

# DIGITAL ACOUSTICS

## **IP7™-ST/STx** **IP Intercom and Analog Call Station** **Reference Manual**



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## Overview

The Digital Acoustics IP7-ST is an IP (Internet Protocol) based Intercom that provides the functional audio equivalent of the basic "push to talk" intercom. Simply connect the unit to an analog call station and a 10/100 Ethernet switch, configure its IP address information and communicate to a host server PC by voice.

Standard features include:

- Supports the following types of analog call stations:
  - Single Transducer (speaker also used as a mic)
  - Aiphone 2-wire products (IE and IF series)
  - Separate mic and speaker
- Talk to/from an IP7-ST to host PC server
- High quality, clear transmit and playback audio
- Hands-free operation at analog call station
- Highly scalable and seamless expansion
- Static or DHCP compliant IP assignment
- PoE (802.3af) standard
- Auto sensing external power from 9VDC to 32VDC
- Integrated 2-port switch option available
- Field upgradeable OS using internal Flash memory
- DIN rail or surface mount



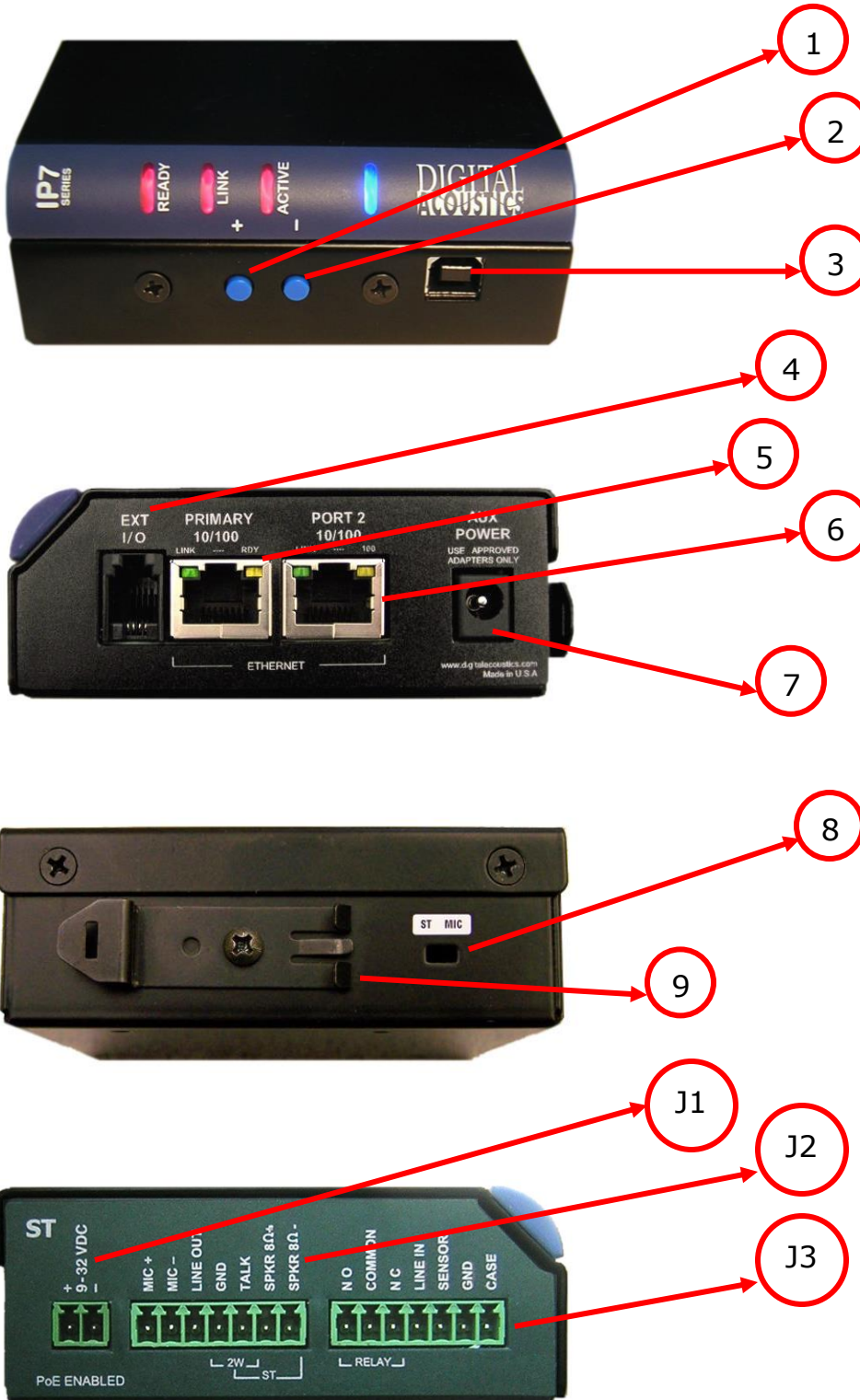
The IP7-STx has the same capabilities as the IP7-ST and includes a 2-port Ethernet switch which enables another IP device to be connected using a single network drop.

