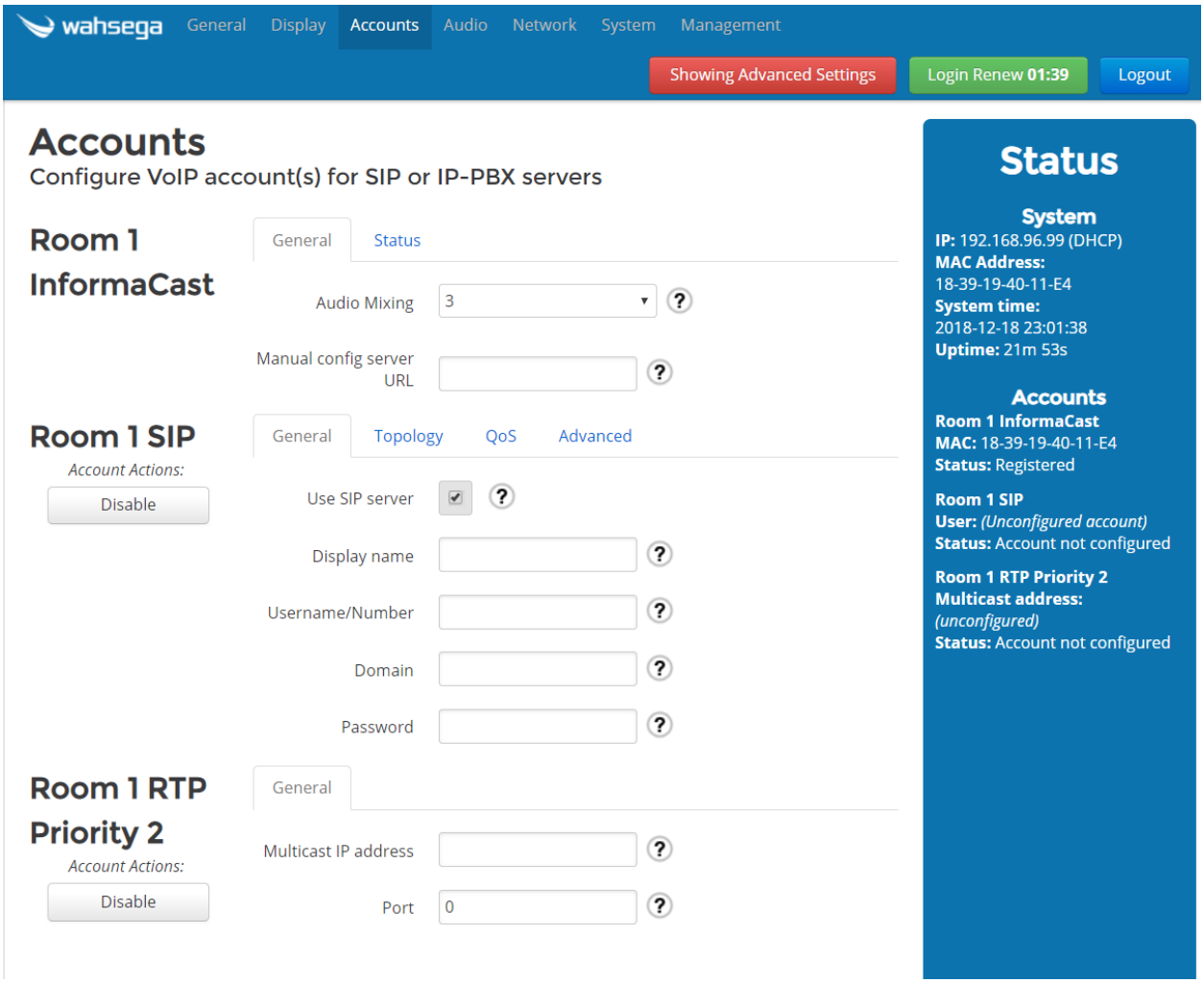
Date

- **Color –** Color of text for date displayed. Available colors include White, Gray, Red, Blue, Green, Orange, Purple, Yellow, or Wahsega Blue.

Text

- **Color –** Color of all other text displayed. Available colors include White, Gray, Red, Blue, Green, Orange, Purple, Yellow, or Wahsega Blue.

