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ACOUSTICS

# **S3 IP Endpoint Configuration Guide**

**For Digital Acoustics IP Audio Endpoints**

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# S3 IP Endpoints Configuration Guide

## Introduction

*This guide is intended for customers who have purchased Digital Acoustics IP Audio products with the S3 firmware feature set (model number ending in -S3 or -S3-IC) or have replaced the TalkMaster/SIP firmware in the IP Audio endpoints with the S3 firmware.*

### **S3 - SIP, Singlewire, Simple!**

Digital Acoustics IP Intercoms, IP Speakers and IP Amplifiers are available with the S3 Firmware features set. The S3 Firmware feature set provides the ability to use Digital Acoustics IP Audio Endpoints with SIP based phone systems, and/or with Singlewire's **InformaCast** software. SIP is a standard feature in the firmware and the Singlewire InformaCast client is an additional feature that can be purchased when ordering an S3 enabled IP Endpoint. A field upgrade is also available for the Singlewire InformaCast client.

S3 IP Endpoints operate in one of the following modes:

- SIP client connected to a SIP Phone System or SIP Peer-to-Peer
- Singlewire InformaCast Client (Singlewire InformaCast License required)
- Combined SIP client/InformaCast Client

The S3 IP Endpoints can be configured using a standard web browser or by using InformaCast configuration files as per the Singlewire V1.2 IP Speaker Protocol.

## S3 IP Endpoint Status LEDs

The S3 IP Endpoint's LEDs provide information about the status of the device. On the blue modules such as the IP7-FX-S3 or IP7-FX-S3-IC, there are three red LEDs: **READY**, **LINK** and **ACTIVE**. Also, the Primary Ethernet jack has a green led which corresponds to the **LINK** led and a yellow LED that corresponds to the **READY** LED. To determine the location of the **READY**, **LINK** and **ACTIVE** LEDs for other models, refer to the device's Getting Started Guide

The **LINK** LED or the green LED on the Ethernet connector will turn on solid when it detects that it is connected to the Ethernet network. If the device does not detect a network connection, the **LINK** LED will be off.

The **READY** LED or yellow LED on the Ethernet connector indicates whether the device is registered to InformaCast or registered to a SIP server. If the S3 IP Endpoint is configured for both InformaCast and SIP, it will first attempt to connect to InformaCast. If it successfully registers with InformaCast, it will then try to register with the SIP server. If it does not connect to InformaCast, it will not attempt to register with the SIP server.

READY LED	S3 IP Endpoint Configuration Type		
	InformaCast Only	SIP Only	InformaCast/SIP
On Solid	Registered	Registered	Registered
Flashing 1x every 2 seconds	N/A	Not registered	Registered
Flashing 4x per second	Not Registered	Not Registered	Not Registered

The **ACTIVE** LED flashes to indicate that the audio is being transmitted or received by the S3 IP Endpoint.

## SIP Overview

SIP is a network protocol used by the majority of VoIP based phone systems.

The S3 IP Endpoint supports the following SIP features:

- G.711 uLaw or aLaw standard voice codec
- G.722 voice codec for enhanced audio can optionally be enabled
- The ability to call an extension, group extension or external phone number (dependant on the Phone systems capabilities) by activating the endpoint's TALK button
- Operate S3 IP Endpoint in full or half duplex audio mode
- Default an endpoint to activate its microphone on call initiation (half duplex mode only)
- Activate the endpoint's on board relay (if so equipped) from a SIP phone
- Change the endpoint's speaker volume from a SIP phone
- Register with a secondary SIP Server if the connection to the primary SIP server is lost. Register back to the primary SIP Server when it becomes available
- Operate in SIP Peer-to-Peer mode instead of registering with a phone system

*Please note that if the Singlewire InformaCast feature is enabled, the SIP options can be configured using the InformaCastSpeaker config files and those options can not be overridden on the S3 IP Endpoint's web page.*

## InformaCast Overview

For Singlewire InformaCast, the Digital Acoustics S3 IP Endpoints support G711 voice quality audio for pre-recorded and live streams. Additionally, Singlewire's V1.2 IP Speaker Protocol specifies that Informacast Speakers can also be configured as SIP devices. Digital Acoustics S3 IP Endpoints adhere to Singlewire's V1.2 specification that describes how IP speakers configured for both InformaCast and SIP should handle conflicts between the two protocols. It also describes how the InformaCast configuration files can be used to provision IP speakers as SIP devices.

*Please note that if the S3 IP Endpoint is configured to connect to both InformaCast and SIP and it is unable to register with InformaCast, it will not attempt to register with the SIP server.*

## InformaCast Configuration

When an S3 IP Endpoint that is licensed for Singlewire Informacast is connected to the network, it will automatically determine the address of the InformaCast Server through Multicast or DNS SRV records and will then connect to the InformaCast Server. To verify that an S3 IP Endpoint has connected:

- The S3 IP Endpoint's READY LED will turn solid red
- Open the InformaCast web interface (refer to Singlewire's documentation)
- Select menu option **Speakers** to view the list of S3 IP Endpoints that have connected to InformaCast
- The endpoint's **Name** will default to its MAC Address
- Press the **Edit** button to change the Name, Description and to adjust the volume to the desired level (levels are 1 - 10 with a max of 9 recommended). Press the **Update** button to save the changes
- Use the **Test** button to test the volume of the speaker

## InformaCast Configuration Files

InformaCast uses XML configuration files to configure system wide device options (InformaCastSpeaker.cfg) or device specific options (InformaCastSpeakerxxxxxxxxxxx.cfg where xxxxxxxxxxxxxx is the device's MAC address). All of the S3 IP Endpoint options can be configured using these files. (refer to the Singlewire InformaCast documentation for details on setting up the cfg files).