The IP7-ST must be configured using the TalkMaster™ software before being used. Please consult the configuration section of the software manual for details.

## Specifications

Items	Specifications
Hardware Protocols	TCP, UDP, SIP, RTP, ICMP, IGMP Multicast
Network Interface	10/100 Ethernet (Auto detection, Auto MDIX)
Command protocols	Proprietary
Audio Rate	64kbs
Audio Resolution	G.711 (8-bit PCM and 16-bit uLaw)
Audio Sample Rate	8K (Voice band), 22K (Background Music)
Audio Frequency	90-4kHz (Voice band) , 90-11khz (Background Music)
Internal Amplifier	1 Watt @ 8 Ohms
Humidity	10~90%
Power	Auto Sensing External Power 9VDC-32VDC DC @ 5 watts
	PoE (802.3af) Requires 7 watts from PSE
Size	3.85. x 3.59 x 1.37 in 98 mm x 91mm x 35mm

# IP7-ST Layout



## Connections and Controls

Refer to the preceding pictures for the Connector number.

Connector	Connector / Control	Notes
1	+ Button	Volume up button
2	- Button	Volume down button
3	USB-B	Provides for low level firmware flashing as well as viewing technical support information. Will also power the unit for diagnostic purposes.
4	Ext I/O	I2C expansion bus interface that can be used for custom applications. Requires custom firmware from Digital Acoustics
5	Ethernet 10/100	10/100 Ethernet network interface. Supports auto negotiation and auto-MDIX.
6	Port 2 10/100	Port-2 is available on the IP7_STx. Provides a 10/100 Ethernet network connection for another device. Supports auto negotiation and auto-MDIX
7	Aux Power	2.1mm connector with center tip positive. Auto sensing from 9VDC to 32VDC @ 5 watts. Overrides PoE power <b>Warning:</b> Connecting power to both the 2.1mm Power jack and the J1-1 and J1-2 power connectors at the same time will damage the unit
8	ST-MIC	Use a pencil tip to move the recessed switch to the <b>ST</b> position (towards the DIN clip) when using a single transducer (speaker also used as a microphone). Move the switch to the <b>MIC</b> position (towards the edge of the case) for the Aiphone IE or IF series 2-wire intercoms or an external microphone.
9	DIN Rail Mounting Clip	Allows unit to be snapped on to standard 35mm DIN Rail stock

There are three sets of pluggable DIN connectors (3.81mm centers):

### J1 Connector

Connector	Signal	Notes
J1-1	Power +	Auto sensing from 9VDC to 32VDC @ 5 watts. Polarity independent. Overrides PoE power. <b>Warning:</b> Connecting power to both the <b>Aux Power</b> 2.1mm power jack and the J1-1 and J1-2 power connectors at the same time will damage the unit
J1-2	Power -	