Account Settings



The ***Accounts*** page configures settings for InformaCast and SIP accounts for the IP Display.

Room 1 InformaCast

- **Audio mixing –** Maximum number of InformaCast audio broadcasts to play simultaneously on this channel. ***Note 1***
    - To disable audio mixing, choose ***1***.
- **Manual config server URL –** Enter the URL of the InformaCast server if needed.
    - Within a typical installation, the configuration server will be detected automatically. However, there may be times when that detection fails and this must be done manually. There are two methods, HTTP or TFTP.
        - **HTTP** – The format of the URL must match "`http://<IP address>:<port_number>/<path_on_server>`". It is easiest to grab this information from the SLP configuration found under *Admin → Network Parameters → SLP Parameters* on the InformaCast server, listed under *URL of Configuration File Server*.
        - **TFTP** – If a TFTP server is in use, the format of the URL must be "`tftp://< ip_address>:<port _number>/<path_on_server>`".

Note 1: While each IP Display is capable of playing up to three (3) audio broadcasts at once, the maximum number of simultaneous *high-quality (44.1 kHz)* audio broadcasts is two (2) per device.

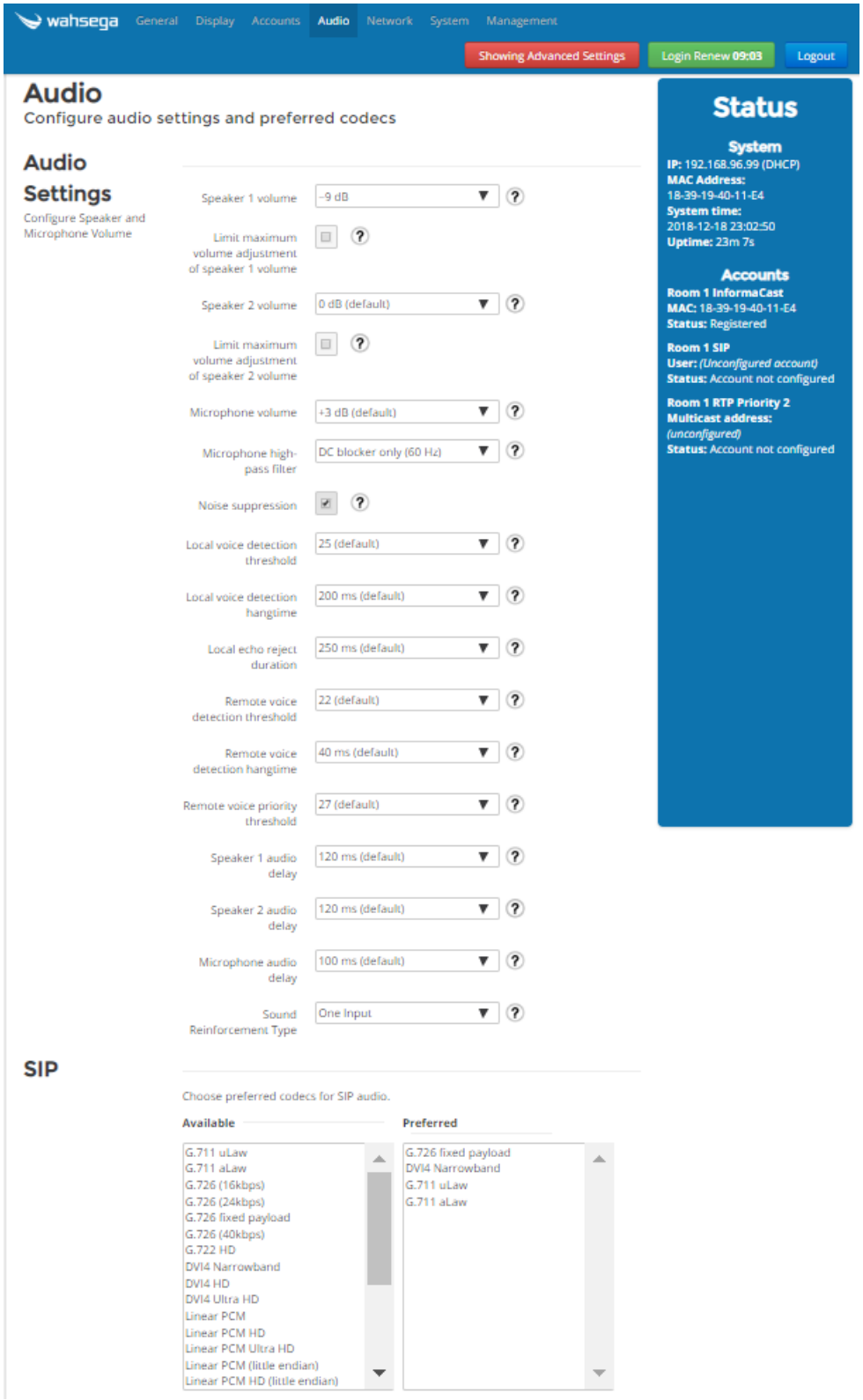
Room 1 SIP

- **Use SIP server –** If checked, the account must register with a server to send or receive calls. If unchecked, the account will operate in peer-to-peer (P2P) mode.
- **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 IP Display 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.
- **Password –** If the SIP server requires a password to authenticate, enter it here.

Room 1 RTP Priority 2

- **Multicast IP address –**The multicast IP address this device should listen on to receive RTP audio. 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 –** The UDP port this account should listen on to receive RTP audio. Valid ports range from **1** to **65535**. Setting this to **0** will use the default RTP port of **5004**.

Audio Settings



The ***Audio*** page configures settings for speaker and microphone audio as well as codec selection.

Audio Settings

- **Speaker volume –** Increase or decrease decibel level of speaker output. Default level is `0 dB`, or no change. *Note: Settings above +6 dB use digital software gain and may reduce audio quality.*

- **Limit maximum volume adjustment of speaker volume –** When checked, speaker will be limited to the maximum volume indicated when local users adjust volume via button press.