*Options set in InformaCast configuration files cannot be overridden via the S3 IP Endpoint's web page.*

After an S3 IP Endpoint connects to InformaCast, it picks up any configuration options from the InformaCastSpeaker.cfg file. It then picks up InformaCastSpeakerxxxxxxxxxxx.cfg file if available and compares those options to the options the device is configured with. If there are differences, the

changes will be applied to the device from the cfg files and it will reboot and reconnect with the updated options.

## XML Configuration File Options

In addition to the standard keywords used in the InformaCast cfg files, the following keywords are supported for Digital Acoustics S3 IP Endpoints.

- DigitalAcoustics
- SipConfig
- Firmware
- IdleAudio
- ZoneConfig

### DigitalAcoustics keyword

The **DigitalAcoustics** keyword is used to configure the following options:

#### Optional configuration keywords:

```
<DigitalAcoustics
username="admin"
password="admin"
relay="FALSE" or relay="TRUE"
beep="FALSE" or beep="TRUE"
debug = "1"
debugAddr="192.168.5.247"
/>
```

- **username / password** – these keywords are used to override the default values used to logon to the *S3 IP Endpoint* Web page. If not specified, the default **UserName** and **Password** both default to **admin**. If these keywords are present, they will
  - override any **username** and **password** that have previously been set in the S3
  - override any **username** and **password** that are changed through the S3 Web Page
- **beep** – when this option is set to **TRUE**, the S3 will play a beep when it first connects to InformaCast. This is typically used when first setting up the system to let the installer know that the speaker has registered to InformaCast. When this option is set to **FALSE**, the option will be disabled. If this parameter is present, it will
  - override the previously set **beep** value
  - override the **beep** value set thru the S3 Web Page
- **relay** – when this option is set to **TRUE**, the S3 IP Endpoint's Relay will be activated while audio is played on the device. This is equivalent to selecting **Activate On...** from the **Relay Type** dropdown and checking the **Speaker** option on the Relays tab of the web configuration. When this option is set to **FALSE**, the option will be disabled. If this parameter is present, it will:

- override the previously set **relay** value
- override the **relay** value set thru the S3 Web Page
- debug – This option should only be used when directed by Digital Acoustics Support. It can not be set in the web configuration
- debugAddr - This option should only be used when directed by Digital Acoustics Support. It can not be set in the web configuration

### SipConfig keyword

The **SipConfig** keyword is used to configure SIP options. For details, refer the corresponding option on the [SIP](#) tab of the web configuration page:

```
<SipConfig
Enabled="TRUE"
Registrar1="registrar.domain.com"
Registrar1Port= "5060"
Server1="server.domain.com"
Server1Port="5060"
Registrar2="AlternateRegistrar.domain.com"
Registrar2Port="5060"
Server2="AlternateServer.domain.com"
Server2Port="5060"
FullDuplex="TRUE"
P2P="TRUE"
Tcp="TRUE"
RegistrarIsProxy="TRUE"
Handset="TRUE" (Indicates that the HS-A1 Handset is connected to the IP7)
SensorEndsCall="TRUE"
PttEndsCall="TRUE"
FreshCred="TRUE"
DefToListen="TRUE"
G722="TRUE"
LocalPort="5060"
RtpPort="46000"
Extension="extension"
Password="password"
Authentication="authentication"
OutDialEnabled="TRUE"
OutDialExtension="extension"
DoorCode="123"
CallTimeout="10"
RegRetry="0"
KeepAlive="0"
/>
```



## Firmware keyword

The **Firmware** keyword is used to update the firmware in the S3 IP Endpoints. If this keyword is present when the device boots up and registered with InformaCast, if it's firmware version does not match the **version** parameter, the firmware update will be sent to the device. The optional **downgrade** parameter controls whether a device will ignore firmware updates that cause the device to be downgraded..

```
<Firmware  
sw7file="1.2.0.27.sw7"  
address="10.10.1.182"  
downgrade="yes" or downgrade="no"  
version="1.2.0.27"  
>
```

- **address** - Species the IP Address of the TFTP server that is hosting the firmware
- **sw7file** - is the name of the SW7 firmware file that is on the TFTP server
- **version** - is the version of the sw7file, used to determine whether the firmware should be replaced
- **downgrade** - "yes" "no", indicates if a device should be downgraded from it's current firmware to a lower version?