### J2 Connector

Connector	Signal	Notes
J2-1	MIC +	Pseudo differential (Actively Balanced differential).
J2-2	MIC -	
J2-3	LINE OUT	-10db with a 10k termination. Capable of driving head phones. Reference to J2-4
J2-4	GND	System Ground. Same as J3-6
J2-5	TALK	Talk or Call button. Initiates a call to the configured Server. Reference to J2-4
J2-6	SPKR 8Ω+	Speaker Output. Floated differential. Able to drive an 8 Ohm load @ 1 watt or a 600 Ohm signal
J2-7	SPKR 8Ω-	

### J3 Connector

Connector	Signal	Notes
J3-1	NO	Isolated Dry Contact Relay output. Connect J3-2 and either J3-1 for NO (Normally Open) or J3-3 for NC (Normally Closed)
J3-2	COMMON	
J3-3	NC	
J3-4	LINE IN	Unbalanced. Reference to ground
J3-5	SENSOR	Door Sensor. Active when closed to ground or Active when open to ground. Reference to J3-6
J3-6	GND	System Ground. Same as J2-4
J3-7	CASE	Optional connection to earth ground



## LED Indicators

### *Intercom LEDs*

There are four LEDs present on the curved bezel on the front of the product.

- The blue LED indicates that the IP7-ST has powered up.
- The three red LEDs indicate status of the unit.

LED	Description
Ready	Indicates whether the unit has connected to a Server
Link	Indicates whether the unit has a valid network Connection
Active	Indicates whether audio is being transmitted or received

### *LED Status Table*

Description	Ready	Link	Activity
Normal operational mode. Intercom can communicate with its Server	On	On	Off
Playing Audio	On	On	Flashing
Playing Broadcast Audio	Fast Flash	On	Flashing
Sending Audio	On	On	On
Attempting to connect to Server IP or unit has not been configured	Slow Flash	On	Off
LAN connection is inactive. The RJ45 may be unplugged	Slow Flash	Off	Off
Unit has been detected by the Intercom Configuration Tool	Fast Flash	On	Off

### *LAN Connector LEDs*

On the **Ethernet 10/100** RJ-45 connector:

- The Green LED tracks to the **Ready** LED
- The Yellow LED tracks to the **Link** LED

On the optional **Port 2 10/100** RJ-45 connector:

- The Green LED tracks to network transmit activity
- The Yellow LED tracks to network receive activity

## Connecting to an Ethernet Network

### *1-Port Model*

The **Ethernet 10/100** connector allows the unit to be attached to a standard Ethernet 10/100 network.

- Plug a Cat5 cable into the RJ-45 connector labeled **Ethernet 10/100** and connect the other end to a 10/100 switch
- The **Ethernet 10/100** connector supports auto “MDIX” and can be plugged directly into a PC for diagnostic purposes

### *2-Port Model*

The optional **Port 2 10/100** allows an additional IP device to be connected to the network without the need for an additional network drop. The second port is not PoE capable.

- Plug a Cat5 cable into the RJ-45 connector labeled **Ethernet 10/100** and connect the other end to a 10/100 switch
- To connect a second IP device to the network, plug a Cat5 cable in the RJ-45 connector labeled **Port 2 10/100**

## Connecting Power

The IP7-ST auto senses both the power source and current. An external power source will always override PoE power.

### *PoE*

Plug a Cat5 cable from an 802.3af compliant switch or injector into the **Ethernet 10/100** connector. 7 watts will be requested from PoE (802.3af compatible) Power Source Equipment (PSE).

### *External Power*

- The 2.1mm Power Jack (center tip positive) accepts 9VDC to 32VDC
- The J1-1 / J1-2 connector will accept 9VDC to 32VDC. Polarity is automatically sensed
- **DO NOT** supply power to both the 2.1mm Power Jack and the J1-1 and J1-2 power connectors

### *USB Power*

The USB connector can be used to power up the unit for diagnostics or low level firmware flashing. Plug a USB cable from a PC into the USB-B connector. The unit will power up and can connect to the network, but will not be able to be used for audio operations.