- **Microphone volume –** Increase or decrease decibel level of microphone input. Default level is `+3 dB`. *Note: Settings above +33 dB use digital software gain and may reduce audio quality.*

- **Microphone high-pass filter –** Eliminates low-frequency noise that can make speech difficult to understand.
    - **DC blocker only** – Eliminates hum from power lines while leaving other low-frequency sounds intact.
    - **High-pass mode –** Eliminates most noise below standard telephone frequencies. Recommended setting for areas with high levels of background noise.

- **Noise suppression –** Eliminates background noise from the device's microphone (such as a steady hum, people or noises in the background, or machinery). *This only affects audio on the remote side of the call; the local side is unaffected.*

- **Local voice detection threshold –** Sets the threshold for detecting voice activity on the microphone. The most sensitive setting is `0`, and the least sensitive setting is `50`. Default level is `25`.

- **Local voice detection hangtime –** Specifies how long voice must be absent at the microphone before deciding that the person who was speaking has stopped. This prevents audio from being cut off during brief pauses in speech. Default level is `200 ms`.

- **Local echo reject duration –** After the remote user has stopped speaking, the microphone is not allowed to detect voice until this much time has elapsed. This prevents speaker audio from echoing back through the microphone to the remote user. The default level is `250 ms`.

- **Remote voice detection threshold –** Sets the threshold for detecting voice activity from the remote user. The most sensitive setting is `0`, and the least sensitive setting is `50`. Default level is `22`.

- **Remote voice detection hangtime –** Specifies how long remote voice must be absent before deciding that the person who was speaking has stopped. This prevents audio from being cut off during brief pauses in speech. Default level is `40 ms`.

- **Remote voice priority threshold –** Sets the threshold for allowing the remote user's voice to override any activity at the microphone. Remote speech above this threshold will be played out the speaker at normal volume regardless of whether the local user is talking. The most sensitive setting is `0`, and the least sensitive setting is `50`. Default level is `27`.

- **Speaker audio delay –** Amount of delay to be applied to the speaker audio, which gives the voice detection algorithm time to unmute the speaker when remote speech begins. Too small of a value can truncate the beginning of audio, while too large of a value can disrupt the flow of a conversation. Default level is `120 ms`.