## IdleAudio keyword

The **IdleAudio** keyword is used to configure background music or low priority audio on an S3 IP Endpoint. A Digital Acoustics IP7 configured as a Music Injector will send low priority multicast audio (typically used for background music). S3 IP Endpoints will listen on the multicast address and port specified and play any incoming audio at the specified volume level. Audio from SIP or InformaCast will always override this low priority audio.

```
<IdleAudio  
address="225.0.0.254"  
port="4000"  
volume="7"  
>
```

- address - specifies the IP Address that the Music Injector is sending Multicast audio to
- port - specifies the port that the Music Injector is sending Multicast audio to
- volume - specifies the volume level that low priority audio should be play at

## ZoneConfig keyword

The **ZoneConfig** keyword only applies to the **IP7-MZC - Multi Zone Controller** and the **Zone Extension Boards** attached to it. It is used to configure the following options:

```
<ZoneConfig  
ZonesExpected="4"  
ZG1="000000000000000000000000"
```

```
ZG2="000000000000000000000000"
ZG3="000000000000000000000000"
ZG4="000000000000000000000000"
ZG5="000000000000000000000000"
ZG6="000000000000000000000000"
ZG7="000000000000000000000000"
ZG8="000000000000000000000000"
```

/>

- **ZonesExpected** - Enter the number of zones attached to a Multi Zone Controller. Each Zone Extension Board includes 4 zones, so the number specified must be a multiple of 4.
- **ZG1 - ZG8** - An IP7-MZC can have up to 48 zones. One or more zones can be included in a Zone Group. Up to 8 Zone Groups can be created using the ZG1 - ZG8 parameters. These Zones can be activated and deactivated during a SIP call from a phone using the following keys on the keypad:
  - \*0 - Turn off all zones
  - \*1 - Turn on Zone Group 1
  - \*2 - Turn on Zone Group 2
  - \*3 - Turn on Zone Group 3
  - \*4 - Turn on Zone Group 4
  - \*5 - Turn on Zone Group 5
  - \*6 - Turn on Zone Group 6
  - \*7 - Turn on Zone Group 7
  - \*8 - Turn on Zone Group 8
  - \*9 - Turn on all zones

The ZG1 - ZG8 parameters consist of 24 ASCII digits indicating the mics and/or speaker on each of the 12 Zone Extension boards that can be attached to the MZC::

- Two ASCII digits are used for each zone extension board. The first digit represents the 4 mics and the second digit represents the 4 speakers
- Each ASCII digit is constructed as a hex "nibble" or four bits to indicate the audio path that needs to be activated. So:
  - 0001 = 1 = 1st mic or speaker
  - 0010 = 2 = 2nd mic or speaker
  - 0100 = 4 = 3rd mic or speaker
  - 1000 = 8 = 4th mic or speaker
- The bits are added together resulting in a single digit with value of 0 - F.
- If the resulting value is equal to 10 (hex A), substitute an (A) keypress
- If the resulting value is equal to 11 (hex B), substitute a (B) keypress
- If the resulting value is equal to 12 (hex C), substitute a (C) keypress
- If the resulting value is equal to 13 (hex D), substitute a (D) keypress
- If the resulting value is equal to 14 (hex E), substitute an asterisk (\*) keypress
- If the resulting value is equal to 15 (hex F), substitute a pound sign (#) keypress

Here are a few examples:

- To specify a zone group consisting of the 1st mic and 1st speaker on the first Zone Extension board, enter ZGx="110000000000000000000000"
- To specify a zone group consisting of all four mics and all four speakers on the first Zone Extension board, enter ZGx="##000000000000000000000000"
- To specify a zone group consisting of the first speaker on the first and second Zone Extension board (zones 1 and 5), enter ZGx="010100000000000000000000":

## Using the Browser based Configuration page

All S3 endpoints can be configured using a standard web browser. Browser based configuration includes the following capabilities:

- DHCP (default) or Static IP Address assignment
- UserID and Password specification
- On Board Relay mode (if so equipped)
- SIP configuration
- InformaCast configuration
- Audio profile configuration
- Firmware Upgrade

To logon to the S3 IP Endpoint's Web Page, enter `http://xxx.xxx.xxx.xxx` (where `xxx.xxx.xxx.xxx` is the IP Address of the S3 IP Endpoint) into a web browser. If the IP Endpoint's IP Address is not known, download and run the [Digital Acoustics Device Discovery](#) utility to determine the endpoint's IP address. When the "Sign in" dialog appears, enter **admin** for both the username and password. It is recommended that these credentials be changed, but make sure they are recorded. If the credentials are lost, the device will have to be reset to factory defaults in order to access the S3 IP Endpoint's Web page (if the InformaCast cfg file parameters of **userid** and **password** are being used, they will override any password set in the Web page).

Please note the following:

- If changes are made on a tab, that tab must be submitted before changes to any other tabs are made
- Pressing the **Submit** button will only submit the information for the current tab. Any changes on other tabs will be ignored
- The **Submit** button at the bottom of page will turn red if changes are not complete or any field is invalid
- The **Submit** button at the bottom of the page will turn green when all mandatory fields have been entered and are valid
- Pressing the **Reboot** button at the bottom of any tab will ignore any changes and cause the S3 IP Endpoint to reboot
- Pressing the F5 key or the browser's refresh icon will remove any changes that have been made but not submitted and redisplay the **General** tab

## Reset to Factory Defaults

if the device does not respond or if the web page password has been lost, the device can be reset to factory defaults to clear all of its settings. Refer to the device's hardware manual for instructions.