## Connecting an Analog Call Station

The IP7-ST can support a variety of door stations or microphones and speakers. When wiring microphone connections, use a shielded twisted multi-conductor such as Belden 9462 or for long runs Belden 5301.

Here are some typical configurations that can be used.

### Single Transducer Door Station

The IP7-ST can connect to a Single Transducer (talkback speaker) for use as both a speaker and a microphone. Maximum distance between the IP7 and the Single Transducer should not exceed 1000' or 300 meters.



To connect the Aiphone LE or LS Series Door Station:

- Set the **ST-MIC** switch to the **ST** position
- Remove Aiphone shorting link between E and - terminals
- Connect J2-6 and J2-7 to Aiphone terminals 1 and E (polarity independent)
- Connect J2-5 to Aiphone - terminal
- Connect J2-4 to the shield and do not connect the other end
- Connect power to the IP7 unit

To connect the Quam CISx or other single transducer speakers:

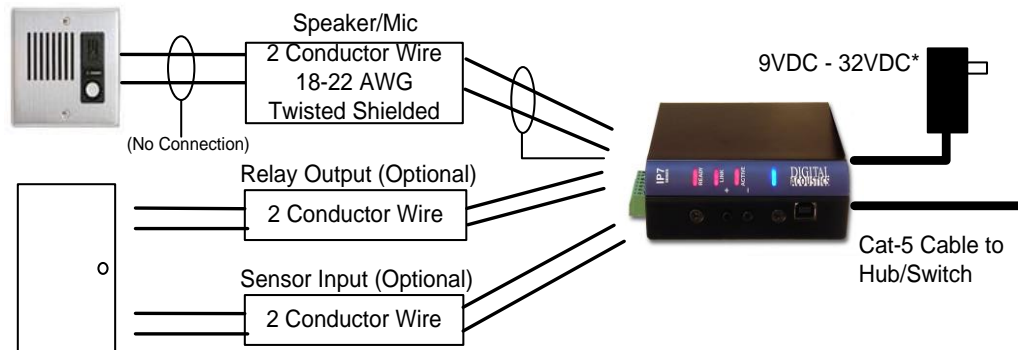
- Set the **ST-MIC** switch to the **ST** position
- Connect J2-6 and J2-7 to the Speaker terminals (polarity independent)
- Optionally connect J2-5 to the Call Button
- The other side of the Call Button must be jumpered to either one of the speaker terminals
- Connect power to the unit
- Connect J2-4 to the shield and do not connect the other end

## **Aiphone 2-Wire Door Station**

The IP7-ST can support the Aiphone IE and IF series Door Stations and their proprietary 2-wire interface. Maximum distance between the IP7 and the 2-Wire Door Station should not exceed 1300' or 400 meters.

### **2-Wire Installation**

Aiphone IE and IF Series



To connect the Aiphone IE and IF series

- Set the **ST-Mic** switch to the **Mic** position
- Connect J2-4 and J2-5 to Aiphone terminals 1 and 2 (polarity independent)
- Connect J2-4 to the shield and do not connect the other end

### **Connecting a Separate Mic and Speaker**

The IP7-ST can also be connected to call stations using a separate microphone and speaker. When wiring microphone connections, use a shielded, twisted multi-conductor such as Belden 9462, or for long runs, Belden 5301.

#### **MIC + and MIC -**

The IP7-ST can accept electret or dynamic microphones. A speaker can also be used as a microphone.

#### **To connect an Electret Microphone:**

- Set the **ST-MIC** switch to the **MIC** position
- Connect J2-1 to the MIC + lead of the Electret Mic
- Connect J2-2 to the MIC - lead of the Electret Mic
- Connect a jumper between J2-2 and the J2-4 Ground

#### **To connect a Dynamic Microphone:**

- Set the **ST-MIC** switch to the **MIC** position
- Connect J2-1 to the MIC + lead of the Dynamic Mic
- Connect J2-2 to the MIC - lead of the Dynamic Mic
- Connect J2-4 to the ground of the Dynamic Mic

### **SPKR 8Ω+ and SPKR 8Ω-**

The Speaker connectors are designed to drive an 8 Ohm speaker. They are also designed to drive a **balanced** 600 Ohm signal, suitable for connection to professional audio amplifiers.