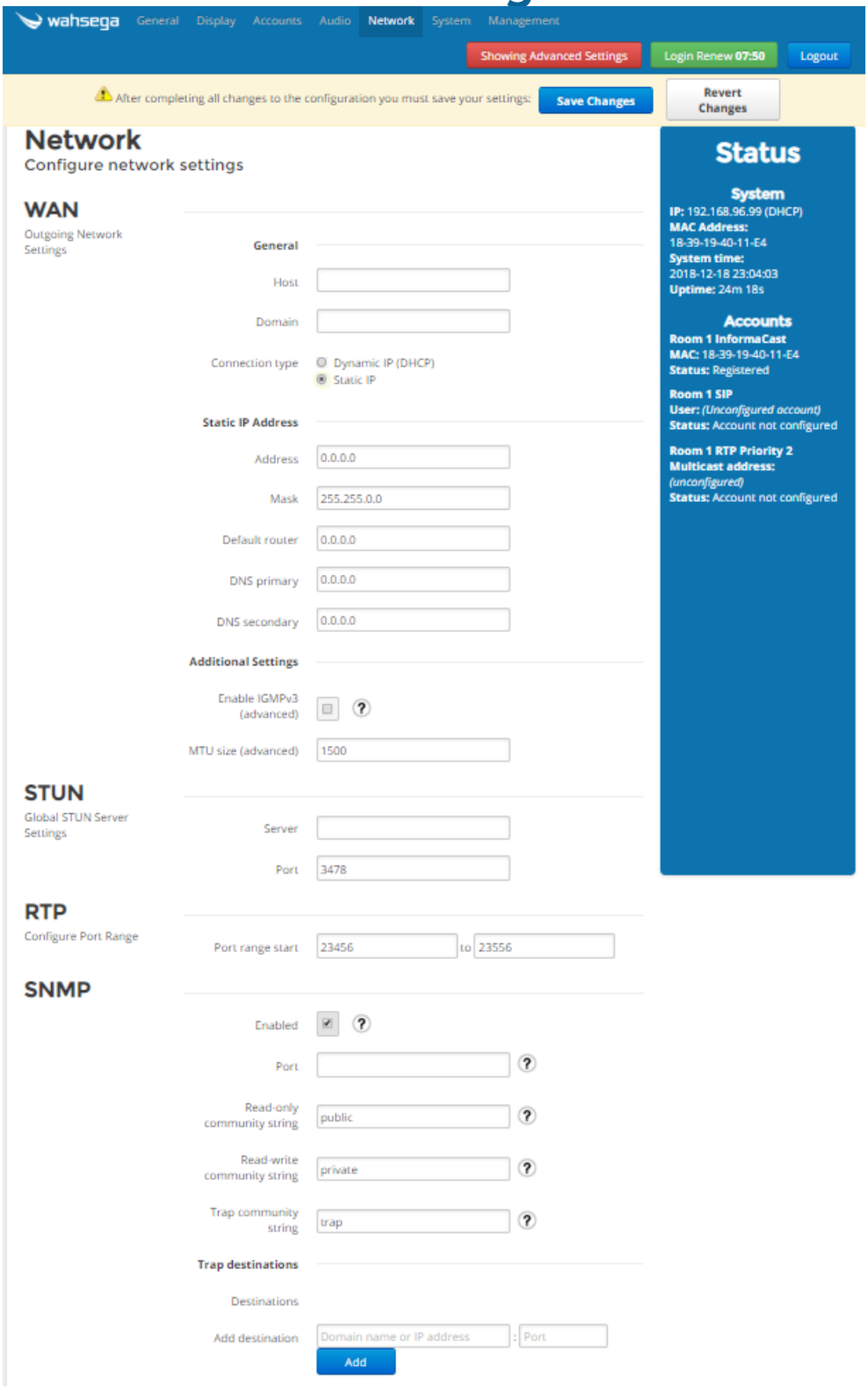
- **Microphone audio delay –** Amount of delay applied to microphone audio, which gives the voice detection algorithm time to unmute the microphone when local speech begins. Too small of a value can truncate the beginning of audio, while too large of a value can disrupt the flow of a conversation. Default level is `100 ms`.