## General tab

Digital Acoustics  
S3 for SIP/SingleWire

General
Security
Relays
Updates
InformaCast
SIP
Audio
Zones

MAC Address	<input type="text" value="00:1b:61:04:a2:79"/>
Version	<input type="text" value="v1.2.0.68"/>
Device Type	<input type="text" value="ICC-m"/>
Processor	<input type="text" value="ICC2A"/>
InformaCast Status	<input type="text" value="Not SingleWire Licensed"/>
SIP Status	<input type="text" value="Register Error"/>
Device Status	<input type="text" value="Healthy"/>
Address Type	<input style="border-bottom: none;" type="text" value="DHCP"/> ▼
IP Address	<input type="text" value="192.168.5.12"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="192.168.5.1"/>
DNS Server 1	<input type="text" value="75.75.75.75"/>
DNS Server 2	<input type="text" value="75.75.76.76"/>

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The General tab displays basic information about the IP Audio Endpoint, its Informacast and SIP status and provides the ability to set a static IP Address.

- **MAC Address** - Displays the permanent address of the device
- **Version** - Displays the firmware version the S3 IP Endpoint is running
- **Device Type** - Displays the internal model number of the device
- **Processor** - Displays the integrated communications core of the device
- **InformaCast Status** - Displays whether InformaCast is licensed or whether the device is register with InformaCast
- **SIP Status** - Displays whether SIP is enabled or whether the device was able to register with the SIP server

- **Device Status** - Displays internal error messages that may prevent the device from functioning properly
- **Address Type** - Specify how the IP Address is obtained. Select DHCP for automatic IP Address allocation (requires an on premise DHCP Server) or select Static to enter the IP Address information manually
- **IP Address** - Display or specify the IP Address assigned to this device
- **Subnet Mask** - Display or specify the Subnet Mask associated with the IP Address
- **Gateway** - Display or specify the Gateway address associated with the IP Address
- **DNS Server 1** - Display or specify the first DNS Server IP Address
- **DNS Server 2** - Display or specify the second DNS Server IP Address. This will only be used if the first DNS Server address is unavailable

## Security tab

The screenshot shows the 'Security' tab of the configuration interface. At the top, it says 'Digital Acoustics' and 'S3 for SIP/SingleWire'. Below this are several tabs: 'General', 'Security' (which is selected), 'Relays', 'Updates', 'InformaCast', 'SIP', 'Audio', and 'Zones'. The main content area contains three input fields: 'User Name' with the value 'admin', 'New Password', and 'Re-enter Password'. A 'Submit' button is located below the password fields. At the bottom of the form, there is a 'Reboot' button. The footer of the page reads 'Copyright 2013-2020, Digital Acoustics LLC'.

This information is used to sign in to S3 IP Endpoint in order to view or update its configuration.

- **User Name** - Display or specify the user name used to sign in to the device's web based configuration page. The factory default user name is admin
- **New Password** - Specifies the new password to be associated with the User Name. The factory default password is admin
- **Re-enter Password** - The password must be entered a second time to verify it

*Please note the following:*

- All three fields on this form are required
- If the User Name and Password are specified in the InformaCast cfg file, they will override the information on this page
- If the User Name and/or Password are forgotten and are not specified in the InformaCast cfg file, the device must be reset to factory defaults in order to configure it

## Relays tab

The screenshot shows the configuration interface for the Relays tab. At the top, there are navigation buttons for General, Security, Relays (selected), Updates, InformaCast, SIP, Audio, and Zones. Below these, the 'Relay Type' is set to 'Door/Relay' in a dropdown menu. The 'Door Relay Activate' field contains the number '5'. There are two unchecked checkboxes for 'Mic' and 'Speaker'. A 'Submit' button is located below the checkboxes, and a 'Reboot' button is at the bottom. The footer text reads 'Copyright 2013-2020, Digital Acoustics LLC'.

To determine if the S3 IP Endpoint has an onboard relay, consult its Getting Started Guide.

- **Relay Type** - If equipped with an onboard relay, select any of the following four options:
  - **None** - The relay is not used
  - **Door/Relay** - The relay can be activated with DTMF keys pressed on a phone during a SIP call. Use the SIP tab → Door Code to specify the key sequence
  - **Activate On...** - The relay will be automatically activated when the device's speaker and/or microphone is active. Indicate the Mic and Speaker options below
  - **Activate on PTT** - The relay will be activated while the device's TALK switch (Push To Talk) is activated on a SIP Call
- **Door Relay Activate** - When the Relay Type is set to Door/Relay, this specifies the number of seconds to open the relay for
- **Mic** - When the Relay Type is set to Activate On... checking this box will open the relay when the device's microphone is active
- **Speaker** - When the Relay Type is set to Activate On... checking this box will open the relay when the device's speaker is active