- Connect J2-6 and J2-7 to the speaker or amplifier (polarity independent)
- Set the IP7-STx volume level to 6 and use the amplifiers volume control to set the desired volume



Do not connect the IP7's SPKR 8Ω+ and SPKR 8Ω- connectors to an **unbalanced** input or to ground. Doing so **will damage the IP7 and void its warranty**. Refer to the IP7's Line Out for connection to an unbalanced signal.

### **Talk**

The **Talk** connector is used to initiate a call and send audio. Once a call has been initiated to the Server, **Talk** is normally software controlled by the Server.

- Connect J2-5 and J2-6 to a normally open button or contact

## **Connecting Line Out or Line In**

### **Line Out**

The **Line Out** connector is designed to drive an **unbalanced** load at -10db. This is capable of driving headphones or a multimedia speaker.

- Connect J2-3 to the + side of the output source
- Connect J2-4 to the - side of the output source
- Cable length should not exceed 6ft (2 meters)
- Use 22 awg shielded/stranded cable

### **Line In**

The **Line In** connector provides a standard unbalanced signal. The Intercom must be set to enable Line In instead of the Microphone via the software configuration software.

- Ensure **Line In** has been enabled in the Intercom's Software Configuration program
- Connect J3-4 to the + side of the input source
- Connect J3-6 to the - side of the input source

## Connecting the Relay

The **Relay** connector provides a dry contact output from the IP7-ST/STx suitable for activating equipment such as electronic door strikes, strobe lights or CCTV cameras. Normally Open (N/O) or Normally Closed (N/C) can be chosen. The **Relay** is rated at 250 VAC / 30VDC @ 60W / 1500 VAC Isolation.

- J3-1 is N/O
- J3-2 is Common
- J3-3 is N/C
- Ensure Relay has been properly configured in the Intercom's Software Configuration program

## Connecting the Sensor

The IP7-ST supports an input **Sensor** that can be used for a variety of applications. The Sensor can be defined as Active Closed or Active Open via software. Digital Acoustics' TalkMaster Software provides functionality for monitoring the status (open or closed) of a door via the **Sensor**.

- Connect J3-5 and J3-6 to a door sensor or device that can provide a contact closure
- Ensure **Sensor** has been configured to be Active Closed (Sensor closed to Ground) or Active Open (Sensor open to ground) in the Intercom's Software Configuration program

## Connecting an I2C Bus

The IP7-ST can support an optional I2C bus via the RJ-10 connector. Buttons, relays and LEDs can be added to the I2C bus, BUT REQUIRE CUSTOM FIRMWARE AND SOFTWARE. Please contact Digital Acoustics for additional information.

## Mounting Instructions

The IP7-ST can be installed on a DIN Rail or surface mounted.

### *DIN Rail Mounting*

To DIN rail mount the IP7-ST:

- Cut a piece of 35mm DIN rail (not supplied) to the desired length and secure it to the wall
- Place the IP7-ST onto the DIN rail by tilting the top of the unit (J1, J2, J3 connectors facing up with Volume buttons and USB-B connector facing forward) back towards the DIN Rail until the IP7-STs DIN clip catches the top of the rail
- Press in at the bottom of the IP7-ST to snap it in place

## ***Surface Mounting***

To surface mount the IP7-ST:

- Attach the detachable surface mount plate to the back of the unit using the provided screws
- Attach two (2) #8 screws two inches (52 mm) apart and screw in to within ¼" of the wall
- Place the mounting holes of the IP7-ST over the #8 screws
- Attach one (1) #8 screw to the remaining hole at the bottom of the mounting plate



## **Setting Volume Levels**

The IP7-ST supports seven volume levels for an attached speaker.