- **Sound Reinforcement Type –** The type of Wahsega Sound Reinforcement Panel you plan to use with this speaker.
    - Two Input
    - One Input
    - Persistent

SIP

- **Choose preferred codecs for SIP audio –** These settings enable/disable audio codecs and set their order of use for SIP calls. The system tries codecs at the top of the *Preferred* list before trying codecs at the bottom of the list.
    - To add a preferred codec, highlight the *Available* codec on the left and click *Enable*, adding it to the *Preferred* list on the right.
    - To change the priority level of a preferred codec, simply highlight it in the *Preferred* list and click *Move Up* or *Move Down*.

Network Configuration



The ***Network*** page configures 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 IP Display 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 IP Display! Double-check that the settings you enter are correct before rebooting the IP Display to apply them.*

Additional Settings (advanced)

- **Enable IGMPv3 –** Check to enable IGMP version 3 on your IP Display. If unchecked, IGMP version 2 (IGMPv2) will be used. Default setting is *disabled*. If you know that your routers have IGMPv3 enabled, you can safely enable this setting. *If unsure, leave disabled* to ensure support with routers that only use IGMPv2.
- **MTU size –** Maximum transmission unit allowed on the Ethernet connection. The standard for Ethernet networks is 1500, and you *should not change this value* unless directed by your network administrator.

STUN

- **Server/Port –** Enter your STUN server here if applicable. STUN servers may be required to operate with a public SIP server from behind a NAT or router.