## Updates tab

Digital Acoustics  
S3 for SIP/SingleWire

General Security Relays **Updates** InformaCast SIP Audio Zones

TFTP IP Address

SW7 Firmware Filename

MZC Firmware Filename

Upgrade Firmware

Reboot

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To update the firmware on the S3 IP Endpoint, a TFTP server is required. Many free options are available such as Tftpd64 or SolarWinds TFTP Server. Once the **Upgrade Firmware** button is pressed, the S3 IP Endpoint will copy the firmware file from the TFTP directory to a temporary location on the device and then begin the update process. After about one minute, the device should reboot with the new firmware. The SW7 firmware version is displayed on the **General** tab. The MZC firmware version is displayed on the **Zones** tab

- **TFTP IP Address** - Specify the IP Address of your TFTP Server
- **SW7 Firmware Filename** - Specify filename of the S3 Firmware file. The file must reside in the default directory of your TFTP Server
- **MZC Firmware Filename** - This option only applies to the IP7-MZC-S3 / IP7-MZC-S3-IC and cannot be run at the same time as the SW7 Firmware update. This firmware updates the special controller that the MZC uses for changing audio zones



## InformaCast tab

The screenshot shows the 'InformaCast' configuration tab. At the top, there are navigation buttons for 'General', 'Security', 'Relays', 'Updates', 'InformaCast' (which is highlighted), 'SIP', 'Audio', and 'Zones'. Below these buttons, the configuration options are as follows:

- Enable InformaCast**: A checkbox that is currently unchecked.
- Unlock InformaCast**: A text input field containing the placeholder text 'Enter Unlock Code'.
- Beep on Connection**: A checkbox that is currently unchecked.
- Force Domain**: A checkbox that is currently unchecked.
- Domain-Name**: A text input field containing the value 'hsd1.il.comcast.net'.

At the bottom of the configuration area, there is a 'Submit' button. Below the configuration area, there is a 'Reboot' button. At the very bottom of the page, the copyright notice reads 'Copyright 2013-2020, Digital Acoustics LLC'.

InformaCast is normally a purchased feature and is enabled at the factory. The InformaCast feature can also be purchased as a field upgrade. To field upgrade a device, Digital Acoustics will provide a unique Unlock code for each device that is being upgraded. Once the device is upgraded, it will function the same as devices that were enabled at the factory.

- **Enable InformaCast** - For InformaCast enabled devices, checking this box will cause the device to register with an InformaCast server. Uncheck this box if the device should not attempt to register with InformaCast
- **Unlock InformaCast** - When adding the InformaCast feature as a field upgrade, Digital Acoustics technical support will supply a unique code to enable InformaCast. If the device already has the InformaCast feature, this field will be disabled
- **Beep on Connection** - Checking this box will cause the device to play a short beep tone when it connects to the InformaCast server. This is typically used when the system is initially installed to verify that the device has successfully registered with the InformaCast server. Most customers uncheck this option after the system is installed and tested
- **Force Domain** - S3 IP Endpoints attempt to register with the InformaCast server thru InformaCast's multicast mechanism. If the device is in a remote subnet or location, multicast may not be available. The S3 IP Endpoint will then attempt to use DNS SRV records to find InformaCast. Normally, the DNS domain will be supplied through DHCP. Check this box to override the DHCP value and use the domain specified below

- **Domain-Name** - The domain will automatically be picked up through DHCP. To force a specific domain name, specify it here and check the Force Domain option above

*Please Note that **Enable InformaCast**, **Unlock InformaCast**, **Force Domain** and **Domain-Name** cannot be specified in the InformaCast cfg files.*

## SIP tab

**Digital Acoustics**  
**S3 for SIP/SingleWire**

General
Security
Relays
Updates
InformaCast
SIP
Audio
Zones

Enable SIP <input type="checkbox"/>	Full Duplex <input type="checkbox"/>	Default to Listen <input type="checkbox"/>
Registrar is Proxy <input type="checkbox"/>	Re-REGISTER with Fresh Credentials <input type="checkbox"/>	
Peer-to-peer <input type="checkbox"/>	Enable G722 <input type="checkbox"/>	
SIP Status	<input type="text" value="Not Enabled"/>	
Primary Registrar	<input type="text"/>	: <input type="text" value="0"/>
Primary Server	<input type="text"/>	: <input type="text" value="0"/>
Secondary Registrar	<input type="text"/>	: <input type="text" value="0"/>
Secondary Server	<input type="text"/>	: <input type="text" value="0"/>
SIP Local Port	<input type="text" value="0"/>	
RTP Local Port	<input type="text" value="0"/>	
Extension	<input type="text"/>	
Password	<input type="text"/>	
Authentication	<input type="text"/>	
Outdial on PTT	<input type="checkbox"/>	
Out dial Extension	<input type="text"/>	
Call Timeout	<input type="text" value="10"/>	
Door Code	<input type="text" value="5"/>	
REGISTER retry (0-255s)	<input type="text" value="0"/>	
Keep alive (0-255s)	<input type="text" value="0"/>	
Disconnect Key	<input type="text" value="None"/>	
Volume	<input type="text" value="5"/>	