- Press the "+" or "-" Button one time to increase or decrease the speaker volume
- Pressing the "-" or "+" button seven times sets the unit at its lowest or highest setting
- Refer to the software manuals for setting the volume via software

## **Software Configuration**

### ***IP Configuration***

Refer to the software manuals for instructions on setting the IP address information for the IP7-ST

### ***Intercom Options***

Refer to the software manuals for instructions on setting the following Intercom options in the IP7-ST:

#### **Relay**

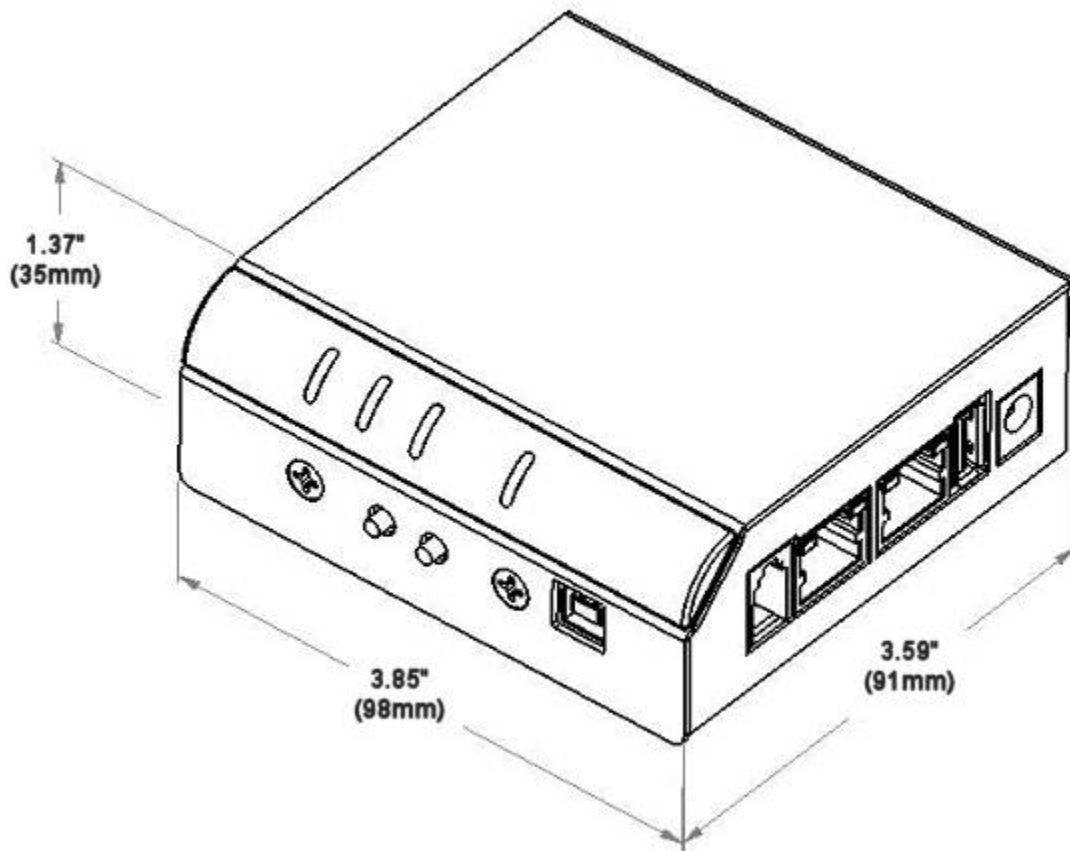
- Activate **Door Open** via Operator control from the software
- Activate when the **Talk** switch is engaged (PTT)
- Activate on Mic, Speaker, or Mic and Speaker

#### **Sensor**

- Active when closed to ground (Door)
- Active when open to ground (Door)
- Active when closed to ground (Custom)
- Active when open to ground (Custom)

## Physical Dimensions

The IP7-ST Dimensions are as follows:



## Environmental

The IP7-ST/STx is designed to operate indoors or in a weather proof box that has a NEMA4 or IP66 rating.