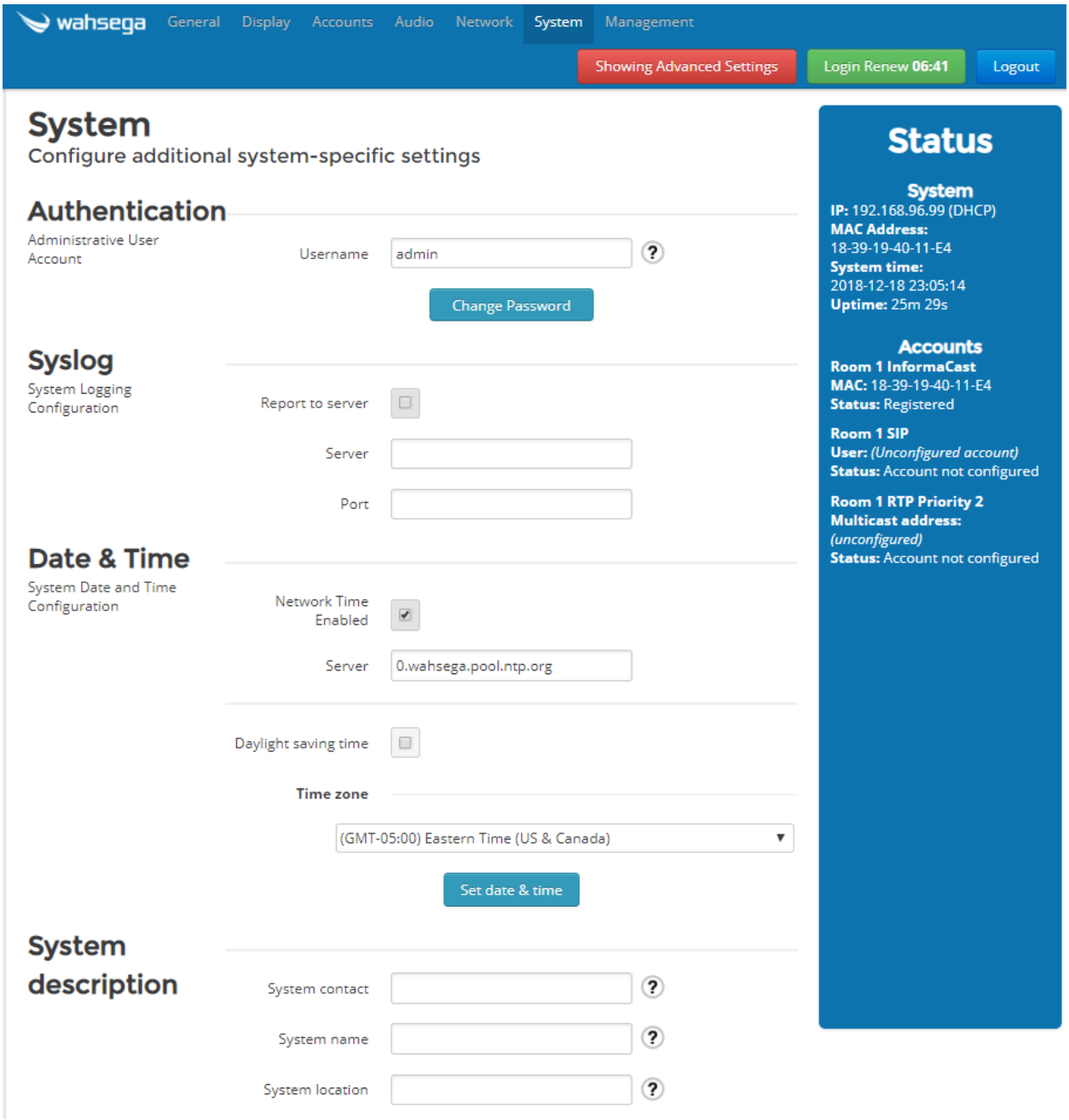
RTP

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

SNMP

- **SNMP Enabled –** SNMP is required for the InformaCast server to control relays in the IP Display. *The IP Display's relays cannot be used while SNMP is disabled*, so be sure to check this box if you may be using relays with InformaCast.
- **Port –** The port number used for SNMP.
- **Read-only community string –** The community string that will allow read-only access to SNMP variables on this device. SNMP community strings are sent in plain-text, so *do not re-use a password that's used for any secure logins or devices!*
- **Read-write community string –** The community string that will allow read-write devices to access the SNMP variables on this device. SNMP community strings are sent in plain-text, so *do not re-use a password that's used for any secure logins or devices!*
- **Trap community string –** The community string used when this device sends SNMP traps.
- **Trap destinations**
    - **Add destination –** Add destination for SNMP trap as domain name or IP address plus port.

General System Configuration



The ***System*** page configures settings for the IP Display's operating system and other administrative functions.

Authentication

Username – Set the username and password used on the configuration webpages and Telnet shell. Default is *admin*.

Syslog (optional)