- **Enable SIP** - enables the SIP Protocol on this device
- **Full Duplex** - S3 IP Endpoints always send and receive audio during a call. If the device does not use a handset, headset or have the acoustic echo cancellation (AEC) feature, uncheck this box. The S3 IP Endpoint will then mute either the speaker or microphone to prevent the Phone Operator from hearing an echo during a call. The Phone Operator can

toggle the speaker or microphone by pressing the 0 key on the phone's keypad

- **Default to Listen** - If the Full Duplex option is unchecked, checking this option will activate the S3 IP Endpoints microphone instead of its speaker when a call is started so the phone operator can listen before saying anything
- **Registrar is Proxy** - Check this option if the SIP Registrar and SIP Server are different. This is typically used with cloud based phone services
- **Re-REGISTER with Fresh Credentials** - When registering with a SIP server, a registration timeout value is supplied by the server. After the timeout, most SIP Servers will allow a device to reconnect using the same credentials as the previous registration. If a SIP server does not allow the same credentials to be used, then enable this feature (very rare)
- **Peer-to-Peer** - Enabling this option eliminates the requirement to register with a SIP server. In this mode, devices can communicate with each other by specifying the other's Extension and IP Address (1234@192.168.0.10) when dialing
- **Enable G722** - G722 is a HD audio codec that improves audio clarity. The [USB Troubleshooting](#) option is disabled while this option is enabled
- **SIP Status** - Displays the SIP Status of the device
- **Primary Registrar and port** - enter the IP address or DNS of the primary SIP Registrar. Typically, the SIP Server and the SIP Registrar are the same. The Registrar is sometimes referred to as the Domain. The Port used to connect to the Primary SIP Registrar is typically 5060
- **Primary Server and port** - enter the IP address or DNS of the primary SIP Server. The Server is sometimes referred to as the Proxy Address. If the Server is different from the Registrar, check the **Registrar is Proxy** checkbox above. The Port used to connect to the Primary SIP Server is typically 5060
- **Secondary Registrar and port** - If the Primary SIP Registrar/Server is unavailable, the device will attempt to register with the Secondary SIP Registrar/Server. When the device determines that the Primary SIP Registrar/Server is available, the device will deregister with the Secondary SIP Registrar/Server and will re register with the Primary SIP Registrar/Server
- **Secondary SIP Server and port** - See above
- **SIP Local Port** - Specifies the device's local port used for SIP traffic. The default port is 5060
- **RTP Port** - Specifies the device's local starting port used for audio traffic (RTP ports are used in pairs). Recommended starting port should be 10000 or above. The first call will use the pair of consecutive RTP ports starting at the specified number. On subsequent calls, the device will increment the port number by two. When 1000 ports have been used, the device will restart at the specified number
- **Extension** - enter the extension number that was created on the SIP Server. If using the Peer-to-Peer option, select a unique extension within the peer group being used

- **Password** - enter the password that was created for the SIP extension. The SIP Password is sometimes referred to as the Secret. If using the Peer-to-Peer, enter the same value that was used for the Extension
- **Authentication** - enter the User that has been associated with this extension in the SIP based phone system. If no User has been set up, use the same value as the Extension. The SIP authentication is sometimes referred to as the SIP Authorization Name or User Name. If using the Peer-to-Peer, enter the same value that was used for the Extension
- **Outdial on PTT** - (Push To Talk) Check this option if the S3 IP Endpoint should place a call when it's TALK button is pressed
- **Outdial Extension** - If the Outdial on PTT option has been checked, enter the **Extension** or phone number the S3 IP Endpoint should call when its TALK button is pressed
- **Door Code** - If the S3 IP Endpoint's integrated relay will be used to open a door during a call, specify a 1 – 4 digit code to be entered on the phone's keypad. If the specified code has multiple digits, the phone operator will need to enter a # after the code (ie if 65 is entered, the phone operator would need to enter the digits 65# during the call to activate the relay). If only a single digit is specified, the phone operator only needs to enter that digit. The **Relay Type** on the [Relays](#) tab must also be set to **Door/Relay**
- **Volume** level (1 - 10) for the S3 IP Endpoint's speaker. The speaker Volume can also be set while a call is in progress
- **Submit** - button The changes will be sent to the S3 IP Endpoint. After rebooting (~20 seconds), the web page will refresh
- The **SIP Status** under the **General** tab should display "Registered"

### Setting SIP Volume during a call

The S3 IP Endpoint has 10 volume steps. Volume level 9 is the highest recommended level. The volume level may vary based on whether a full or half duplex Audio Profile has been selected on the Audio tab. Volume can be adjusted when a SIP call is in progress by pressing the following keys on the telephone:

- Press #00 to lower the volume by one step
- Press #01 ( or #02, #03 through #0\*) to set the volume to a specific level (1 -10)
- Press #0# to raise the volume by one step

## Audio tab

The screenshot shows the configuration interface for the Audio tab. At the top, there are navigation tabs: General, Security, Relays, Updates, InformaCast, SIP, Audio (selected), and Zones. The main content area includes:

- Audio Profiles:** A dropdown menu currently set to "None".
- Audio Profile Detail:** A large empty text area for displaying details.
- Audio Input:** A dropdown menu currently set to "Microphone".
- Idle Audio Volume:** A text input field containing the value "5".
- Test Tone:** A dropdown menu currently set to "None".
- Test Tone Timeout (Secs):** A text input field containing the value "5".