## **Troubleshooting**

Always refer the LED Indicator table when troubleshooting the IP7-ST.

### ***Reset to Factory Defaults***

The IP Address information and all Intercom options can be reset to factory defaults by the following procedure:

- Unplug the Power
- Press and hold the "Vol +" and "Vol -" buttons
- Power the unit
- Wait till the unit plays a 3 tone beep (about 5 seconds)
- Release the "Vol +" and "Vol -" buttons
- Refer to the software manuals for instructions on configuring the IP address information

### ***Connecting 1/8" (3.5mm) Audio Plug to the Pluggable connectors***

To connect a Mic, Line In or Line Out to the pluggable connectors via a 1/8" audio connector, the audio plug should be wired as follows:

- The Tip should be wired to positive
- The Sleeve should be wired to minus or ground
- On stereo plugs, the Ring should be left unconnected

### ***Reducing electrical noise in audio***

- Locate the unit at least one meter away from transformers, stepper motors or other noise producing equipment
- Use shielded twisted cable for audio. Connect the shield to the J2-4 or the J3-6 connector. Leave the other end of the shield "floating"
- Do not run audio cable in the same conduit with AC power
- Attached J3-7 to an earth ground

### ***Viewing tech support info via the USB port***

If requested by Digital Acoustics Support, a USB cable can be attached to the IP7-ST to capture additional information.

- Attach a USB cable to the USB-B connector on the unit.
- Attach the other end of the cable to a PC running Windows®.
- If an "Install Hardware" prompt is displayed, insert the Software CD that came with the product to install the USB Virtual Com port.
- Open the Windows Device Manager to determine the virtual Serial port that has been assigned
- Open the Windows® Hyperterm program (or similar terminal emulation program) and set the properties to select the new

- Serial port with settings of 115kbs, 8,N,1, no flow control and ANSI Terminal
- Press the Enter key
  - Provide the requested info to Digital Acoustics Tech support

### ***Low Level Flashing Utility***

If a power is removed from the unit while the firmware is being updated from the network, the unit may require a low level flash.

- Install the Low Level Flashing Utility from the original CD
- Remove the four screws (two on the front and two on the back)
- Open the case by pulling up on the side opposite the Volume buttons till the top pops off
- Connect the USB cable (this will power the unit up)
- Bend a paper clip or piece of wire and insert into the two holes indicated by the picture.
- Power cycle the unit by removing and reinserting the USB cable
- Run the Low Level Flashing Utility

### **Contacting Technical Support**

Information online at [www.digitalacoustics.com](http://www.digitalacoustics.com)

***Email support:***

[esupport@digitalacoustics.com](mailto:esupport@digitalacoustics.com)

## Regulatory Notices

### **Federal Communication Commission Class A Notice**


This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to **Part 15** of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

In compliance with FCC regulations, the following information is provided on the device or devices covered in this document.

- Product Name: IP7 Series
- Model number: SS20,Sx8,STx
- Company name: Digital Acoustics LLC  
37 Sherwood Terrace  
Lake Bluff, IL 60044  
847-604-9246

### **IC Notice (Canada Only)**

This Class A digital apparatus complies with Canadian ICES-003.  
Cet appareil numérique de la classe A est conforme à la norme **NMB-003** du Canada.

 *NOTE: Industry Canada regulations provide that changes or modifications not expressly approved by Digital Acoustics, LLC could void your authority to operate this equipment*

### **CE Notice**

Marking by the symbol **CE** indicates compliance of this equipment to the EMC (Electromagnetic Compatibility) directive of the European Community. Such marking is indicative that this equipment meets or exceeds at least an **EN 55022:2006 Class A** device

### **VCCI Compliance**

Class A

### **AS/NZS CISPR22:2006 Compliance**

Class A

### **CNS 13438 Compliance**

Class A

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[www.digitalacoustics.com](http://www.digitalacoustics.com)

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