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

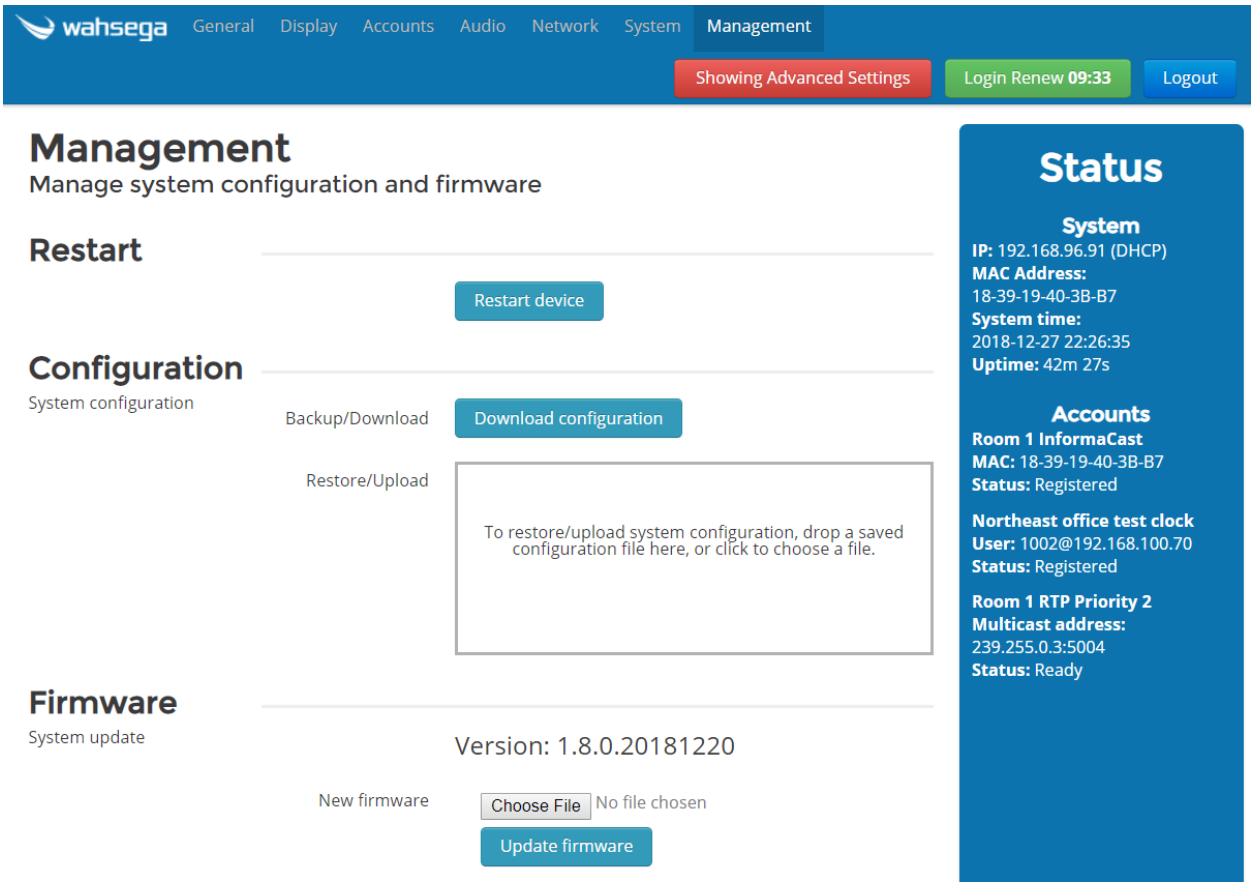
Date & Time

- **NTP Enabled –** Automatically determines the time of day using an NTP server. This is recommended, as the IP Display does not have a battery-backed clock.
- **Daylight saving time –** Select this only if daylight saving time is currently in effect in your location. (For more information about DST rules and dates, see http://www.nist.gov/pml/div688/dst.cfm.)
- **Time zone –** Select the region that most closely matches your time zone. (Note that daylight saving time is *not* automatically applied based on region.)

System Description (optional)

- **System contact –** Identification and contact information for this device's administrator (usually an IT person).
- **System name –** Administratively-assigned name for this device. By SNMP convention, this is the device's fully-qualified domain name. Also available through SNMP as `sysname` (`1.3.6.1.2.1.1.1.5`), as defined by RFC 1213.
- **System location –** The physical location of this device (e.g., "3rd floor telephone closet"). Also available through SNMP as `sysLocation` (`1.3.6.1.2.1.1.6`), as defined by RFC 1213.

Firmware Management



The ***Management*** page has functions for managing the IP Display's configuration and firmware.

Restart

- **Restart device –** Click to reboot your device if needed.

Configuration

- **Backup/Download –** Use this to retrieve a copy of the IP Display's current configuration and save to disk.
- **Restore/Upload –** Use this to upload a valid configuration file (`.json` format) which was retrieved and saved from an IP Display. *Note that a reboot will be required before the settings take effect.*