At the bottom of the configuration area, there are two buttons: "Submit" and "Reboot". The footer of the page reads "Copyright 2013-2020, Digital Acoustics LLC".

- **Audio Profiles** - On some S3 IP Endpoints, Audio Profiles are available. Audio profiles enable the device to be customized to a particular environment. For instance an S3 IP Endpoint may be used to drive a two way Intercom with Acoustic Echo Cancellation or may be used to power a one way Speaker. Select an audio profile from the drop down list as recommended by the device's Getting Started Guide or by Digital Acoustics Technical Support
- **Audio Profile Detail** - Displays the internal code associated with the audio profile. *DO NOT MAKE ANY CHANGE TO THIS UNLESS DIRECTED BY DIGITAL ACOUSTICS TECHNICAL SUPPORT*
- **Audio Input** - On some S3 IP Endpoint models, "Line" In is available as an alternate audio input. Select Line In if it is being used instead of the Microphone
- **Idle Audio Volume** - Background Music

## Testing or Locating an S3 IP Endpoint

- **Test Tone / Test Tone Timeout (Secs)** - The Test Tone can be used to verify that an S3 IP Endpoint's speaker is working or to help determine where it is installed.
- Select either **Low** or **High** from the drop down list, enter the number of seconds to run the test in **Test Tone Timeout (Secs)** and press the **Submit** button
- The selected tone will play for the specified number of seconds

## Zones tab

The screenshot shows the 'Zones' configuration tab for the Digital Acoustics S3 for SIP/SingleWire device. The interface includes a navigation bar with tabs for General, Security, Relays, Updates, InformaCast, SIP, Audio, and Zones. The main configuration area contains the following fields and controls:

Version	<input type="text" value="Not an MZC"/>
Zones Found	<input type="text" value="0"/>
Zones In Use	<input type="text" value="0"/>
Zone Group 1	<input type="text" value="000000000000000000000000"/>
Zone Group 2	<input type="text" value="000000000000000000000000"/>
Zone Group 3	<input type="text" value="000000000000000000000000"/>
Zone Group 4	<input type="text" value="000000000000000000000000"/>
Zone Group 5	<input type="text" value="000000000000000000000000"/>
Zone Group 6	<input type="text" value="000000000000000000000000"/>
Zone Group 7	<input type="text" value="000000000000000000000000"/>
Zone Group 8	<input type="text" value="000000000000000000000000"/>

Below the fields are two buttons: **Submit** and **Reboot**. At the bottom of the page, the copyright notice reads: Copyright 2013-2020, Digital Acoustics LLC.

- **Zones Found** - Displays the number of zones that were discovered on the IP7-MZC device the last time it was rebooted or powered up
- **Zones In Use** - Enter the number of zones attached to a Multi Zone Controller. Each Zone Extension Board includes 4 zones, so the number specified must be a multiple of 4. Use this as a cross check against the number of **Zones Found**
- **Zone Group 1 - 8** - Refer to the discussion of [ZoneConfig keyword](#) earlier in this document



## Multi-Zone Controller Configuration

The IP7-MZC-FD-S3 is an IP Audio controller that can support up to 48 zones of full or half duplex audio as well as a handset for private conversations.

The MZC works as a single SIP extension and DTMF keypresses are used to switch between eight zone groups. During a SIP call, the phone operator can select one of 8 zone groups by pressing the digits that corresponds to that zone group. If the handset is lifted off of the switch hook, audio to the other zones is automatically stopped and switched to the handset.

The MZC can also be used with Singlewire's InformaCast software by configuring the MZC as a single SIP extension and setting it up in Singlewire's Legacy Paging Interface (LPI) plugin as a **Paging Device**.

*Please note: InformaCast must be configured to communicate with the SIP Server. Refer to the InformaCast documentation for set up.*

The screenshot shows the InformaCast web interface. At the top, it says "InformaCast advanced notification" and "License Expiration: Jul 20, 2020". The main content area is titled "Legacy Paging Interface" and "Paging Devices". On the left, there is a navigation menu with options: "Current Activities", "Paging Devices", "SIP Server Groups", "Configuration", and "License". The "Paging Devices" section contains a table with the following data:

Device Name	Action
MZC	EDIT [pencil icon] DELETE [trash icon]

Below the table, it says "Results 1 - 1 of 1." There is also an "ADD +" button and a search bar with "15" and navigation icons.

The SIP extension and DTMF codes for switching Zone Groups are set up in the Edit Paging Device page.