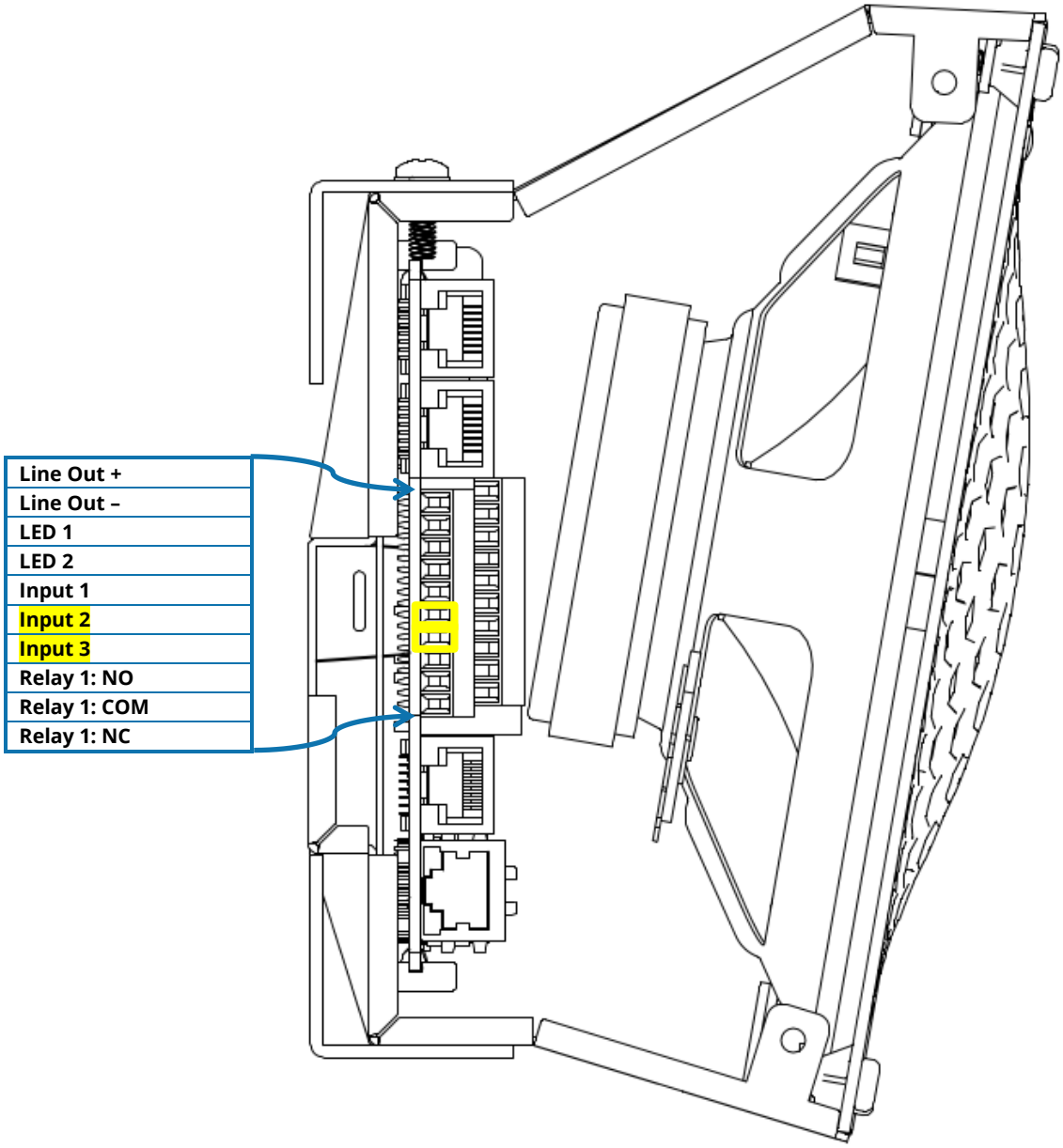
Firmware

- **Choose File –** Click first to select a valid firmware file in .bin format.
- **Update firmware –** After choosing your file above, click here to upload the new firmware. Your device will reboot upon update completion. *DO NOT UNPLUG THE IP DISPLAY OR INTERRUPT THE FIRMWARE UPGRADE PROCESS BEFORE IT COMPLETES, OR IT MAY BE RENDERED UNUSABLE.*

Appendix A
Restoring Factory Settings

Software-based Factory Reset

If you need to erase the configuration settings in your Wahsega IP Display, you can do so by following the steps below.



Steps for activating a full factory reset:

1. Start with the PoE cable unplugged and the IP Display powered **off**.
2. Jumper Input 3 and Input 4 (highlighted in yellow, above).
3. While jumper is in place, plug in the PoE cable and apply power to your IP Display.
4. Once power is applied, continue to hold the jumper in place for **at least five (5) seconds.**
5. After 5 seconds, the status light will flash to indicate that the file system has been reformatted and all data has been erased from the device.
6. Remove jumper and restart your IP Display for the new settings to take effect.
7. If you have previously changed the IP address of your IP Display to a static IP address, keep in mind that restoring factory default settings will return your IP Display to dynamic IP (DHCP) mode. You will need to use the new, dynamic IP address to gain access to your IP Display's configuration webpages once again.

IP Display with InformaCast®

WL-IPD-SPKR-10-INF

WL-IPD-SPKR-520-INF

WL-IPD-SPKR-540-INF

WL-IPD-SPKR-510D-INF

WL-IPD-SPKR-510D-INF-TM

User's Guide

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