**InformaCast**  
advanced notification  
License Expiration: Jul 20, 2020

Plugins | Legacy Paging Interface

Current Activities  
Paging Devices  
SIP Server Groups  
Configuration  
License

**Edit Paging Device**

Device Name: MZC \*

SIP Server Group: Asterisk \*

SIP User or Telephone Number: 6006

Max SIP Response Time (seconds: 0=forever): 0 \*

DTMF Duration (milliseconds): 20 \*

Pause Before First DTMF (milliseconds): 20 \*

Pause After Last DTMF (milliseconds): 20 \*

Pause Between DTMF Tones (milliseconds): 20 \*

\* required

**Paging Zones**

Zone Name	MAC Address	DTMF Codes	Action
ALL ZONES	* FF1B619FA317	* *9	DELETE STATUS
Zone 1	* FF1B61812EA2	* *1	DELETE STATUS
Zone 2	* FF1B6125C9C0	* *2	DELETE STATUS
Zone 3	* FF1B61048BF9	* *3	DELETE STATUS
Zone 4	* FF1B61FE6643	* *4	DELETE STATUS

ADD +

After saving the changes to the Edit Paging Device page, InformaCast automatically creates **IP Speaker** entries for each zone. Each configured zone will be counted as a separate device within InformaCast and will be subject to Singlewire's licensing requirements.

<input type="checkbox"/>	MZC: ALL ZONES	Automatically added, name=MZC: ALL ZONES Status: Registered at Thu Jun 25 17:03:13 CDT 2020, IP=10.3.3.250	12	ff1b619fa317	EDIT DELETE TEST
<input type="checkbox"/>	MZC: Zone 1	Automatically added, name=MZC: Zone 1 Status: Registered at Thu Jun 25 17:03:14 CDT 2020, IP=10.3.3.250	12	ff1b61812ea2	EDIT DELETE TEST
<input type="checkbox"/>	MZC: Zone 2	Automatically added, name=MZC: Zone 2 Status: Registered at Thu Jun 25 17:03:15 CDT 2020, IP=10.3.3.250	12	ff1b6125c9c0	EDIT DELETE TEST
<input type="checkbox"/>	MZC: Zone 3	Automatically added, name=MZC: Zone 3 Status: Registered at Thu Jun 25 17:03:13 CDT 2020, IP=10.3.3.250	12	ff1b61048bf9	EDIT DELETE TEST
<input type="checkbox"/>	MZC: Zone 4	Automatically added, name=MZC: Zone 4 Status: Registered at Thu Jun 25 17:03:16 CDT 2020, IP=10.3.3.250	12	ff1b61fe6643	EDIT DELETE TEST

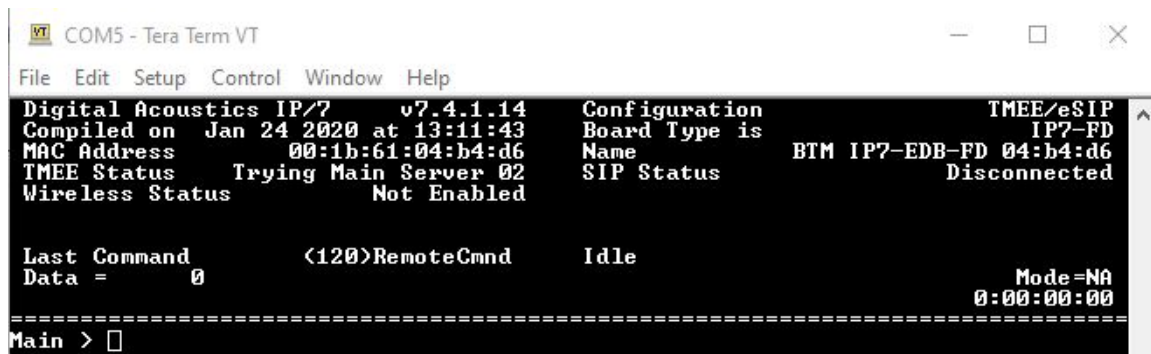
When sending audio to a zone, InformaCast will use the SIP protocol instead of Multicast.

## USB Troubleshooting

A USB cable can be used to troubleshoot certain issues with an S3 IP Endpoint.

*Please note that the **Enable G722** option on the **SIP** tab must be unchecked to use USB troubleshooting.*

- Plug the USB cable into a PC and into the S3 IP Endpoint
- Use the Windows Device Manager to determine the PORT that was assigned by Windows (it will enumerate as a COM port called GPS DATA LOGGER)
- Use a terminal emulation program (many free options are available such as TeraTerm) on the PC using the following options:
  - BPS of 115200
  - Data Bits of 8
  - Parity of None
  - Stop Bits of 1
  - No Flow Control
- For some terminal emulators, the USB cable will need to be disconnected and reconnected before the data will appear
- Follow the instructions provided by Digital Acoustics Technical Support



```
COM5 - Tera Term VT
File Edit Setup Control Window Help
Digital Acoustics IP7 v7.4.1.14 Configuration TMEE/eSIP
Compiled on Jan 24 2020 at 13:11:43 Board Type is IP7-FD
MAC Address 00:1b:61:04:b4:d6 Name BTM IP7-EDB-FD 04:b4:d6
TMEE Status Trying Main Server 02 SIP Status Disconnected
Wireless Status Not Enabled

Last Command <120>RemoteCmd Idle
Data = 0 Mode=NA
0:00:00:00
=====
Main > □
```